3rd Generation Partnership Project; Technical Specification Group Radio Access Network; V16. App. (2019-12)

User Equipment (UE) conformance specification Radio Resource Management (RRM)
(Release 16)





The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP. The present document has not been subject to any approval process by the 3GPP Organizational Partners and shall not be implemented.

This Specification is provided for future development work within 3GPP only. The Organizational Partners accept no liability for any use of this Specification.

Keywords <NR, RRM, terminal, testing>

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis Valbonne - FRANCE Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

http://www.3gpp.org

Copyright Notification

No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

 $\ @$ 2019, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC). All rights reserved.

UMTSTM is a Trade Mark of ETSI registered for the benefit of its members $3GPP^{TM}$ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners LTETM is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners GSM® and the GSM logo are registered and owned by the GSM Association

Contents

Conte	nts	3
Forew	ord	16
1	Scope	17
2	References	17
3	Definitions, symbols and abbreviations	18
3.1	Definitions.	
3.1 3.2	Symbols	
3.3	Abbreviations	
٥,٥		
3A	Requirements for the support of RRM	
3A.1	General	
3A.1.1		
3A.2	Requirements Classification for Statistical Testing	23
3A.3	Antenna Configuration	23
3A.4	NR band groups	23
3A.4.1	NR operating bands in FR1	23
3A.4.2	NR operating bands in FR2	24
3A.5	NR operating band configuration	25
4	EN-DC with all NR cells in FR1	25
4.1	Void	26
4.2	Void	26
4.3	RRC_CONNECTED state mobility	26
4.3.1	Void	
4.3.2	RRC connection mobility control	
4.3.2.1		
4.3.2.2	Random access	26
4.3.2.2		
4.3.2.2	.2 Non-contention based random access test in FR1 for PSCell in EN-DC	32
4.3.2.3	Void	40
4.4	Timing	40
4.4.1	UE transmit timing	40
4.4.1.0	Minimum conformance requirements	40
4.4.1.0	.1 Minimum conformance requirements for UE transmit timing accuracy	40
4.4.1.1	EN-DC FR1 UE transmit timing accuracy	41
4.4.2	UE timer accuracy	48
4.4.3	Timing advance	48
4.4.3.0	Minimum conformance requirements	48
4.4.3.0		
4.4.3.0		
4.4.3.1		
4.5	Signaling characteristics	
4.5.1	Radio link monitoring	
4.5.1.0		
4.5.1.0		54
4.5.1.0		
4.5.1.0		55
4.5.1.0		
4.5.1.1	·	-
	RS in non-DRX mode	59
4.5.1.2		
	in non-DRX mode	65
4.5.1.3		
	RS in DRX mode	70

4.5.1.4	EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS	70
4515	in DRX mode	/6
4.5.1.5	EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based	00
4516	RLM RS in non-DRX mode	82
4.5.1.6	EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM	00
4545	RS in non-DRX mode	88
4.5.1.7	EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based	00
4 = 0	RLM RS in DRX mode	
4.5.2	Interruption	
4.5.2.0	Minimum conformance requirements	.104
4.5.2.0.1	Minimum conformance requirements for interruptions at transitions between active and non-	
	active during DRX	.104
4.5.2.0.2	Minimum conformance requirements for interruptions during measurements on deactivated	
	NR SCC	.105
4.5.2.0.3	Minimum conformance requirements for interruptions during measurements on deactivated	
	E-UTRAN SCC	.106
4.5.2.1	EN-DC FR1 interruptions at transitions between active and non-active during DRX in	
	synchronous EN-DC	.106
4.5.2.2	EN-DC FR1 interruptions at transitions between active and non-active during DRX in	
	asynchronous EN-DC	111
4.5.2.3	EN-DC FR1 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	
		116
4.5.2.4	EN-DC FR1 interruptions during measurements on deactivated NR SCC in asynchronous EN-	
	DC	.121
4.5.2.5	EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous	
	EN-DC	.126
4.5.2.6	EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous	
	EN-DC	.131
4.5.3	SCell activation and deactivation delay	
4.5.3.0	Minimum conformance requirements	
4.5.3.0.1	Minimum conformance requirements for SCell activation and deactivation delay	
4.5.3.1	EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell	
	measurement cycle	139
4.5.3.2	EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 320ms SCell	1200
	measurement cycle	.146
4.5.3.3	EN-DC FR1 SCell activation and deactivation of unknown SCell in non-DRX	
4.5.4	UE UL carrier RRC reconfiguration delay	
4.5.5	Link recovery procedures	
4.5.5.1	EN-DC FR1 SSB-based beam failure detection and link recovery in non-DRX	
4.5.5.2	EN-DC FR1 SSB-based beam failure detection and link recovery in DRX	
4.5.5.3	154	.100
4.5.5.4	EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX	15/
4.5.6	Active BWP switch delay	
4.5.6.1	DCI-based and time-based active BWP switch.	
4.5.6.1.0	Minimum conformance requirements.	
4.5.6.1.1	EN-DC FR1 DCI-based DL active BWP switch in non-DRX in synchronous EN-DC	
4.5.6.1.2	EN-DC FR1 DCI-based DL active BWP switch in hon-DRX in synchronous EN-DC FR1 DCI-based DL active BWP switch with SCell in non-DRX in synchronous EN-	.105
4.3.0.1.2	·	164
4 5 6 0	DC RRC-based active BWP switch	
4.5.6.2		
4.5.6.2.0	Minimum conformance requirements	104
4.5.6.2.1	EN-DC FR1 RRC-based DL active BWP switch in non-DRX in synchronous EN-DC	
4.5.7	PSCell addition and release delay	
4.5.7.1	EN-DC FR1 addition and release delay of known PSCell	
4.6	Measurement procedures	
4.6.1	Intra-frequency measurements	
4.6.1.0	Minimum conformance requirements	
4.6.1.0.1	Minimum conformance requirements for event-triggered reporting without gap	
4.6.1.0.2	Minimum conformance requirements for event-triggered measurements with gap	
4.6.1.1	EN-DC FR1 event-triggered reporting without gap in non-DRX	
4.6.1.2	EN-DC FR1 event-triggered reporting without gap in DRX	
4.6.1.3	EN-DC FR1 event-triggered reporting with gap in non-DRX	.180

4.6.1.4	EN-DC FR1 event-triggered reporting with gap in DRX	185
4.6.1.5	EN-DC FR1 event-triggered reporting without gap in non-DRX with SSB time index detection	
4.6.1.6	EN-DC FR1 event-triggered reporting with gap in non-DRX with SSB time index detection	
4.6.2	Inter-frequency measurements	
4.6.2.0	Minimum conformance requirements for Inter-frequency measurements	
4.6.2.1	EN-DC FR1-FR1 event-triggered reporting in non-DRX	
4.6.2.2	EN-DC FR1-FR1 event-triggered reporting in DRX	
4.6.2.3	Void	213
4.6.2.4	Void	213
4.6.2.5	EN-DC FR1-FR1 event-triggered reporting in non-DRX with SSB time index detection	213
4.6.2.6	EN-DC FR1-FR1 event-triggered reporting in DRX with SSB time index detection	
4.6.2.7	Void	225
4.6.2.8	Void	225
4.6.3	L1-RSRP measurement for beam reporting.	
4.6.3.0	Minimum conformance requirements	225
4.6.3.0.1	Minimum conformance requirements for SSB-based L1-RSRP measurement for beam reporting	225
4.6.3.0.2	· ·	
4.6.3.1	EN-DC FR1 SSB-based L1-RSRP measurement in non-DRX	
4.6.3.2	EN-DC FR1 SSB-based L1-RSRP measurement in DRX	
4.6.3.3	EN-DC FR1 CSI-RS-based L1-RSRP measurement in non-DRX	
4.6.3.4	EN-DC FR1 CSI-RS-based L1-RSRP measurement in DRX	
4.7	Measurement performance requirements	
4.7.1	SS-RSRP	
4.7.1.0	Minimum conformance requirements	
4.7.1.0.1		
4.7.1.0.2		
4.7.1.0.3		
4.7.1.0.4		
4.7.1.1	Intra-frequency measurements	
4.7.1.1.1		
4.7.1.1.2	EN-DC FR1 SS-RSRP relative measurement accuracy	253
4.7.1.2	Inter-frequency measurements	
4.7.1.2.1	EN-DC FR1-FR1 SS-RSRP absolute measurement accuracy	256
4.7.1.2.2	EN-DC FR1-FR1 SS-RSRP relative measurement accuracy	257
4.7.2	SS-RSRQ	259
4.7.2.0	Minimum conformance requirements	259
4.7.2.0.1	Intra-frequency SS-RSRQ measurement accuracy requirements	259
4.7.2.0.2	Inter-frequency SS-RSRQ measurement accuracy requirements	259
4.7.2.1	EN-DC FR1 SS-RSRQ measurement accuracy	259
4.7.2.2	EN-DC FR1-FR1 SS-RSRQ measurement accuracy	260
4.7.3	SS-SINR	261
4.7.3.1	EN-DC FR1 SS-SINR measurement accuracy	
4.7.3.2	EN-DC FR1-FR1 SS-SINR measurement accuracy	
4.7.4	L1-RSRP	
4.7.4.0	Minimum conformance requirements	
4.7.4.0.1		
4.7.4.0.2	J 1	
4.7.4.0.3	J 1	
4.7.4.0.4		
4.7.4.1	SSB based L1-RSRP measurements	
4.7.4.1.1	V	
4.7.4.1.2	J	
4.7.4.2	CSI-RS based L1-RSRP measurements	
4.7.4.2.1	J Comment of the comm	
4.7.4.2.2 5 E	EN-DC FR1 CSI-RS based L1-RSRP relative measurement accuracy	
5.1	Void	
5.2	Void	
~· -		

5.3	RRC_CONNECTED state mobility	
5.3.1	Void	
5.3.2	RRC connection mobility control	269
5.3.2.1	Void	269
5.3.2.2	Random access	269
5.3.2.3	Void	
5.4	Timing	
5.4.1	UE transmit timing	
5.4.1.0	Minimum Conformance Requirements 5.4.1.0.1 Minimum conformance requirements for UE	05
5.4.1.0	transmit timing accuracy	269
5.4.1.1	EN-DC FR2 UE transmit timing accuracy	
5.4.2	UE timer accuracy	
5.4.3	Timing advance	
5.4.3.0	Minimum conformance requirements	
5.4.3.0.1	Minimum conformance requirements for timing advance adjustment accuracy	
5.4.3.1	EN-DC FR2 timing advance adjustment accuracy	
5.5	Signaling characteristics	
5.5.1 5.5.1.0	Radio link monitoring	
0.0.	Minimum conformance requirements	
5.5.1.0.1	Minimum conformance requirements for out-of-sync SSB-based RLM	
5.5.1.0.2	Minimum conformance requirements for in-sync SSB-based RLM	
5.5.1.0.3	Minimum conformance requirements for out-of-sync CSI-RS based RLM	
5.5.1.0.4	Minimum conformance requirements for in-sync CSI-RS based RLM	288
5.5.1.1	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM	
	RS in non-DRX mode	291
5.5.1.2	EN-DC FR2 Radio Link Monitoring In-sync Test for FR2 PSCell configured with SSB-based	
	RLM RS in non-DRX mode	297
5.5.1.3	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM	
	RS in DRX mode	302
5.5.1.4	EN-DC FR2 Radio Link Monitoring In-sync Test for FR2 PSCell configured with SSB-based	
	RLM RS in DRX mode	308
5.5.1.5	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based	
	RLM RS in non-DRX mode	313
5.5.1.6	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM	
	RS in non-DRX mode	318
5.5.1.7	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based	
	RLM RS in DRX mode	323
5.5.2	Interruption	334
5.5.2.0	Minimum conformance requirements	334
5.5.2.0.1	Minimum conformance requirements for interruptions at transitions between active and non-	
	active during DRX	334
5.5.2.0.2	Minimum conformance requirements for interruptions during measurements on deactivated	
	NR SCC	335
5.5.2.0.3	Minimum conformance requirements for interruptions during measurements on deactivated	
	E-UTRAN SCC	336
5.5.2.1	EN-DC FR2 interruptions at transitions between active and non-active during DRX in	
0.0.2.1	synchronous EN-DC	336
5.5.2.2	EN-DC FR2 interruptions at transitions between active and non-active during DRX in	
0.0.2.2	asynchronous EN-DCasynchronous EN-DC	2/1
5.5.2.3	EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	541
3.3.2.3	EN-DC FR2 interruptions during measurements on deactivated fix SCC in synchronous EN-DC	245
E E D 4		343
5.5.2.4	EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-	240
	DC	349
5.5.2.5	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous	o = 4
F F 2 2	EN-DC.	354
5.5.2.6	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous	<u></u>
	EN-DC	
5.5.3	SCell activation and deactivation delay	
5.5.3.1	EN-DC FR2 SCell activation and deactivation intra-band in non-DRX	
5.5.4	UE UL carrier RRC reconfiguration delay	
5.5.5	Link recovery procedures	368

5.5.5.0	Minimum conformance requirements	368
5.5.5.0.1	Minimum conformance requirements for SSB-based BFD and link recovery procedures	368
5.5.5.0.2	Minimum conformance requirements for CSI-RS-based BFD and link recovery procedures	
		371
5.5.5.1	EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX	374
5.5.5.2	EN-DC FR2 SSB-based beam failure detection and link recovery in DRX	379
5.5.5.3	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX	384
5.5.5.4	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX	
5.5.6	Active BWP switch delay	
5.5.6.1	DCI-based and time-based active BWP switch	
5.5.6.1.0	Minimum conformance requirements	
5.5.6.1.1	EN-DC FR2 DCI-based DL active BWP switch in non-DRX in synchronous EN-DC	
5.5.6.1.2	EN-DC FR2 DCI-based DL active BWP switch with SCell in non-DRX in synchronous EN-	
	DC	396
5.5.6.2	RRC-based active BWP switch	
5.5.6.2.0	Minimum conformance requirements	
5.5.6.2.1	EN-DC FR2 RRC-based DL active BWP switch in non-DRX in synchronous EN-DC	
5.6	Measurement procedures.	
5.6.1	Intra-frequency measurements	
5.6.1.0	Minimum conformance requirements	
5.6.1.0.1	Minimum conformance requirements for event-triggered measurement without gap	
5.6.1.0.2	Minimum conformance requirements for event-triggered measurement with gap	
5.6.1.1	EN-DC FR2 event-triggered reporting without gap in non-DRX	
5.6.1.2	EN-DC FR2 event-triggered reporting without gap in DRX	
5.6.1.3	EN-DC FR2 event-triggered reporting with gap in non-DRX	
5.6.1.4	EN-DC FR2 event-triggered reporting with gap in DRX	
5.6.2	Inter-frequency measurements	
5.6.2.0	Minimum conformance requirements for Inter-frequency measurements	
5.6.2.1	EN-DC FR2-FR2 event-triggered reporting in non-DRX	
5.6.2.2	EN-DC FR2-FR2 event-triggered reporting in DRX	
5.6.2.3	EN-DC FR2-FR2 event-triggered reporting in non-DRX with SSB time index detection	
	EN-DC FR2-FR2 event-triggered reporting in DRX with SSB time index detection	
5.6.2.4		
5.6.2.5 5.6.2.6	EN-DC FR1-FR2 event-triggered reporting in non-DRX.	
5.6.2.7	EN-DC FR1-FR2 event-triggered reporting in DRX	
	EN-DC FR1-FR2 event-triggered reporting in non-DRX with SSB time index detection	
5.6.2.8	EN-DC FR1-FR2 event-triggered reporting in DRX with SSB time index detection	
5.6.3	L1-RSRP measurement for beam reporting.	
5.6.3.0	Minimum conformance requirements	4/0
5.6.3.0.1	Minimum conformance requirements for SSB-based L1-RSRP measurement for beam	470
5 6 3 6 3	reporting	4/0
5.6.3.0.2	Minimum conformance requirements for CSI-RS-based L1-RSRP measurement for beam	
	reporting	
5.6.3.1	EN-DC FR2 SSB-based L1-RSRP measurement in non-DRX.	
5.6.3.2	EN-DC FR2 SSB-based L1-RSRP measurement in non-DRX	
5.6.3.3	EN-DC FR2 CSI-RS-based L1-RSRP measurement in non-DRX	
5.6.3.4	EN-DC FR2 CSI-RS-based L1-RSRP measurement in DRX	
5.7	Measurement performance requirements	
5.7.1	SS-RSRP	
5.7.1.1	Intra-frequency measurements	
5.7.1.2	Inter-frequency measurements	
5.7.2	SS-RSRQ	
5.7.3	SS-SINR	480
6 N	R standalone in FR1	490
6.1	RRC_IDLE state mobility	
6.1.1	NR cell re-selection	
6.1.1.0	Minimum conformance requirements	
6.1.1.0.1	Minimum conformance requirements for intra-frequency cell re-selection	
6.1.1.0.2	Minimum conformance requirements for inter-frequency cell re-selection	
6.1.1.1	NR SA FR1 cell re-selection	
6.1.1.2	NR SA FR1-FR1 cell re-selection.	
6.1.2	NR – E-UTRA cell re-selection	493

6.1.2.0	Minimum conformance requirements	
6.1.2.0.1	Minimum conformance requirements for NR – E-UTRA cell re-selection	
6.1.2.1	NR SA FR1 – E-UTRA cell re-selection to higher priority E-UTRA	
6.1.2.2	NR SA FR1 – E-UTRA cell re-selection to lower priority E-UTRA	499
6.2	RRC_INACTIVE state mobility	504
6.3	RRC_CONNECTED state mobility	504
6.3.1	Handover	
6.3.1.0	Minimum conformance requirements	
6.3.1.0.1	Minimum conformance requirements for NR – E-UTRAN handover	
6.3.1.0.2	Minimum conformance requirements for NR FR1 – NR FR1 handover	
6.3.1.1	NR SA FR1 handover with known target cell	
6.3.1.2	NR SA FR1 handover with unknown target cell	
6.3.1.3	NR SA FR1-FR1 handover with unknown target cell	
6.3.1.4	NR SA FR1 – E-UTRA handover with known target cell	
6.3.1.5	NR SA FR1 – E-UTRA handover with unknown target cell	
6.3.2	RRC connection mobility control	
6.3.2.1	RRC re-establishment	
6.3.2.1.0	Minimum conformance requirements	
6.3.2.1.1	NR SA FR1 RRC re-establishment.	
6.3.2.1.2	NR SA FR1 - FR1 RRC re-establishment	
6.3.2.2	Random access	
6.3.2.2.0	Minimum conformance requirements	
6.3.2.2.1		
	Contention based random access test in FR1 for NR standalone	
6.3.2.2.2	Non-Contention based random access test in FR1 for NR standalone	
6.3.2.3	RRC connection release with redirection	
6.3.2.3.0	Minimum conformance requirements	
6.3.2.3.1	NR SA FR1 RRC connection release with redirection	
6.3.2.3.2	NR SA FR1 – E-UTRA RRC connection release with redirection	
6.4	Timing	
6.4.1	UE transmit timing	
6.4.1.0	Minimum conformance requirements	
6.4.1.0	Minimum conformance requirements	
6.4.1.1	NR SA FR1 UE transmit timing accuracy	
6.4.2	UE timer accuracy	
6.4.3	Timing advance	
6.4.3.0	Minimum conformance requirement	
6.4.3.0.1	Minimum conformance requirement for timing advance adjustment	
6.4.3.1	NR SA FR1 timing advance adjustment accuracy	
6.5	Signaling characteristics	
6.5.1	Radio link monitoring	
6.5.1.0	Minimum conformance requirements	
6.5.1.0.1	Minimum conformance requirements for out-of-sync SSB-based RLM	
6.5.1.0.2	Minimum conformance requirements for in-sync SSB-based RLM	581
6.5.1.0.3	Minimum conformance requirements for out-of-sync and in-sync CSI-RS based RLM	583
6.5.1.1	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM	
	RS in non-DRX mode	584
6.5.1.2	NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in	
	non-DRX mode	590
6.5.1.3	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM	
	RS in DRX mode	596
6.5.1.4	NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in	
	DRX mode	602
6.5.1.5	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based	
0.5.1.5	RLM RS in non-DRX mode	608
6.5.1.6	NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS	
0.0.1.0	in non-DRX mode	613
6.5.1.7	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based	
0.3.1./	RLM RS in DRX mode	619
6.5.1.8	NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS	010
0.5.1.0	· · · · · · · · · · · · · · · · · · ·	623
6.5.2	in DRX mode	
0.5.4	Interruption	025

6.5.2.1	NR SA FR1 interruptions during measurements on deactivated NR SCC	
6.5.3	SCell activation and deactivation delay	
6.5.4	UE UL carrier RRC reconfiguration delay	634
6.5.4.0	Minimum conformance requirements	634
6.5.4.0.1	Minimum conformance requirements for UL carrier RRC reconfiguration delay	634
6.5.4.1	NR SA FR1 UE UL carrier RRC reconfiguration delay	635
6.5.5	Link recovery procedures	
6.5.5.0	Minimum conformance requirements	
6.5.5.0.1	Minimum conformance requirements for SSB-based BFD and link recovery procedures	
6.5.5.0.2	Minimum conformance requirements for CSI-RS-based BFD and link recovery procedures	
		644
6.5.5.3	NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX	
6.5.5.4	NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX	
6.5.6	Active BWP switch delay	
6.5.6.1	DCI-based and time-based active BWP switch	
6.5.6.1.0	Minimum conformance requirements	
6.5.6.1.1	NR SA FR1 DCI-based DL active BWP switch in non-DRX	
6.5.6.2	RRC-based active BWP switch	
6.5.6.2.0	Minimum conformance requirements	
6.5.6.2.1	NR SA FR1 RRC-based DL active BWP switch in non-DRX	
6.6	Measurement procedures	
6.6.1	Intra-frequency measurements.	
6.6.1.0	Minimum conformance requirements.	
6.6.1.0.1	Minimum conformance requirements for event-triggered measurement without gap	
6.6.1.0.2	Minimum conformance requirements for event-triggered measurement with gap	
6.6.1.0.3	Minimum conformance requirements for event-triggered measurement with gap Minimum conformance requirements for event-triggered measurement without gap with SSB	
0.0.1.0.3	index readingindex reading	
66104	Minimum conformance requirements for event-triggered measurement with gap with SSB	002
6.6.1.0.4		CC
6611	index reading	
6.6.1.1 6.6.1.2		
	NR SA FR1 event-triggered reporting without gap in DRX	
6.6.1.3	NR SA FR1 event-triggered reporting with gap in non-DRX	
6.6.1.4	NR SA FR1 event-triggered reporting with gap in DRX	
6.6.1.5	NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading	
6.6.1.6	NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading	
6.6.2	Inter-frequency measurements	
6.6.2.0	Minimum conformance requirements for Inter-frequency measurements	
6.6.2.1	NR SA FR1-FR1 event-triggered reporting in non-DRX	
6.6.2.2	NR SA FR1-FR1 event-triggered reporting in DRX	
6.6.2.3	Void	
6.6.2.4	Void	
6.6.2.5	NR SA FR1-FR1 event-triggered reporting in non-DRX with SSB time index detection	
6.6.2.6	NR SA FR1-FR1 event-triggered reporting in DRX with SSB time index detection	
6.6.2.7	Void	
6.6.2.8	Void	
6.6.3	Inter-RAT Measurements	
6.6.3.0	Minimum conformance requirements	713
6.6.3.0.1	Minimum conformance requirements for inter-RAT event triggered reporting to E-UTRAN	
	FDD	713
6.6.3.0.2	Minimum conformance requirements for inter-RAT event triggered reporting to E-UTRAN	
	TDD	
6.6.3.1	NR SA FR1 – E-UTRAN event-triggered reporting in non-DRX	
6.6.3.2	NR SA FR1 – E-UTRAN event-triggered reporting in DRX	
6.6.4	L1-RSRP measurement for beam reporting	729
6.6.4.0	Minimum conformance requirements	
6.6.4.1	NR SA FR1 SSB-based L1-RSRP measurement in non-DRX	729
6.6.4.2	NR SA FR1 SSB-based L1-RSRP measurement in DRX	732
6.6.4.3	NR SA FR1 CSI-RS-based L1-RSRP measurement in non-DRX	735
6.6.4.4	NR SA FR1 CSI-RS-based L1-RSRP measurement in DRX	738
6.7	Measurement performance requirements	
6.7.1	SS-RSRP	

6.7.1.0	Minimum conformance requirements	
6.7.1.0.1	Intra-frequency absolute SS-RSRP measurement accuracy requirements	
6.7.1.0.2	Intra-frequency relative SS-RSRP measurement accuracy requirements	741
6.7.1.0.3	Inter-frequency absolute SS-RSRP measurement accuracy requirements	741
6.7.1.0.4	Inter-frequency relative SS-RSRP measurement accuracy requirements	741
6.7.1.1	Intra-frequency measurements	741
6.7.1.1.1	NR SA FR1 SS-RSRP absolute measurement accuracy	741
6.7.1.1.2	NR SA FR1 SS-RSRP relative measurement accuracy	747
6.7.1.2	Inter-frequency measurements	750
6.7.1.2.1	NR SA FR1-FR1 SS-RSRP absolute measurement accuracy	
6.7.1.2.2	NR SA FR1-FR1 SS-RSRP relative measurement accuracy	
6.7.2	SS-RSRQ	
6.7.2.0	Minimum conformance requirements	
6.7.2.0.1	Intra-frequency SS-RSRQ measurement accuracy requirements	
6.7.2.0.2	Inter-frequency SS-RSRQ measurement accuracy requirements	
6.7.2.1	NR SA FR1 SS-RSRQ measurement accuracy	
6.7.2.2	NR SA FR1-FR1 SS-RSRQ measurement accuracy	
6.7.3	SS-SINR	
6.7.3.1	NR SA FR1 SS-SINR measurement accuracy	
6.7.3.2	NR SA FR1-FR1 SS-SINR measurement accuracy	
6.7.4	L1-RSRP	
6.7.4.0		
6.7.4.0	Minimum conformance requirements	
	SSB based absolute L1-RSRP measurement accuracy requirements	
6.7.4.0.2	SSB based relative L1-RSRP measurement accuracy requirements	
6.7.4.0.3	CSI-RS based absolute L1-RSRP measurement accuracy requirements	
6.7.4.0.4	CSI-RS based relative L1-RSRP measurement accuracy requirements	
6.7.4.1	SSB based L1-RSRP measurements	
6.7.4.1.1	NR SA FR1 SSB based L1-RSRP absolute measurement accuracy	
6.7.4.1.2	NR SA FR1 SSB based L1-RSRP relative measurement accuracy	
6.7.4.2	CSI-RS based L1-RSRP measurements	
6.7.4.2.1	NR SA FR1 CSI-RS based L1-RSRP absolute measurement accuracy	
6.7.4.2.2	NR SA FR1 CSI-RS based L1-RSRP relative measurement accuracy	761
7 NI	R standalone with at least one NR cell in FR2	762
7.1	RRC_IDLE state mobility	
7.1 7.1.1	NR cell re-selection	
7.1.1 7.1.1.0		
	Minimum conformance requirements	
7.1.1.0.1	Minimum conformance requirements for intra-frequency cell re-selection	
7.1.1.0.2	Minimum conformance requirements for inter-frequency cell re-selection	
7.1.1.1	NR SA FR2 cell re-selection	
7.1.1.2	NR SA FR2-FR2 cell re-selection.	
7.2	RRC_INACTIVE state mobility	
7.3	RRC_CONNECTED state mobility	
7.3.1	Handover	
7.3.2	RRC connection mobility control.	
7.3.2.1	RRC re-establishment	
7.3.2.1.0	Minimum conformance requirements	
7.3.2.1.1	NR SA FR2 RRC re-establishment	
7.3.2.1.2	NR SA FR2 - FR2 RRC re-establishment	779
7.3.2.2	Random access	783
7.3.2.3	RRC connection release with redirection	783
7.4	Timing	783
7.4.1	UE transmit timing	
7.4.2	UE timer accuracy	
7.4.3	Timing advance	
7.5	Signalling characteristics	
7.5.1	Radio link monitoring	
7.5.2	Interruption	
7.5.2	SCell activation and deactivation delay	
7.5.4	UE UL carrier RRC reconfiguration delay	
7.5. 4 7.5.5	Link recovery procedures	
	Minimum conformance requirements	
7.5.5.0		

7.5.5.0.1	Minimum conformance requirements for SSB-based BFD and link recovery procedures	783
7.5.5.0.2	Minimum conformance requirements for CSI-RS-based BFD and link recovery procedures	
		785
7.5.5.1	NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX	787
7.5.5.2	NR SA FR2 SSB-based beam failure detection and link recovery in DRX	793
7.5.5.3	NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX	799
7.5.5.4	NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX	805
7.5.6	Active BWP switch delay	
7.5.6.1	DCI-based and time-based active BWP switch	811
7.5.6.1.0	Minimum conformance requirements	
7.5.6.1.1	NR SA FR2 DCI-based DL active BWP switch in non-DRX	
7.5.6.1.2	NR SA FR1-FR2 DCI-based DL active BWP switch in non-DRX	
7.5.6.2	RRC-based active BWP switch	
7.5.6.2.0	Minimum conformance requirements	
7.5.6.2.1	NR SA FR2 RRC-based DL active BWP switch in non-DRX	
7.6	Measurement procedures	813
7.6.1	Intra-frequency measurements	813
7.6.1.0	Minimum conformance requirements	
7.6.1.0.1	Minimum conformance requirements for event-triggered measurement without gap	
7.6.1.0.2	Minimum conformance requirements for event-triggered measurement with gap	
7.6.1.1	NR SA FR2 event-triggered reporting without gap in non-DRX	
7.6.1.2	NR SA FR2 event-triggered reporting without gap in DRX	
7.6.1.3	NR SA FR2 event-triggered reporting with gap in non-DRX	
7.6.1.4	NR SA FR2 event-triggered reporting with gap in DRX	
7.6.2	Inter-frequency measurements	
7.6.2.0	Minimum conformance requirements for Inter-frequency measurements	
7.6.2.1	NR SA FR2-FR2 event-triggered reporting in non-DRX	
7.6.2.2	NR SA FR2-FR2 event-triggered reporting in DRX	
7.6.2.3	NR SA FR2-FR2 event-triggered reporting in non-DRX with SSB time index detection	
7.6.2.4	NR SA FR2-FR2 event-triggered reporting in DRX with SSB time index detection	
7.6.2.5	NR SA FR1-FR2 event-triggered reporting in non-DRX	
7.6.2.6	NR SA FR1-FR2 event-triggered reporting in DRX	
7.6.2.7	NR SA FR1-FR2 event-triggered reporting in non-DRX with SSB time index detection	
7.6.2.8	NR SA FR1-FR2 event-triggered reporting in DRX with SSB time index detection	
7.6.3	L1-RSRP measurement for beam reporting	
7.6.3.0	Minimum conformance requirements for L1-RSRP measurement for beam reporting	
7.6.3.1	NR SA FR2 SSB-based L1-RSRP measurement in non-DRX	
7.6.3.2	NR SA FR2 SSB-based L1-RSRP measurement in DRX	
7.6.3.3	NR SA FR2 CSI-RS-based L1-RSRP measurement in non-DRX	
7.6.3.4	NR SA FR2 CSI-RS-based L1-RSRP measurement in DRX	
7.7	Measurement performance requirements	
7.7.1	SS-RSRP	
7.7.1.1 7.7.1.2	Intra-frequency measurements	
7.7.1.2	Inter-frequency measurements	
7.7.1.3 7.7.1.3.1	NR SA FR1-FR2 SS-RSRP absolute measurement accuracy	
7.7.1.3.1		
7.7.1.3.2 7.7.2	NR SA FR1-FR2 SS-RSRP relative measurement accuracy	
7.7.2	SS-SINR	
8.2.1.0	Minimum conformance requirements	
8.2.1.0.1	Minimum conformance requirements for E-UTRA-NR FR1 inter-RAT cell reselection	
8.2.1.1	E-UTRA – NR FR1 cell re-selection to higher priority NR target cell	
8.3.1.0	Minimum conformance requirements	
8.3.1.0.1	Minimum conformance requirements for E-UTRA – NR FR1 handover	
8.3.1.1	E-UTRA – NR FR1 handover with known target cell	
8.4.1.0	Minimum conformance requirements	
8.4.1.0.1	Minimum conformance requirements for E-UTRA – NR FR1 SFTD measurement delay	
8.4.1.1	E-UTRA – NR FR1 SFTD measurement delay in non-DRX	
8.4.1.2	E-UTRA – NR FR1 SFTD measurement delay in DRX	
8.4.2.0	Minimum conformance requirements	
0.4.2.0 8 <i>1</i> 2 0 1	Minimum conformance requirements for F-I/TRA – NR event-triggered measurement	

8.4.2.0.2 Void	
8.4.2.1 E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX	
8.4.2.2 E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX	
8.4.2.3 E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX	
8.4.2.4 E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX	
8.4.2.5 E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in non-DRX	952
8.4.2.6 E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in DRX	956
8.4.2.7 E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in non-DRX	960
8.4.2.8 E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in DRX	963
8.5.1 SFTD measurement accuracy	
8.5.1.0 Minimum conformance requirements	
8.5.1.0.1 Intra-frequency absolute SS-RSRP measurement accuracy requirements	
8.5.1.1 E-UTRA – NR FR1 SFTD measurement accuracy	968
Annex A (normative): RRM test configurations	975
A.1 Reference measurement channels	
A.1.1 PDSCH	
A.1.1.1 FDD	
A.1.1.2 TDD	
A.1.2 CORESET for RMSI scheduling	
A.1.2.1 FDD	
A.1.2.2 TDD	
A.1.3 CORESET for RMC scheduling	
A.1.3.1 FDD	
A.1.3.2 TDD	
A.1.4 CSI-RS.	
A.1.4.1 FDD	
A.1.4.2 TDD	
A.1.4A CSI-RS for tracking	
A.1.4A.1 FR1	
A.1.4A.1.1 FDD	
A.1.4A.1.2 TDD	
A.1.4A.2 FR2	
A.1.4A.2.1 TDD	
A.1.5 TDD UL/DL configuration.	
A.1.6 PUSCH	
A.2 Reference OCGN configuration	990
A.2.1 Generic OFDMA channel noise generator (OCGN)	990
A.3 Reference SSB configuration	
A.3.1 SSB configuration for FR1	
A.3.2 SSB configuration for FR2	991
A.4 Reference SMTC configuration	991
A.5 Reference DRX configurations	991
A.6 EN-DC test setup	001
A.6.1 E-UTRA serving cell parameters	
A.6.1.1 E-UTRA serving cell parameters for EN-DC tests with NR FR1	
A.6.1.2 E-UTRA serving cell parameters for EN-DC tests with NR FR2	
A.6A NR FR1-FR2 test setup.	
A.7 Reference PRACH configurations	
A.7.1 PRACH configurations for FR1	
A.7.2 PRACH configurations for FR2	
A.8 Reference BWP configurations	
A.8.1 Downlink BWP configurations	999
A.8.2 Uplink BWP configurations	999

A.9 Angle of Arrival (AoA) for FR2 RRM test cases	1000
A.9.1 Setup 1: Single AoA in Rx beam peak direction	
A.9.2 Setup 2: Single AoA in non Rx beam peak direction	
A.9.2.1 Setup 2a: Single AoA in non Rx beam peak direction without change in direction	
A.9.2.2 Setup 2b: Single AoA in non Rx beam peak direction with change in direction	1000
A.9.3 Setup 3: 2 AoAs	
A.9.4 Setup 4: 2 AoAs, 1 AoA in Rx beam peak direction, 1 in non Rx beam peak	
A.9.4.1 Setup 4a: 2 AoAs, 1 AoA in Rx beam peak direction, 1 in non Rx beam peak without chang	e in
direction	
A.9.4.2 Setup 4b: 2 AoAs, 1 AoA in Rx beam peak direction, 1 in non Rx beam peak with change in	
direction	1001
A.10 TCI State Configuration	1001
A.10.1 Introduction	
A.10.2 TCI states	
11.10.2 1 01 3tates	1002
Annex B (normative): Conditions for RRM requirements applicability for operating bands	1002
B.1 Conditions for NR RRC_IDLE state mobility	1002
B.1.1 Introduction	
B.1.2 Conditions for measurements on NR intra-frequency cells for cell re-selection	
B.1.3 Conditions for measurements on NR inter-frequency cells for cell re-selection	
B.2 Conditions for NR RRC_CONNECTED state	1003
B.2.1 Introduction	
B.2.2 Conditions for NR intra-frequency measurements	
B.2.3 Conditions for NR inter-frequency measurements	1004
B.3 RRM requirement exceptions	1005
B.3.1 Introduction	
B.3.2 Receiver sensitivity relaxation for CA	
B.3.2.1 Receiver sensitivity relaxation for UE supporting CA in FR1	
B.3.2.2 Receiver sensitivity relaxation for UE configured with CA in FR1	
B.3.2.2.1 Inter-band carrier aggregation	
B.3.2.2.2 Reference sensitivity exceptions due to UL harmonic interference for CA	
B.3.2.2.3 Reference sensitivity exceptions due to intermodulation interference due to 2UL CA	
B.3.2.3 Receiver sensitivity relaxation for UE supporting CA in FR2	
B.3.2.4 Receiver sensitivity relaxation for UE configured with CA in FR2	
B.3.2.4.1 Intra-band contiguous carrier aggregation	
B.3.2.4.2 Intra-band non-contiguous carrier aggregation	
B.3.3 Receiver sensitivity relaxation for DC	
B.3.4 Receiver sensitivity relaxation for SUL	
B.3.4.1 Receiver sensitivity relaxation for UE supporting SUL in FR1	
B.3.4.2 Receiver sensitivity relaxation for UE configured with SUL in FR1	
B.3.4.2.1 Reference sensitivity exceptions due to UL harmonic interference for SUL	
Annex C (normative): Downlink physical channels and propagation conditions	1008
C.1 Downlink physical channels	1008
C.1.1 General	1008
C.1.2 Default downlink signal levels	1008
C.1.3 Default connection setup	1008
C.2 Propagation conditions	1009
C.2.1 No interference.	
C.2.2 Static propagation conditions	
C.2.2.1 UE receiver with 2Rx antenna connectors	
C.2.2.2 UE receiver with 4Rx antenna connectors	
C.2.3 Multi-path fading propagation conditions	

Anne	ex D (normative): Deviations from standard test configuration	1010
D.1	Test cases with different numerologies	1010
D.2	EN-DC test cases with different EN-DC configurations	
D.2.1	Principle of testing	1010
D.3	Carrier aggregation test cases with different CA configurations	1011
D.3.1		
D.4	Antenna connection for 4Rx capable UEs	1011
D.4.1		
D.4.2 D.4.2		
D.4.2 D.4.2		
D.4.2		
D.4.2		
DE	Test Cases with Different Channel Bandwidths	
D.5 D.5.1		
D.5.1		
D.5.1		
	-	
D.6	Test Cases for Synchronous and Asynchronous DC Operations	
D.6.1 D.6.1	y y	
D.6.1		
	•	
Anne	ex E (normative): Cell configuration mapping	1014
E.1	Test frequency selection.	1015
E.1.1	E-UTRA PCell for EN-DC test cases	
E.1.2		
E.1.3		
E.1.3.	1 - J	
E.1.3. E.1.4	1 - J	
E.1.4 E.1.4.	00 -0	
E.1.4.	99 9	
E.1.4.	6 66 6	
E.2	Cell configuration mapping for EN-DC FR1 test cases in Chapter 4	
E.3	Cell configuration mapping for EN-DC FR2 test cases in Chapter 5	
E.4	Cell configuration mapping for SA FR1 test cases in Chapter 6	
E.5	Cell configuration mapping for SA FR2 test cases in Chapter 7	
E.6	Cell configuration mapping for E-UTRAN – SA test cases in Chapter 8	1022
Anne	ex F (normative): Measurement uncertainties and test tolerances	1023
F.1	Measurement uncertainties and test tolerances for FR1	1023
F.1.1	Acceptable uncertainty of test system (normative)	
F.1.1.	1 Measurement of test environments	1023
F.1.1.	1	
F.1.2	Interpretation of measurement results (normative)	
F.1.3 F.1.3.	Test Tolerance and Derivation of Test Requirements (informative)	
F.1.3.		
	= 1.2000010111011 of 101011 requirementormannium.	

Anne	ex G (normative): Statistical testing	1041
G .1	General	1041
G.2	Statistical testing of delay and UE measurement performance in RRM tests	1041
G.2.1		1041
G.2.2	Design of the test	1041
G.2.3	Numerical definition of the pass fail limits	1041
G.2.4		1042
G.2.5		
G.2.6	Test conditions for delay tests and UE measurement performance	1043
G.X	Theory to derive the numbers in Table G.2.3-1 (informative)	1043
Anne	ex H (normative): Default message contents for RRM	1044
H.1	1044	
H.2	System information blocks message content exceptions	1044
H.2.1	•	
H.2.2	System information blocks message contents exceptions for NR inter frequency cell re-selection	1045
H.2.3	System information blocks message contents exceptions for NR inter-RAT cell re-selection	1047
Н.3	RRC message content exceptions	1049
H.3.1	•	
H.3.2		
	handoverRACH-ConfigGeneric: for NR cell re-selection and handover	1059
H.3.3		
H.3.4	E-UTRA RRC messages and information elements contents exceptions for NR measurement	
	configuration	1060
H.3.6	RRC messages and IE content exceptions for L1-RSRP measurement for beam reporting	1064
H.3.7		
		1069
Anne	ex I (normative): RRM OTA procedures	1070
I.0	Test applicability per permitted test method	1070
I.1	Direct far field (DFF)	1071
I.1.1	RX beam peak direction search	
I.2	Direct far field (DFF) simplification.	1071
I.2.1	RX beam peak direction search	
I.3	Indirect far field (IFF)	1071
I.3.2	RX beam peak direction search	
Anne	x J (informative): Change history	1072

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the measurement procedures for the conformance test of the user equipment (UE) that contain requirements for support of RRM (Radio Resource Management) as part of the 5G New Radio (5G-NR). This document covers NR Range 1, NR Range 2 and Interworking.

The requirements are listed in different clauses only if the corresponding parameters deviate. More generally, tests are only applicable to those mobiles that are intended to support the appropriate functionality. To indicate the circumstances in which tests apply, this is noted in the "test applicability" part of the test.

For example, only Release 15 and later UE declared to support NR shall be tested for this functionality. In the event that for some tests different conditions apply for different releases, this is indicated within the text of the test itself.

2 References

The following documents contain provisions, which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

Release as iii	e present document.
[1]	3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
[2]	3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".
[3]	3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".
[4]	3GPP TS 38.101-3: "NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios".
[5]	3GPP TS 38.101-4: "NR; User Equipment (UE) radio transmission and reception; Part 4: Performance requirements".
[6]	3GPP TS 38.133: "NR; Requirements for support of radio resource management".
[7]	3GPP TS 38.211: "NR; Physical channels and modulation".
[8]	3GPP TS 38.213: "NR; Physical layer procedures for control".
[9]	3GPP TS 38.214: "NR; Physical layer procedures for data".
[10]	3GPP TS 38.215: "NR; Physical layer measurements".
[11]	3GPP TS 38.306: "NR; User Equipment (UE) radio access capabilities".
[12]	3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".
[13]	3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".
[14]	3GPP TS 38.508-1: "5GS; User Equipment (UE) conformance specification; Part 1: Common test environment".
[15]	3GPP TS 38.508-2: "5GS; User Equipment (UE) conformance specification; Part 2: Common

Implementation Conformance Statement (ICS) proforma".

[16]	3GPP TS 38.509: "5GS; Special Conformance Testing Functions for UE".
[17]	3GPP TS 38.521-1: "NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 Standalone".
[18]	3GPP TS 38.521-2: "NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Range 2 Standalone".
[19]	3GPP TS 38.521-3: "NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios".
[20]	3GPP TS 38.521-4: "NR; User Equipment (UE) conformance specification; Part 4: Performance".
[21]	3GPP TS 38.522: "NR; User Equipment (UE) conformance specification; Applicability of radio transmission, radio reception and radio resource management test cases".
[22]	3GPP TS 38.903: "NR; Derivation of test tolerances and measurement uncertainty for User Equipment (UE) conformance test cases".
[23]	3GPP TS 36.133: "E-UTRA requirements for support of radio resource management".
[24]	3GPP TS 36.211: "E-UTRA Physical Channels and Modulation".
[25]	3GPP TS 36.508: "Common test environments for User Equipment (UE)".
[26]	3GPP TS 36.521-3: "E-UTRA; UE conformance specification; Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing"
[27]	3GPP TS 36.101: "E-UTRA UE radio transmission and reception".
[28]	3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".
[29]	3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC) Protocol Specification".
[30]	3GPP TS 38.304: "NR; User Equipment (UE) procedures in idle mode".
[31]	3GPP TS 38.212 "NR; Multiplexing and channel coding".
[32]	3GPP TR 38.810: "Study on test methods for New Radio".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

Active DL BWP: Active DL bandwidth part as defined in TS 38.213 [8].

Blackbox Approach: Testing methodology, in which the UE internal implementation of certain specific UE functionality involved in the test, is unknown.

Control Resource Set: As defined in TS 38.213 [8].

DL BWP: DL bandwidth part as defined in TS 38.213 [8].

EN-DC: E-UTRA-NR Dual Connectivity as defined in clause 4.1.2 of TS 37.340 [TBD].

en-gNB: As defined in TS 37.340 [TBD].

FR1: Frequency range 1 as defined in clause 5.1 of TS 38.104 [28].

FR2: Frequency range 2 as defined in clause 5.1 of TS 38.104 [28].

gNB: as defined in TS 38.300 [TBD].

Master Cell Group: As defined in TS 38.331 [13].

Multi-Radio Dual Connectivity: Dual Connectivity between E-UTRA and NR nodes, or between two NR nodes, as defined in TS 37.340 [TBD].

ng-eNB: As defined in TS 38.300 [TBD].

NE-DC: NR-E-UTRA Dual Connectivity as defined in clause 4.1.3.2 of TS 37.340 [TBD].

NGEN-DC: NG-RAN E-UTRA-NR Dual Connectivity as defined in clause 4.1.3.1 of TS 37.340 [TBD].

NR-DC: NR-NR Dual Connectivity as defined in clause 4.1.3.3 of TS 37.340 [TBD].

Primary Cell: As defined in TS 38.331 [13].

Quasi Co-Location: As defined in TS 38.214 [9].

RLM-RS resource: A resource out of the set of resources configured for RLM by higher layer parameter RLM-RS-List [2] as defined in TS 38.213 [8].

SA operation mode: Operation mode when the UE is configured with at least PCell and not any MR-DC.

Secondary Cell: As defined in TS 38.331 [13].

Secondary Cell Group: As defined in TS 38.331 [13].

Serving Cell: As defined in TS 38.331 [13].

SMTC: An SSB-based measurement timing configuration configured by *SSB-MeasurementTimingConfiguration* as specified in TS 38.331 [13].

Special Cell: As defined in TS 38.331 [13].

SSB: SS/PBCH block as defined in clause 7.8.3 of TS 38.211 [7].

Timing Advance Group: As defined in TS 38.331 [13].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

[...] Values included in square bracket must be considered for further studies, because it means that a

decision about that value was not taken.

 T_c Basic time unit, defined in clause 4.1 of TS 38.211 [7].

T_s Reference time unit, defined in clause 4.1 of TS 38.211 [7].

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

BFD Beam Failure Detection BFD-RS BFD Reference Signal

BS Base Station
BWP Bandwidth Part
CA Carrier Aggregation
CBD Candidate Beam Detection
CDF Cumulative Distribution Function

CC Component Carrier

CLI Cross Link Interference CORESET Control Resource Set

CP Cyclic Prefix

CSI Channel-State Information
CSI-RS CSI Reference Signal
DC Dual Connectivity

DCI Downlink Control Information

DL Downlink

DMRS Demodulation Reference Signal DRX Discontinuous Reception DUT Device under test

E-UTRA E-UTRAN Evolved UTRAN

Device under test
Enhanced Cell ID
Evolved UTRA
Evolved UTRAN

EN-DC E-UTRA – NR Dual Connectivity
FDD Frequency Division Duplex

FR Frequency Range FR1 Frequency Range 1 FR2 Frequency Range 2

HARQ Hybrid Automatic Repeat Request

HO Handover L1-RSRP Layer 1 RSRP

MAC Medium Access Control
MCG Master Cell Group
MG Measurement Gap
MGL Measurement Gap Length

MGRP Measurement Gap Repetition Period

MIB Master Information Block

MN Master Node

MR-DC Multi-Radio Dual Connectivity
NE-DC NR-E-UTRA Dual Connectivity

NGEN-DC NG-RAN E-UTRA-NR Dual Connectivity

NR New Radio

NR-DC NR-NR Dual Connectivity

NSA Non-Standalone

OCNG OFDMA Channel Noise Generator

OFDM Orthogonal Frequency Division Multiplexing
OFDMA Orthogonal Frequency Division Multiple Access

OTDOA Observed Time Difference Of Arrival

PCC Primary Component Carrier

PCell Primary Cell

PDCCH Physical Downlink Control Channel
PDSCH Physical Downlink Shared Channel
PLMN Public Land Mobile Network

PRACH Physical RACH

PSCell Primary Secondary Cell

PSS Primary Synchronization Signal pTAG Primary Timing Advance Group PUCCH Physical Uplink Control Channel PUSCH Physical Uplink Shared Channel

QCL Quasi Co-Location
RACH Random Access Channel
RAT Radio Access Technology
RLM Radio Link Monitoring
RLM-RS Reference Signal for RLM
RMC Reference Measurement Channel

RMSI Remaining Minimum System Information

RRC Radio Resource Control
RRM Radio Resource Management
RSSI Received Signal Strength Indicator
RSTD Reference Signal Time Difference

SA	Standalone
SCC	Secondary Component Carrier
SCell	Secondary Cell
SCG	Secondary Cell Group
SCS	Subcarrier Spacing
SCS_{SSB}	SSB subcarrier spacing
SDL	Supplementary Downlink
SFN	System Frame Number
SFTD	SFN and Frame Timing DifferenceSI System Information
SIB	System Information Block
SMTC	SSB-based Measurement Timing configuration
SpCell	Special Cell
SRS	Sounding Reference Signal
SS	System Simulator
SS-RSRP	Synchronization Signal based Reference Signal Received Power
SS-RSRQ	Synchronization Signal based Reference Signal Received Quality
SS-SINR	Synchronization Signal based Signal to Noise and Interference Ratio
SSB	Synchronization Signal Block
SSB_RP	Received (linear) average power of the resource elements that carry NR SSB signals and channels,
	measured at the UE antenna connector.
SSS	Secondary Synchronization Signal
sTAG	Secondary Timing Advance Group
SUL	Supplementary Uplink
TA	Timing Advance
TAG	Timing Advance Group
TCI	Transmission Configuration Indicator
TDD	Time Division Duplex
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink

3A Requirements for the support of RRM

3A.1 General

Radio Resource Management (RRM) ensures the efficient use of the available radio resources and also provides mechanisms that enable NR to meet radio resource related requirements. The requirements are divided in four main clauses according to the network deployment and the frequency range:

- Clause 4 for EN-DC option 3 test cases where all NR cells are in FR1.
- Clause 5 for EN-DC option 3 test cases where at least one NR cell is in FR2.
- Clause 6 for SA option 2 test cases where all NR cells are in FR1.
- Clause 7 for SA option 2 test cases where at least one NR cell is in FR2.

The requirements that are tested include:

Idle mode, the cell re-selection algorithms that are controlled by the setting of parameters (thresholds and hysteresis values) that define the best cell and/or determine when the UE should select a new cell

Inactive mode, the cell re-selection algorithms that are controlled by the setting of parameters (thresholds and hysteresis values) that define the best cell and/or determine when the UE should select a new cell

- The configuration of the UE measurement and reporting procedures that are transmitted via dedicated signalling in connected mode and the reporting accuracy of the required measurements.
- Connected mode, the mobility of radio connections that has to be supported
- Handover decisions that may be based on UE or gNB measurements

- Inter-RAT RRM, the management of radio resources in connection with inter-RAT mobility, e.g. Inter-RAT handover

Inter frequency and inter-RAT test cases are performed without frequency overlapping between cells required in the test.

- For bands with bandwidth not accommodating all the NR cells required in the test without frequency overlapping, inter band testing shall be done according to subclause 3A.5. If the UE does not support the combination given in subclause 3A.5, the relevant tests are applicable only to the bands with the necessary bandwidth.
- In case when frequency overlapping occurs due to the frequency channel selection defined for the test (i.e. Cell number as per Annex D), other frequency channels which avoid the frequency overlapping shall be selected. If no suitable selection is found the test is not applicable for the affected band.

3A.1.1 Test coverage across 5G NR architecture options

The test cases in this specification cover both Standalone (FR1, FR2) as well as Non-Standalone FR1 and FR2 (E-UTRA and 5G NR interworking) testing. Below shall be the understanding with respect to coverage across 5G NR architecture options:

- 1. Unless otherwise stated within the test case, it shall be understood that test requirements for NSA Option 3 and 7 are agnostic of the NSA architecture option configured within the test. The test coverage across the mentioned NSA options shall be considered fulfilled by execution of the NSA test case using one of them. Subsequently the test results can be leveraged to the other NSA option.
- 2. Only one SA or NSA architecture option type is identified and utilized in the definition of each test case. For example, most NSA test cases are configured using Connectivity EN-DC i.e. NSA Option 3 and Standalone (SA) test cases are configured using Connectivity NR i.e. SA Option 2.
- 3. If a UE does not support NSA Option 3, NSA Option 7 can be configured to execute the test. This is accomplished by appropriately picking the generic procedure parameter from Table 3A.1.1-2. The leverage rule detailed in (1) would apply.
- 4. No additional test case is defined for NE-DC. Devices supporting NE-DC shall be tested with the existing EN-DC and NR (SA Option 2) test cases.

Table 3A.1.1-1: Generic procedure parameter summary for SA

Generic Procedure Parameter to use in Initial Conditions		Description	5G NR SA Architecture Option supported by UE
Connectivit	NR	NG-RAN NR Radio	SA Option 2
y		Access	
	E-UTRA	NG-RAN E-UTRA	SA Option 5
		Radio Access	

Editor's Note: Any additional test config details needed for SA Option 5 is FFS

Table 3A.1.1-2: Generic procedure parameter summary for NSA

Generic Procedure Parameter to use in Initial Conditions		Description	5G NR NSA Architecture Option supported by UE
Connectivit	NSA		
y EN-DC		E-UTRA-NR Dual Connectivity	NSA Option 3
	NE-DC	NR-E-UTRA Dual Connectivity	NSA Option 4
	NGEN-DC	NG-RAN E-UTRA-NR Dual Connectivity	NSA Option 7

Editor's Note: Any additional test config details needed for NSA Options 4 and 7 are FFS

3A.2 Requirements Classification for Statistical Testing

The test requirements are expressed as absolute requirements with a single value stating the requirement or expressed as a success rate. The statistical nature depends on the type of test requirement. Some have large statistical variations, while others are not statistical in nature at all. When testing a parameter with a statistical nature, a confidence level is set. This establishes the probability that a Device Under Test (DUT) passing the test actually meets the test requirement and determines how many times a test have to be repeated and what the pass and fail criteria is. The statistical significance shall be set according to Annex G.

23

3A.3 Antenna Configuration

Unless otherwise specified, NR FDD or NR TDD cells in all RRM test cases in AWGN propagation condition are configured with antenna configuration 1x2.

3A.4 NR band groups

The intention of the band grouping defined in this clause is to increase the readability of the test specification.

The frequency bands grouping is derived based on UE REFSENS requirements specified in TS 38.101-1 [2], TS 38.101-2 [3] and TS 38.101-3 [4] and assuming 0.5 dB step between the neighbour groups. The groups are defined in the order of increasing REFSENS, i.e., the group A has the smallest REFSENS among the groups. For the same SCS and a given bandwidth, the bands within the same group have the same Io conditions in a corresponding requirement in this specification, provided the bands support this SCS. For different SCSs supported by a frequency band and the same bandwidth, different Io conditions may apply for the frequency band in the requirements, while the band group is the same, based on the lowest REFSENS requirement normalized by the number of subcarriers among its supported SCSs for this bandwidth. For the same SCS but different supported bandwidths, the group for a band is determined based on the lowest REFSENS requirement normalized by the number of subcarriers among its supported bandwidths.

3A.4.1 NR operating bands in FR1

NR frequency bands grouping for FR1 is specified in Table 3A.4.1-1.

Table 3A.4.1-1: NR frequency band groups for FR1

Group	NR FDD		NR	TDD	NR S	SDL⁵
	Band group notation	Operating bands	Band group notation	Operating bands	Band group notation	Operating bands
Α	NR_FDD_FR1_A	n1, n18, n70,	NR_TDD_FR1_A	n34, n38, n39, n40,	NR_SDL_FR1_A	n75, n76
		n74⁴		n50, n51		
В	NR_FDD_FR1_B	n65, n66, n74 ³	NR_TDD_FR1_B	-	NR_SDL_FR1_B	-
С	NR_FDD_FR1_C	n30	NR_TDD_FR1_C	n48, n77 ¹ , n78, n79	NR_SDL_FR1_C	-
D	NR_FDD_FR1_D	n28	NR_TDD_FR1_D	n77²	NR_SDL_FR1_D	-
E	NR_FDD_FR1_E	n2, n5, n7	NR_TDD_FR1_E	n41	NR_SDL_FR1_E	-
F	NR_FDD_FR1_F	-	NR_TDD_FR1_F	-	NR_SDL_FR1_F	-
G	NR_FDD_FR1_G	n3, n8, n12, n14,	NR_TDD_FR1_G	-	NR_SDL_FR1_G	n29
		n20, n71				
Н	NR_FDD_FR1_H	n25	NR_TDD_FR1_H	-	NR_SDL_FR1_H	-

NOTE 1: Except 3.8 GHz to 4.2 GHz.

NOTE 2: Only 3.8 GHz to 4.2 GHz.

NOTE 3: Except 1475.9 MHz to 1510.9 MHz.

NOTE 4: Only when the band is confined in 1475.9 MHz to 1510.9 MHz.

NOTE 5: These bands are used only in NR carrier aggregation with other NR bands according to NR CA band combinations specified in TS 38.101-1 [18] and TS 38.101-3 [20].

Table 3A.4.1-2: Power offsets for the test configuration between NR frequency band groups for FR1 with respect to NR_FDD_FR1_A

Group	NR FDD		p NR FDD NR TDD		NR SDL	
	Band group notation	Power Offset [dB], Δ_{BG_offset}	Band group notation	Power Offset [dB], Δ _{BG_offset}	Band group notation	Operating bands
Α	NR_FDD_FR1_A	-	NR_TDD_FR1_A	0.0	NR_SDL_FR1_A	0.0
В	NR_FDD_FR1_B	0.5	NR_TDD_FR1_B	0.5	NR_SDL_FR1_B	-
С	NR_FDD_FR1_C	1.0	NR_TDD_FR1_C	1.0	NR_SDL_FR1_C	-
D	NR_FDD_FR1_D	1.5	NR_TDD_FR1_D	1.5	NR_SDL_FR1_D	-
Е	NR_FDD_FR1_E	2.0	NR_TDD_FR1_E	2.0	NR_SDL_FR1_E	-
F	NR_FDD_FR1_F	2.0	NR_TDD_FR1_F	2.0	NR_SDL_FR1_F	-
G	NR_FDD_FR1_G	3.0	NR_TDD_FR1_G	3.0	NR_SDL_FR1_G	-
Н	NR_FDD_FR1_H	3.5	NR_TDD_FR1_H	3.5	NR_SDL_FR1_H	-

NOTE 1: In the test parameters table, only the power configuration for NR_FDD_FR1_A or NR_TDD_FR1_A will be given.

3A.4.2 NR operating bands in FR2

NR frequency bands grouping for FR2 is specified in Table 3A.4.2-1.

Table 3A.4.2-1: NR frequency band groups for FR2

Group	Band group notation	Operating bands
Α	NR_TDD_FR2_A	n257¹, n258¹, n261¹
В	NR_TDD_FR2_B	n257 ⁴ , n258 ⁴ , n261 ⁴
С	NR_TDD_FR2_C	
D	NR_TDD_FR2_D	
E	NR_TDD_FR2_E	
F	NR_TDD_FR2_F	n260⁴
G	NR_TDD_FR2_G	n257 ² , n258 ² , n260 ¹ , n261 ²
Н	NR_TDD_FR2_H	
1	NR_TDD_FR2_I	
J	NR_TDD_FR2_J	
K	NR_TDD_FR2_K	
L	NR_TDD_FR2_L	
M	NR_TDD_FR2_M	
Ν	NR_TDD_FR2_N	
0	NR_TDD_FR2_O	
Р	NR_TDD_FR2_P	
Q	NR_TDD_FR2_Q	
R	NR_TDD_FR2_R	
S	NR_TDD_FR2_S	
Т	NR_TDD_FR2_T	n257³, n258³, n261³
U	NR_TDD_FR2_U	
V	NR_TDD_FR2_V	
W	NR_TDD_FR2_W	
Х	NR_TDD_FR2_X	
Υ	NR_TDD_FR2_Y	n260³
NOTE 1:	UE power class 1.	

NOTE 2: UE power class 2. NOTE 3: UE power class 3.

NOTE 4: UE power class 4.

Table 3A.4.2-2: Power offsets for the test configuration between NR frequency band groups for FR2 with respect to NR_TDD_FR2_A

Group	Band group notation	Power Offset [dB], Δ _{BG_offset}
Α	NR_TDD_FR2_A	-
В	NR_TDD_FR2_B	TBD
С	NR_TDD_FR2_C	TBD
D	NR_TDD_FR2_D	TBD
E	NR_TDD_FR2_E	TBD
F	NR_TDD_FR2_F	TBD
G	NR_TDD_FR2_G	TBD
Н	NR_TDD_FR2_H	TBD
	NR_TDD_FR2_I	TBD
J	NR_TDD_FR2_J	TBD
K	NR_TDD_FR2_K	TBD
L	NR_TDD_FR2_L	TBD
М	NR_TDD_FR2_M	TBD
N	NR_TDD_FR2_N	TBD
0	NR_TDD_FR2_O	TBD
Р	NR_TDD_FR2_P	TBD
Q	NR_TDD_FR2_Q	TBD
R	NR_TDD_FR2_R	TBD
S	NR_TDD_FR2_S	TBD
Т	NR_TDD_FR2_T	TBD
U	NR_TDD_FR2_U	TBD
V	NR_TDD_FR2_V	TBD
W	NR_TDD_FR2_W	TBD
X	NR_TDD_FR2_X	TBD
Υ	NR_TDD_FR2_Y	TBD

NOTE 1: In the test parameters table, only the power configuration for NR_TDD_FR2_A will be given.

3A.5 NR operating band configuration

Inter-band configuration is not affecting the Test purpose since the minimum requirements are valid regardless of band. Band combinations defined in table 3A.5-1 shall be used for testing.

Table 3A.5-1: Inter-band configuration

Bar	nd under test	Additional band	
	TBD	TBD	
Note 1:	The band under te	est should contain the inter-	
	frequency (neighb	our) cell.	
Note 2:	The additional bar	nd should contain the serving	
	cell of the test. If n	nore than one inter-frequency	
	cell is needed, tha	t cell should be on the	
additional band.			
Note 3: The bands and cells referred in this table are NF		lls referred in this table are NR	
bands and cells only. For instructions on how to		nly. For instructions on how to	
	configure the E-UTRA operating band please		
	refer to TS 36.521	-3 [26].	

4 EN-DC with all NR cells in FR1

This clause contains test scenarios for E-UTRA and NR dual connectivity with E-UTRA as PCell and NR and PSCell. This configuration is also known as NSA Option 3 and 3a. All NR cells are in Frequency Range 1.

4.1 Void

4.2 Void

4.3 RRC CONNECTED state mobility

4.3.1 Void

4.3.2 RRC connection mobility control

- 4.3.2.1 Void
- 4.3.2.2 Random access
- 4.3.2.2.1 Contention based random access test in FR1 for PSCell in EN-DC

4.3.2.2.1.1 Test purpose

The purpose of this test is to verify that the behaviour of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits.

4.3.2.2.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.3.2.2.1.3 Minimum conformance requirement

The random access procedure is used when establishing the layer 1 communication between the UE and NG-RAN. The random access is as defined in TS 38.213 [8] clause 7.4 and the control of the RACH transmission is as defined in TS 38.321 [12] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 38.213 [8] clause 7.4 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in TS 38.101-1 [2] Table 6.3.4.2-1. The relative power applied to additional preambles shall have an accuracy as specified in TS 38.101-1 [2] Table 6.3.4.3-1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preamble transmission counter has been reached for the random access procedure on PCell or PSCell as specified in TS 38.321 [12] clause 5.1.4.

With the UE selected SSB with SS-RSRP above *rsrp-ThresholdSSB*, UE shall have the capability to select a Random Access Preamble randomly with equal probability from the Random Access Preambles associated with the selected SSB if the association between Random Access Preambles and SS blocks is configured, as specified in clause 5.1.2 in TS 38.321 [12].

With the UE selected SSB with SS-RSRP above *rsrp-ThresholdSSB*, UE shall have the capability to transmit Random Access Preamble on the next available PRACH occasion from the PRACH occasions corresponding to the selected SSB permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex* if configured, if the association between PRACH occasions and SSBs is configured, and PRACH occasion shall be randomly selected with equal probability amongst the selected SSB associated PRACH occasions occurring simultaneously but on different subcarriers, as specified in clause 5.1.2 in TS 38.321 [12].

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random

Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window defined in clause 5.1.4 in TS 38.321 [12].

The UE shall re-transmit the msg3 upon the reception of an UL grant for msg3 retransmission.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

The normative reference for this requirement is TS 38.133 [6] clauses 6.2.2 and A.4.3.2.2.1.

4.3.2.2.1.4 Test description

4.3.2.2.1.4.1 Initial conditions

This test can be run in the configurations defined in Table 4.3.2.2.1.4.1-1.

Table 4.3.2.2.1.4.1-1: Contention based random access test in FR1 for PSCell in EN-DC supported test configurations

Test Case ID	Test Config Index	Description	
4.3.2.2.1-1	1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.3.2.2.1-2	2	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.3.2.2.1-3	3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD	
4.3.2.2.1-4	4	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.3.2.2.1.4.1-2.

Table 4.3.2.2.1.4.1-2: Initial conditions for Contention based random access test in FR1 for EN-DC

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.1-1 and TS 38.	508-1 [14] subclause 4.3.1.	
Channel bandwidth	As specified	As specified by the test configuration selected from Table 4.3.2.2.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram	N/A			

- 1. Message contents are defined in clause 4.3.2.2.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The E-UTRAN PCell power levels and settings are specified in Table A.6.1.1-1. Cell 2 is the NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, with downlink signal levels as per Annex C.1.2. General Test parameters are defined in Table 4.3.2.2.1.5-1.
- 3. Downlink signals for NR cell are initially set up according to Annex C.2.1.

4.3.2.2.1.4.2 Test procedure

For this test two cells are used, an E-UTRA serving cell (PCell) and an NR FR1 PSCell. For the NR PSCell, the System Simulator shall not explicitly assign a random access preamble via dedicated signalling in the downlink.

- 1. Ensure the UE is in state E-UTRA RRC_CONNECTED with generic procedure parameters *Connectivity* E-UTRA/EPC with Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to Table 4.3.2.2.1.5-1.
- 3. The test system shall send a RRCReconfiguration message to the UE to add NR PSCell, then the UE shall trigger a random access procedure.
- 4. Test 1: Correct behaviour when transmitting Random Access Preamble
 - 4.1. The UE shall send a preamble to the System Simulator. The System Simulator shall check that the Random Access Preamble belongs to one of the Random Access Preambles associated with the SSB with index 0, which has SS-RSRP above the configured rsrp-ThresholdSSB.
- 5. Test 2: Correct behaviour when receiving Random Access Response
 - 5.1. Repeat steps 1-3.
 - 5.2. The UE shall send preambles to the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response containing Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.
 - 5.3. As the received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires.
 - 5.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.
 - 5.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.
 - 5.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 4.3.2.2.1.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 4.3.2.2.1.5.
- 6. Test 3: Correct behaviour when not receiving Random Access Response
 - 6.1. Repeat steps 1-3.
 - 6.2. The UE shall send preambles to the System Simulator. The System Simulator shall not respond to the first 4 preambles.
 - 6.3. As no Random Access Response was received within the RA Response window, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires.
 - 6.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.
 - 6.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.
 - 6.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 4.3.2.2.1.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 4.3.2.2.1.5.
- 7. Test 4: Correct behaviour when receiving an UL grant for msg3 retransmission
 - 7.1. Repeat steps 1-3.

- 7.2. The UE shall send a preamble to the System Simulator. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble.
- 7.3. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3 including C-RNTI MAC control element.
- 7.4. The System Simulator shall send PDCCH addressed to the Temporary C-RNTI after receiving the msg3.
- 7.5. The UE shall re-transmit the msg3 including C-RNTI MAC control element.
- 7.6. The System Simulator shall check if UE re-transmit the msg3.
- 8. Test 5: Correct behaviour when receiving a successful UE Contention Resolution
 - 8.1. Repeat steps 1-3.
 - 8.2. The UE shall send a preamble to the System Simulator. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble.
 - 8.3. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3 including C-RNTI MAC control element.
 - 8.4. The System Simulator shall send a PDCCH addressed to the C-RNTI.
 - 8.5. The UE shall send PUSCH according to the received PDCCH addressed to the C-RNTI.
- 9. Test 6: Correct behaviour when contention Resolution timer expires
 - 9.1. Repeat steps 1-3.
 - 9.2. The UE shall send a preamble to the System Simulator. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble.
 - 9.3. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3 including C-RNTI MAC control element.
 - 9.4. The System Simulator shall not send a PDCCH addressing the C-RNTI.
 - 9.5. As there was no PDCCH addressing the C-RNTI, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the Contention Resolution Timer expires and then after the backoff timer expires.
 - 9.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 4.3.2.2.1.5.

4.3.2.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with t

Table 4.3.2.2.1.4.3-1: RACH-ConfigCommon for Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-128			
Information Element	Value/remark	Comment	Condition
RACH-ConfigCommon::= SEQUENCE {			
rach-ConfigGeneric	RACH-ConfigGeneric		
totalNumberOfRA-Preambles	48		
ssb-perRACH-OccasionAndCB-PreamblesPerSSB CHOICE {			
oneFourth	n48		FR1
}			
groupBconfigured SEQUENCE {			
numberOfRA-PreamblesGroupA	48		
}			
ra-ContentionResolutionTimer	sf48		
rsrp-ThresholdSSB	RSRP_51		
prach-RootSequenceIndex CHOICE {			
l139	0		
}			
msg1-SubcarrierSpacing	kHz 15		15kHz
	kHz 30		30kHz
}			

Table 4.3.2.2.1.4.3-2: RACH-ConfigGeneric for Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-13	0		
Information Element	Value/remark	Comment	Condition
RACH-ConfigGeneric ::= SEQUENCE {			
prach-ConfigurationIndex	102		FR1
msg1-FDM	one		FR1
zeroCorrelationZoneConfig	11		
preambleReceivedTargetPower	-120		
preambleTransMax	n6		
powerRampingStep	dB2		
ra-ResponseWindow	sl10		
}			

Table 4.3.2.2.1.4.3-3: ServingCellConfigCommon for Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 7.3-3			
Information Element	Value/remark	Comment	Condition
ServingCellConfigCommon ::= SEQUENCE {			
ssb-PositionsInBurst SEQUENCE {			
inOneGroup	'1100 0000'B		
}			
ss-PBCH-BlockPower	-5		
}			

4.3.2.2.1.5 Test requirement

Table 4.3.2.2.1.5-1 defines the primary level settings for contention based random access test in FR1 for PSCell in ENDC. Tables 4.3.2.2.1.5-2, 4.3.2.2.1.5-3 and 4.3.2.2.1.5-4 define the Absolute power limits, Relative power limits and uplink timing error limits respectively, and all include test tolerances.

Table 4.3.2.2.1.5-1: General test parameters for contention based random access test in FR1 for PSCell in EN-DC

	Parame	ter	Unit	Test-1	Comments	
SSB Configu	ration	Config 1,2		SSB.3 FR1	As defined in A.3.1	
g-		Config 3,4		SSB.4 FR1		
Duplex Mode for Cell 2		Config 1,2		FDD		
,		Config 3,4		TDD		
TDD Configu	ration	Config 3,4		TDDConf.2.1		
OCNG Patter	n Note 1			OCNG pattern 1	As defined in A.2.1.	
PDSCH para	meters Note	Config 1,2		SR1.1 FDD	As defined in A.1.1.	
4		Config 3,4	1	SR.2.1 TDD		
NR RF Chan	nel Number			1		
EPRE ratio o			dB	-		
EPRE ratio o			dB			
		PBCH DMRS	dB			
		MRS to SSS	dB	0		
		PDCCH DMRS	dB			
EPRE ratio o	f PDSCH [MRS to SSS	dB			
EPRE ratio o	f PDSCH to	PDSCH DMRS	dB			
SSB with	\hat{E}_{s}/I_{ot}		dB	3	Power of SSB with ind	
index 0	N_{oc}	Config 1,2	dBm/15kHz	-98	0 is set to be above configured <i>rsrp</i> -	
	00	Config 3,4		-101	ThresholdSSB	
	\hat{E}_s/N_o		dB	3		
	SS-RSRI		dBm/ SCS	-95		
SSB with	\hat{E}_s/I_{ot}		dB	-17	Power of SSB with index	
index 1	N_{oc}	Config 1,2	dBm/15kHz	-98	1 is set to be below configured <i>rsrp</i> -	
	OC	Config 3,4		-101	ThresholdSSB	
	\hat{E}_s/N_o	c .	dB	-17		
	SS-RSRI		dBm/ SCS	-115		
Note 0	1	Config 1,2	dBm	-65.3/9.36MHz	For symbols without SSI	
Io Note 2		Config 3,4		-62.2/38.16MHz	index 1	
ss-PBCH-BlockPower		dBm/ SCS	-5	As defined in clause 6.3. in TS 38.331 [13].		
Configured UE transmitted power (dBm	23	As defined in clause 6.2.		
$P_{ m CMAX,f,c})$				in TS 38.101-1 [2].		
PRACH Configuration			PRACH.1 FR1	As defined in A.7.1.		
Propagation	Condition		_	AWGN		

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: Es/lot, SS-RSRP and lo level have been derived from other parameters for information purpose. They are not settable parameters.

Note 3: Void.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.

Test 1: Correct behaviour when transmitting Random Access Preamble

- The Random Access Preamble shall be one of the Random Access Preambles associated with SSB index 0.

Test 2: Correct behaviour when receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 4.3.2.2.1.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 4.3.2.2.1.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 4.3.2.2.1.5-4.

Test 3: Correct behaviour when not receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 4.3.2.2.1.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 4.3.2.2.1.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 4.3.2.2.1.5-4.

Test 4: Correct behaviour when receiving an UL grant for msg3 retransmission

- The UE shall re-transmit the msg3 upon the reception of an UL grant for msg3 retransmission.

Test 5: Correct behaviour when receiving a successful UE Contention Resolution

- The UE shall send PUSCH according to the PDCCH addressed to the C-RNTI.

Test 7: Correct behaviour when contention resolution timer expires

- The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if the contention resolution timer expires.
- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 4.3.2.2.1.5-2.
- The transmit timing of the PRACH transmission shall be within the accuracy specified in Table 4.3.2.2.1.5-4.

Table 4.3.2.2.1.5-2 Absolute power tolerance Test requirements

Conditions	Tolerance
Normal	± 11.1 dB

Table 4.3.2.2.1.5-3 Relative power tolerance Test requirements

Power step ∆P (Up or down) (dB)	PRACH (dB)
2 ≤ ΔP < 3	± 3.2

Table 4.3.2.2.1.5-4: Te Timing error Test requirements

Frequency Range	SCS of SSB signals (kHz)	SCS of uplink signals s(KHz)	T _e		
1	15	15	880*T _c		
	30	30	624*T _c		
Note 1: T _c is the basic timing unit defined in TS 38.211 [7]					

4.3.2.2.2 Non-contention based random access test in FR1 for PSCell in EN-DC

4.3.2.2.2.1 Test purpose

The purpose of this test is to verify that the behaviour of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits.

4.3.2.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.3.2.2.3 Minimum conformance requirement

The random access procedure is used when establishing the layer 1 communication between the UE and NG-RAN. The random access is as defined in TS 38.213 [8] clause 7.4 and the control of the RACH transmission is as defined in TS 38.321 [12] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 38.213 [8] clause 7.4 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in TS 38.101-1 [2] Table 6.3.4.2-1. The relative power applied to additional preambles shall have an accuracy as specified in TS 38.101-1 [2] Table 6.3.4.3-1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preamble transmission counter has been reached for the random access procedure on PCell or PSCell as specified in TS 38.321 [12] clause 5.1.4.

If the contention-free Random Access Resources and the contention-free PRACH occasions associated with SSBs is configured, with the UE selected SSB with SS-RSRP above *rsrp-ThresholdSSB* amongst the associated SSBs, UE shall have the capability to select the Random Access Preamble corresponding to the selected SSB, and to transmit Random Access Preamble on the next available PRACH occasion from the PRACH occasions corresponding to the selected SSB permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex* if configured, and PRACH occasion shall be randomly selected with equal probability amongst the selected SSB associated PRACH occasions occurring simultaneously but on different subcarriers, as specified in clause 5.1.2 in TS 38.321 [12].

If the contention-free Random Access Resources and the contention-free PRACH occasions associated with CSI-RSs is configured, with the UE selected CSI-RS with CSI-RSRP above *cfra-csirs-DedicatedRACH-Threshold* amongst the associated CSI-RSs, UE shall have the capability to select the Random Access Preamble corresponding to the selected CSI-RS, and to transmit Random Access Preamble on the next available PRACH occasion from the PRACH occasions in *ra-OccasionList* corresponding to the selected CSI-RS, and PRACH occasion shall be randomly selected with equal probability amongst the selected CSI-RS associated PRACH occasions occurring simultaneously but on different subcarriers, as specified in clause 5.1.2 in TS 38.321 [12].

The UE may stop monitoring for Random Access Response(s), if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble, unless the random access procedure is initialized for Other SI request from UE.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12] for the next available PRACH occasion, and transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12] for the next available PRACH occasion, and transmit the preamble with the calculated PRACH transmission power, if no Random Access Response is received within the RA Response window configured in *RACH-ConfigCommon* or if no PDCCH addressed to UE's C-RNTI is received within the RA Response window configured in *BeamFailureRecoveryConfig*, as defined in clause 5.1.4 in TS 38.321 [12].

The normative reference for this requirement is TS 38.133 [6] clauses 6.2.2 and A.4.3.2.2.2. Non-contention based random access procedure is not initialized for Other SI requested from UE or for beam failure recovery, so the requirements related to those features are omitted.

4.3.2.2.4 Test description

4.3.2.2.4.1 Initial conditions

This test can be run in the configurations defined in Table 4.3.2.2.2.4.1-1.

Table 4.3.2.2.2.4.1-1: Non-contention based random access test in FR1 for PSCell in EN-DC supported test configurations

Test Case ID	Test Config Index	Description
4.3.2.2.2-1	1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD

4.3.2.2.2-2	2	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD			
4.3.2.2.2-3	3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD			
4.3.2.2.4	4	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD			
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations				

Configure the test equipment and the DUT according to the parameters in Table 4.3.2.2.2.4.1-2.

Table 4.3.2.2.2.4.1-2: Initial conditions for Non-contention based random access test in FR1 for ENDC

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] subclause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 4.3.2.2.2.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
iag.a	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

- 1. Message contents are defined in clause 4.3.2.2.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The E-UTRAN PCell power levels and settings are specified in Table A.6.1.1-1. Cell 2 is the NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, with downlink signal levels as per Annex C.1.2. General Test parameters are defined in Table 4.3.2.2.2.5-1.
- 3. Downlink signals for NR cell are initially set up according to Annex C.2.1.

4.3.2.2.4.2 Test procedure

For this test two cells are used, an E-UTRA serving cell (PCell) and an NR FR1 PSCell. For the NR PSCell, the System Simulator shall explicitly assign a random access preamble via dedicated signalling in the downlink. There are two subtests, to test both SSB-based non-contention based random access (subtest 1) and CSI-RS-based non-contention based random access (subtest 2).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to Table 4.3.2.2.5-1.
- 3. SS sends a RRCReconfiguration to trigger a contention-free random access procedure.
- 4. Test 1: Correct behaviour when transmitting SSB-based Random Access Preamble
 - 4.1. The UE shall send a preamble to the System Simulator. The System Simulator shall check that the Random Access Preamble has the Preamble Index associated with the SSB with index 0, that it arrives on a PRACH occasion which belongs to the PRACH occasions corresponding to the SSB with index 0, and that the

selected PRACH occasion belongs to the PRACH occasions permitted by the restrictions given by the *rassb-OccasionMaskIndex*.

- 5. Test 2: Correct behaviour when transmitting CSI-RS-based Random Access Preamble
 - 5.1. Set the parameters according to Table 4.3.2.2.5-1 Subtest 2.
 - 5.2. Repeat steps 1-3
 - 5.3. The UE shall send a preamble to the System Simulator. The System Simulator shall check that the Random Access Preamble has the Preamble Index associated with the CSI-RS configured, that it arrives on a PRACH occasion which belongs to the PRACH occasions corresponding to the CSI-RS configured, and that the selected PRACH occasion belongs to the PRACH occasions permitted by the restrictions given by the *ra-OccasionList*.
- 6. Test 3: Correct behaviour when receiving Random Access Response
 - 6.1. Repeat steps 1-3
 - 6.2. The UE shall send preambles to the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response containing Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.
 - 6.3. As the received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power.
 - 6.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.
 - 6.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE may stop monitoring for Random Access Response(s).
 - 6.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 4.3.2.2.2.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 4.3.2.2.2.5.
- 7. Test 4: Correct behaviour when not receiving Random Access Response
 - 7.1. Repeat steps 1-3.
 - 7.2. The UE shall send preambles to the System Simulator. The System Simulator shall not respond to the first 4 preambles.
 - 7.3. As no Random Access Response was received within the RA Response window configured in *RACH-ConfigCommon*, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power.
 - 7.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.
 - 7.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE may stop monitoring for Random Access Response(s).
 - 7.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 4.3.2.2.2.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 4.3.2.2.2.5.

4.3.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions:

Table 4.3.2.2.4.3-1: RACH-ConfigCommon for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-128			
Information Element	Value/remark	Comment	Condition
RACH-ConfigCommon::= SEQUENCE {			
rach-ConfigGeneric	RACH-ConfigGeneric		
totalNumberOfRA-Preambles	48		
groupBconfigured SEQUENCE {			
numberOfRA-PreamblesGroupA	48		
}			
ra-ContentionResolutionTimer	Not present		
rsrp-ThresholdSSB	RSRP_51		Subtest 1
prach-RootSequenceIndex CHOICE {			
l139	0		
}			
msg1-SubcarrierSpacing	kHz 15		15kHz
	kHz 30		30kHz
}			

Table 4.3.2.2.4.3-2: RACH-ConfigDedicated for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-129			
Information Element	Value/remark	Comment	Condition
RACH-ConfigDedicated::= SEQUENCE {			
cfra SEQUENCE {			
occasions SEQUENCE {			
ssb-perRACH-Occasion	oneFourth		
}			
resources CHOICE {			
ssb SEQUENCE {			
ssb-ResourceList SEQUENCE (SIZE(1maxRA-	2 entries		
SSB-Resources)) OF {			
ssb[1]	0		
ssb[2]	1		
ra-PreambleIndex[1]	50		Subtest 1
}			
ra-ssb-OccasionMaskIndex	1		Subtest 1
}			
csirs SEQUENCE {			
csirs-ResourceList SEQUENCE			
(SIZE(1maxRA- CSIRS -Resources)) OF {			
ra-OccasionList	1		Subtest 2
ra-PreambleIndex[1]	50		Subtest 2
}			
rsrp-ThresholdCSI-RS	RSRP_51		Subtest 2
}			
}			
}			
}			

Table 4.3.2.2.4.3-3: RACH-ConfigGeneric for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-13	0		
Information Element	Value/remark	Comment	Condition
RACH-ConfigGeneric ::= SEQUENCE {			
prach-ConfigurationIndex	87		FR1
msg1-FDM	one		FR1
zeroCorrelationZoneConfig	11		
preambleReceivedTargetPower	-120		
preambleTransMax	n6		
powerRampingStep	dB2		
ra-ResponseWindow	sl10		
}			

Table 4.3.2.2.2.4.3-4: ServingCellConfigCommon for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-168			
Information Element	Value/remark	Comment	Condition
ServingCellConfigCommon ::= SEQUENCE {			
ssb-PositionsInBurst SEQUENCE {			
inOneGroup	'1100 0000'B		
}			
ss-PBCH-BlockPower	-5		
}			

4.3.2.2.5 Test requirement

Table 4.3.2.2.5-1 defines the primary level settings for non-contention based random access test in FR1 for PSCell in EN-DC. Tables 4.3.2.2.2.5-2, 4.3.2.2.5-3 and 4.3.2.2.5-4 define the Absolute power limits, Relative power limits and uplink timing error limits respectively, and all include test tolerances.

Table 4.3.2.2.5-1: General test parameters for non-contention based random access test in FR1 for PSCell in EN-DC

	Parame	ter	Unit	Test-1	Test-2	Comments
SSB Configu	ıration	Config 1,2		SSB.3 FR1	SSB.3 FR1	As defined in A.3.1
_		Config 3,4]	SSB.4 FR1	SSB.4 FR1	
CSI-RS Con	figuration	Config 1,2		N/A	CSI-RS.1.1 FDD	As defined in A.1.4
	_	Config 3,4			CSI-RS.2.1 TDD	
Duplex Mode	e for Cell 2	Config 1,2		FDD	FDD	
		Config 3,4]	TDD	TDD	
TDD Configu	ıration	Config 3,4		TDDConf.2.1	TDDConf.2.1	
OCNG Patte				OCNG pattern 1	OCNG pattern 1	As defined in A.2.1.
PDSCH para	ameters ^{Note}	Config 1,2		SR1.1 FDD	SR1.1 FDD	As defined in A.1.1.
4		Config 3,4]	SR2.1 TDD	SR2.1 TDD	
NR RF Char	inel Number	•		1	1	
EPRE ratio	of PSS to SS	SS	dB			
EPRE ratio	of PBCH_DN	MRS to SSS	dB			
EPRE ratio	of PBCH to F	PBCH_DMRS	dB			
		DMRS to SSS	dB	0	0	
EPRE ratio	of PDCCH to	PDCCH_DMRS	dB			
EPRE ratio o	of PDSCH_D	DMRS to SSS	dB			
EPRE ratio o	of PDSCH to	PDSCH_DMRS	dB			
SSB with	\hat{E}_{s}/I_{ot}		dB	3	3	Power of SSB with
index 0	N_{oc}	Config 1,2	dBm/15kHz	-98	-98	index 0 is set to be above configured
	- · oc	Config 3,4	1	-101	-101	rsrp-ThresholdSSB
	\hat{E}_s/N_o		dB	3	3	-
	SS-RSR		dBm/ SCS	-95	-95	-
SSB with	\hat{E}_{s}/I_{ot}		dB	-17	-17	Power of SSB with
index 1	N_{oc}	Config 1,2	dBm/15kHz	-98	-98	index 1 is set to be below configured
	00	Config 3,4	1	-101	-101	rsrp-ThresholdSSB
	\hat{E}_{s}/N_{o}		dB	-17	-17	-
	SS-RSR		dBm/ SCS	-115	-115	-
- Note 2		Config 1,2	dBm	-65.3/9.36MHz	-65.3/9.36MHz	For symbols without
lo Note 2		Config 3,4	1	-62.2/38.16MHz	-62.2/38.16MHz	SSB index 1
ss-PBCH-Blo			dBm/ SCS	-5	-5	As defined in clause 6.3.2 in TS 38.331 [13].
Configured U	JE transmitt	ed power (dBm	23	23	As defined in clause
$P_{ m CMAX,f,c}$						6.2.4 in TS 38.101-1 [2].
PRACH Con	figuration			PRACH.2 FR1	PRACH.3 FR1	As defined in A.7.1.
Propagation	Condition		-	AWGN	AWGN	
						and a study of a section is

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: Es/lot, SS-RSRP and lo levels have been derived from other parameters for information purpose. They are not settable parameters.

Note 3: Void.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.

Test 1: Correct behaviour when transmitting SSB-based Random Access Preamble

- The Random Access Preamble shall be one of the Random Access Preambles associated with SSB index 0.
- The Random Access Preamble shall arrive on a PRACH occasion which belongs to the PRACH occasions corresponding to the SSB with index 0.
- The selected PRACH occasion shall belong to the PRACH occasions permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex*.

Test 2: Correct behaviour when transmitting CSI-RS-based Random Access Preamble

- The Random Access Preamble shall have the Preamble Index associated with the CSI-RS configured.
- The Random Access Preamble shall arrive on a PRACH occasion which belongs to the PRACH occasions corresponding to the CSI-RS configured.
- the selected PRACH occasion belongs to the PRACH occasions permitted by the restrictions given by the ra-OccasionList.

Test 3: Correct behaviour when receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 4.3.2.2.2.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 4.3.2.2.2.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 4.3.2.2.2.5-4.

Test 4: Correct behaviour when not receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 4.3.2.2.2.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 4.3.2.2.2.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 4.3.2.2.2.5-4.

Table 4.3.2.2.2.5-2: Absolute power tolerance Test requirements

Conditions	Tolerance
Normal	± 11.1 dB

Table 4.3.2.2.5-3: Relative power tolerance Test requirements

Power step ∆P (Up or down) (dB)	PRACH (dB)
2 ≤ ΔP < 3	± 3.2

Table 4.3.2.2.5-4: Te Timing error Test requirements

Frequency Range	SCS of SSB signals (kHz)	SCS of uplink signals s(KHz)	T _e	
1	15	15	880*T _c	
	30	30	624*T _c	
Note 1: T _c is the basic timing unit defined in TS 38.211 [7]				

4.3.2.3 Void

4.4 Timing

4.4.1 UE transmit timing

4.4.1.0 Minimum conformance requirements

4.4.1.0.1 Minimum conformance requirements for UE transmit timing accuracy

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is specified in Table 4.4.1.0.1-1. This requirement applies:

- when it is the first transmission in a DRX cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission.

The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{c}}$. The downlink timing is defined as the time when the first detected path (in time) of the corresponding downlink frame is received from the reference cell. N_{TA} for PRACH is defined as 0.

 $(N_{\rm TA} + N_{\rm TA~offset}) \times T_{\rm c}$ (in T_c units) for other channels is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance in TS 38.133 [6] clause 7.3 was applied. $N_{\rm TA}$ for other channels is not changed until next timing advance is received. The value of $N_{\rm TA~offset}$ depends on the duplex mode of the cell in which the uplink transmission takes place and the frequency range (FR). $N_{\rm TA~offset}$ is defined in Table 4.4.1.0.1-2.

Frequency Range	SCS of SSB signals (KHz)	SCS of uplink signals s(KHz)	T _e	
		15	12*64*T _c	
	15	30	10*64*T _c	
1		60	10*64*T _c	
1	30	15	8*64*T _c	
		30	8*64*T _c	
		60	7*64*T _c	
	120	60	3.5*64*T _c	
2	120	120	3.5*64*T _c	
	240	60	3*64*T _c	
		120	3*64*T _c	
Note 1: T _c is	ote 1: T_c is the basic timing unit defined in TS 38.211 [6]			

Table 4.4.1.0.1-1: Te Timing Error Limit

Table 4.4.1.0.1-2: The Value of $N_{\mathrm{TA~offset}}$

Freque	ency range and band of cell used for uplink transmission	N _{TA offset} (Unit: T _c)			
FR1 FDD	band without LTE-NR coexistence case or FR1	25600 (Note 1)			
TDD ban	d without LTE-NR coexistence case				
FR1 FDD	band with LTE-NR coexistence case	0 (Note 1)			
FR1 TDD	band with LTE-NR coexistence case	39936 (Note 1)			
FR2	FR2 13792				
Note 1:	Note 1: The UE identifies $N_{ m TA~offset}$ based on the information n-TimingAdvanceOffset				
	according to [2]. If UE is not provided with the information n-				
TimingAdvanceOffset, the default value of $N_{ m TA~offset}$ is set as 25600 for FR1					
	band. In case of multiple UL carriers in the same TAG, UE expects that the same value of n-TimingAdvanceOffset is provided for all the UL carriers				
	according to section 4.2 in [3] and the value 39936 of $N_{ m TA~offset}$ can also be				
	provided for a FDD serving cell.Note 2: Void				

When it is not the first transmission in a DRX cycle or there is no DRX cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame of the reference cell except when the timing advance in TS 38.133 [6] clause 7.3 is applied.

When the transmission timing error between the UE and the reference timing exceeds $\pm T_e$, the UE is required to adjust its timing to within $\pm T_e$. The reference timing shall be $(N_{\rm TA} + N_{\rm TA \, offset}) \times T_c$ before the downlink timing of the reference cell. All adjustments made to the UE uplink timing shall follow these rules:

- 1) The maximum amount of the magnitude of the timing change in one adjustment shall be T_q.
- 2) The minimum aggregate adjustment rate shall be T_p per second.
- 3) The maximum aggregate adjustment rate shall be T_q per 200ms.

where the maximum autonomous time adjustment step T_q and the aggregate adjustment rate T_p are specified in Table 4.4.1.0.1-3.

Table 4.4.1.0.1-3: T_q Maximum Autonomous Time Adjustment Step and T_p Minimum Aggregate Adjustment rate

Frequency Range	SCS of uplink signals (KHz)	Tq	Тр	
	15	5.5*64*T _c	5.5*64*T _c	
1	30	5.5*64*T _c	5.5*64*T _c	
	60	5.5*64*T _c	5.5*64*T _c	
2	60	2.5*64*T _c	2.5*64*T _c	
2	120	2.5*64*T _c	2.5*64*T _c	
NOTE 1: T _c is the basic timing unit defined in TS 38.211 [6]				

The normative reference for this requirement is TS.38.133 [6] clause 7.1.2.

4.4.1.1 EN-DC FR1 UE transmit timing accuracy

4.4.1.1.1 Test purpose

The purpose of this test is to verify that the UE can follow frame timing change of the connected gNB and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits.

4.4.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.4.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.4.1.0.1.

The normative reference for this requirement is TS.38.133 [6] clause A.4.4.1.1

4.4.1.1.4 Test Description

4.4.1.1.4.1 Initial Conditions

This test can be run in one of the configurations defined in Table 4.4.1.1.4.1-1.

Table 4.4.1.1.4.1-1: Supported test configurations for FR1 PSCell

Configuration	Description		
4.4.1.1-1	LTE FDD, NR FDD, SSB SCS 15 KHz, data SCS 15 KHz, BW 10 MHz		
4.4.1.1-2	LTE FDD, NR TDD, SSB SCS 15 KHz, data SCS 15 KHz, BW 10 MHz		
4.4.1.1-3	LTE FDD, NR TDD, SSB SCS 30 KHz, data SCS 30 KHz, BW 40 MHz		
4.4.1.1-4	LTE TDD, NR FDD, SSB SCS 15 KHz, data SCS 15 KHz, BW 10 MHz		
4.4.1.1-5	LTE TDD, NR TDD, SSB SCS 15 KHz, data SCS 15 KHz, BW 10 MHz		
4.4.1.1-6	LTE TDD, NR TDD, SSB SCS 30 KHz, data SCS 30 KHz, BW 40 MHz		
1	Iote: The UE is only required to be tested in one of the supported test configurations in FR1 depending on UE capability.		

Configure the test equipment and the DUT according to the parameters in Table 4.4.1.1.4.1-2

Parameter	Value		Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As	s specified in Annex E.1.1, Table E.2	2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.4.1.1.4.1-1		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part A.3.2.3.4		
Exceptions to connection		N/A	

Table 4.4.1.1.4.1-2: Initial conditions for EN-DC FR1 transmit timing accuracy

- 1. Message contents are defined in clause 6 4.4.1.1.4.3.
- 2. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.6.1.1-1. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2.
- 3. Downlink signals for NR cell are initially set up according to Annex C.1.

4.4.1.1.4.2 Test procedure

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). The downlink timing of the PSCell is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS used as a measurement reference facilitating the SS timing estimation.

The test sequence shall be carried out in RRC_CONNECTED for every test case.

Following will be the test sequence for this test

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set up E-UTRA PCell according to parameters given in Table A.6.1.1-1 and setup NR PSCell according to parameters given in Table 4.4.1.1.4.1-1.
- 3. The SS shall transmit an RRCConnectionReconfiguration message configuring the UE with the message content defined in clause 4.4.1.1.4.3.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. After connection set up with the cell, the test equipment will verify that the timing of the NR cell is within ($N_{TA} + N_{TA_offset}$) \pm T_e of the first detected path of DL SSB.
 - a. The N_{TA} offset value (in T_c units) is 25600 for FR1
 - b. The T_e values depend on the DL and UL SCS for which the test is being run and are given in Table 4.4.1.1.5-4.
- 6. The test system shall adjust the timing of the DL path by values given in Table 4.4.1.1.4.2-1

Table 4.4.1.1.4.2-1: Adjustment Value for DL Timing

SCS of SSB signals (KHz)	Adjustment Value	
	Test1	Test2
15	+64*64Tc	+32*64Tc
30	+32*64Tc	+16*64Tc

- 7. The test system shall verify that the adjustment step size and the adjustment rate shall be according to requirements specified in Table 4.4.1.1.5-5. This will only be done for Test1. The test system samples the UE Transmit Timing once per SRS transmission (as per configured SRS periodicity). To check Rule 1, the SS shall check that the maximum time adjustment step size T_q between one SRS transmission to next consecutive SRS transmission of a valid UL slot is within Rule 1 as specified in clause 4.4.1.0.1 and Table 4.4.1.0.1-3. To check that the minimum adjustment rate is within Rule 2 as specified in clause 4.4.1.0.1 and Table 4.4.1.0.1-3, the SS shall measure the change in SRS transmission timing over a 1 + offset seconds sliding window (offset in ms to the next consecutive SRS transmission), with step size p (where p is the periodicity of SRS), as long as the resulting slot is a valid UL slot. To check that the maximum adjustment rate is within Rule 3 as specified in clause 4.4.1.0.1 and Table 4.4.1.0.1-3, the SS shall measure the change in SRS transmission timing over a 200ms offset sliding window of previous SRS transmission, with step size p (where p is the periodicity of SRS), as long as the resulting slot is a valid UL slot. The three rules apply until the UE transmit timing offset is within the limits specified in 4.4.1.0.1 and Table 4.4.1.0.1-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 8. The test system shall verify that the UE transmit timing offset stays within $(N_{TA} + N_{TA_offset}) \pm T_e$ of the first detected path of DL SSB. For Test 2 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment

4.4.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions:

Table 4.4.1.1.4.3-1: SRS-Config: Additional test requirement for UE transmit timing accuracy for ENDC FR1 UE

Derivation Path: TS 38.331 [6], clause 6.3.2			
Information Element	Value/remark	Comment	Condition
SRS-Config ::= SEQUENCE {			
srs-ResourceSetToReleaseList	Not present		
srs-ResourceSetToAddModList SEQUENCE			
(SIZE(0maxNrofSRS-ResourceSets)) OF			
SEQUENCE {			
srs-ResourceSetId	0		
srs-ResourceldList SEQUENCE			Test 1, Test
(SIZE(1maxNrofSRS-ResourcesPerSet)) OF {			2 and 15kHz SCS, Test 2 and 30kHz SCS
SRS-Resourceld[1]	0		
}			
resourceType CHOICE {			
periodic SEQUENCE {			
periodicityAndOffset-p	sl1		Test 1
periodicityAndOffset-p	sl320		Test 2 and 15kHz SCS
periodicityAndOffset-p	sl640		Test 2 and
,			30kHz SCS
}			
}			
usage	codebook		
alpha	Alpha		
p0	0		
pathlossReferenceRS CHOICE {			+
ssb-Index	SSB-Index		
33b-IIIdeX	33B-IIIdex		
srs-PowerControlAdjustmentStates	Not present		
1	Not present		
srs-ResourceToReleaseList	Not present		
srs-ResourceToAddModList SEQUENCE	Not present		
(SIZE(1maxNrofSRS-Resources)) OF SEQUENCE {			
srs-ResourceId	0		
nrofSRS-Ports	Port1		
ptrs-PortIndex	Not present		
transmissionComb CHOICE {			
n2 SEQUENCE {			
combOffset-n2	0		-
cyclicShift-n2	0		+
}			-
}			
resourceMapping SEQUENCE {		1	1
startPosition	0	1	1
nrofSymbols	n1		1
repetitionFactor	n1		1
}			1
freqDomainPosition	0		1
freqDomainShift	0		
freqHopping SEQUENCE {			
c-SRS	1		
b-SRS	0		
b-hop	0		
}			
groupOrSequenceHopping		NOT PRESENT	
}	1		1
sequenceld	0		1
spatialRelationInfo SEQUENCE {	SRS-SpatialRelationInfo		+
servingCellId	Not present		+
referenceSignal CHOICE {	1 NOT PICOCIII	1	+
ssb-Index	SSB-Index		+
29n-IIIncv	JOD-IIIUCX		

}		
}		
}		
tpc-Accumulation	Not present	
}		

Table 4.4.1.1.4.3-2: DRX-Config: Additional test requirement for UE transmit timing accuracy Test 2 for EN-DC FR1

Derivation Path: TS 38.331 [6], clause 6.3.2			
Information Element	Value/remark	Comment	Condition
DRX-Config ::= CHOICE {			
drx-onDurationTimer CHOICE {			
milliSeconds	ms6		
}			
drx-InactivityTimer	ms1		
drx-HARQ-RTT-TimerDL	56		
drx-HARQ-RTT-TimerUL	56		
drx-RetransmissionTimerDL		sl1	
drx-RetransmissionTimerUL		sl1	
drx-LongCycleStartOffset CHOICE {			
ms320	0		
}			
shortDRX		NOT PRESENT	
drx-SlotOffset	0		
}			

4.4.1.1.5 Test Requirements

Table 4.4.1.1.5-1: Cell Specific Test Parameters for UL Transmit Timing test

Parameter	Unit	Config	Test1	Test2	Band Group
SSB ARFCN		1,2,3	Freq1	Freq1	•
Duplex Mode		1		FDD	
Duplex Wode		2,3		TDD	
TDD		1`		ot Applicable	
TDD configuration		2		DDConf.1.1	
		3	Т	DDConf.2.1	
		1	10	: NRB,c = 52	
BW _{channel}	MHz	2	10	0: N _{RB,c} = 52	
		3		$N_{RB,c} = 106$	
		1		: NRB,c = 52	
BWP BW	MHz	2	10: N _{RB,c} = 52 40: N _{RB,c} = 106		
		3			
DRx Cycle	ms	1,2,3	N/A	320 ^{Note5}	
PDSCH Reference		1	5	SR.1.1 FDD	
measurement		2	5	SR.1.1 TDD	
channel		3	9	SR.2.1 TDD	
CORESET		1	CR.1.1 FDD		
Reference Channel		2	C	R.1.1 TDD	
		3	CR.2.1 TDD		
OCNG Patterns		1,2,3	OCNG pattern 1		
SMTC configuration		1,2	FI	R1 pattern 1	
SMTC configuration		3	FI	R1 pattern 2	
PDSCH/PDCCH	kHz	1,2		15	
subcarrier spacing	KIIZ	3		30	

EPRE ratio of PSS					
to SSS					
EPRE ratio of PBCH					
DMRS to SSS					
EPRE ratio of PBCH					
to PBCH DMRS					
EPRE ratio of					
PDCCH DMRS to					
SSS					
EPRE ratio of					
PDCCH to PDCCH	l n	4.00			
DMRS	dB	1,23	0	0	
EPRE ratio of PDSCH DMRS to					
SSS					
EPRE ratio of					
PDSCH to PDSCH					
EPRE ratio of OCNG					
DMRS to SSS(Note					
1)					
EPRE ratio of OCNG					
to OCNG DMRS					
(Note 1)					
N_{oc} Note2	dBm/15 kHz	1,2,3	-98	-98	
$N_{_{OC}}$ Note2	dBm/SCS	1,2	-98	-98	
00	UDI11/3C3	3	-95	-95	
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		1,2,3	3	3	
\hat{E}_s/N_{oc}		1,2,3	3	3	
SS-RSRP ^{Note3}	dBm/SCS	1,2	-95	-95	
	uBIII/SCS	3	-92	-92	
IO ^{Note3}	dBm/9.36MHz	1,2	-65.2	-65.2	
	dBm/38.1MHz	3	-59.2	-59.2	7
Propagation		1,2,3		AWGN	
condition					
SRS Config		1,2,4,5	Config1 ^{Note6}	Config3 ^{Note6}	
		3, 6	Config1 ^{Note6}	Config2 ^{Note6}	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: DRx related parameters are given in Table 4.4.1.1.5-3
- Note 6: SRS configs are given in Table 4.4.1.1.5-2

Table 4.4.1.1.5-2: SRS Configuration for Timing Accuracy Test

	Field	Config1	Config2	Config 3	Comments
SRS-	srs-ResourceSetId	0	0	0	
ResourceSet	srs-ResourceldList	0	0	0	
	resourceType	Periodic	Periodic	Periodic	
	Usage	Codebook	Codebook	Codebook	
	SRS-ResourceSetId	0	0	0	
SRS-Resource	nrofSRS-Ports	Port1	Port1	Port1	
	transmissionComb	n2	n2	n2	
	combOffset-n2	0	0	0	
	cyclicShift-n2	0	0	0	
	resourceMapping startPosition	0	0	0	
	resourceMapping nrofSymbols	n1	n1	n1	

resourceMapping repetitionFactor	n1	n1	n1	
freqDomainPosition	0	0	0	
freqDomainShift	0	0	0	
freqHopping	sl1	sl1	sl1	
c-SRS				
freqHopping	0	0	0	
b-SRS				
freqHopping	0	0	0	
b-hop				
groupOrSequenceHopping	Neither	Neither	Neither	
resourceType	Periodic	Periodic	Periodic	
periodicityAndOffset-p	sl1	sl640	sl320, 0	Offset to align with DRx periodicity
sequenceld	0	0	0	Any 10 bit number

Table 4.4.1.1.5-3: DRX-Configuration for UL Timing Tests

Field	Test 2	
Ficiu	Value	
drx-onDurationTimer	6 ms	
drx-InactivityTimer	1 ms	
drx-RetransmissionTimerDL	1 slot	
drx-RetransmissionTimerUL	1 slot	
longDRX-CycleStartOffset	320 ms	
shortDRX	disable	
TimeAlignmentTimer	Infinity	
Note: The DRX cycle and time alignment timer parameters are specified in clause 6.3.2 in TS 38.331 [13]		

Table 4.4.1.1.5-4: Te Timing Error Limit

Frequency Range	SCS of SSB signals (KHz)	SCS of uplink signals s(KHz)	T _e
		15	13.75*64*T _c
	15	30	11.75*64*T _c
1		60	11.75*64*T _c
		15	9.75*64*T _c
	30	30	9.75*64*T _c
		60	8.75*64*T _c
Note 1: T _c is the basic timing unit defined in TS 38.211 [6]			

Table 4.4.1.1.5-5: T_q Maximum Autonomous Time Adjustment Step and T_p Minimum Aggregate Adjustment rate

Frequency Range	SCS of uplink signals (KHz)	Tq	Tp	
	15	5.5*64*T _c	5.5*64*T _c	
1	30	5.5*64*T _c	5.5*64*T _c	
	60	5.5*64*T _c	5.5*64*T _c	
NOTE 1: T_c is the basic timing unit defined in TS 38.211 [6]				

4.4.2 UE timer accuracy

4.4.3 Timing advance

4.4.3.0 Minimum conformance requirements

The timing advance is initiated from PSCell in EN-DC operation mode with MAC message that implies and adjustment of the timing advance, as defined in clause 5.2 of TS 38.321 [12].

4.4.3.0.1 Minimum conformance requirements for timing advance adjustment accuracy

The UE shall adjust the timing of its transmissions with a relative accuracy better than or equal to the UE Timing Advance adjustment accuracy requirement in Table 4.4.3.0.1-1, to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command step is defined in TS38.213 [8].

Table 4.4.3.0.1-1: UE Timing Advance adjustment accuracy

Sub Carrier Spacing, SCS kHz	15	30	60	120
UE Timing Advance adjustment accuracy	±256 T _c	±256 T _c	±128 T _c	±32 T _c

4.4.3.0.2 Minimum conformance requirements for timing advance adjustment delay

UE shall adjust the timing of its uplink transmission timing at time slot n+k for a timing advance command received in time slot n, and the value of k is defined in section 4.2 in TS 38.213 [8]. The same requirement applies also when the UE is not able to transmit a configured uplink transmission due to the channel assessment procedure.

The normative reference for this requirement is TS.38.133 [6] clause A.4.4.3.1.

4.4.3.1 EN-DC FR1 timing advance adjustment accuracy

4.4.3.1.1 Test purpose

The purpose of the test is to verify UE timing advance adjustment delay and accuracy requirement defined in clause 7.3 of TS 38.133 [6].

4.4.3.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.4.3.1.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 4.4.3.0.1 and clause 4.4.3.0.2.

The normative reference for this requirement is TS.38.133 [6] clause A.4.4.3.1.

4.4.3.1.4 Test description

4.4.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.4.3.1.4.1-1.

Table 4.4.3.1.4.1-1: EN-DC FR1 timing advance adjustment accuracy supported test configurations

Test Case ID	Description		
4.4.3.1.4.1-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD		
4.4.3.1.4.1-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD		
4.4.3.1.4.1-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD		
4.4.3.1.4.1-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD		
4.4.3.1.4.1-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD		
4.4.3.1.4.1-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD		
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.4.3.1.4.1-2

Table 4.4.3.1.4.1-2: Initial conditions for EN-DC FR1 timing advance adjustment accuracy

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E.1.1, E.1.2, and Table E.	2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	As specified	by the test configuration selected fr	om Table 4.4.3.1.4.1-1
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

Table 4.4.3.1.4.1-3: General test parameters for timing advance

Parameter	Unit	Value	Comment
RF channel number		Cell 1: 1	1 for E-UTRAN Pcell
		Cell 2: 2	2 for NR PSCell
DL BWP		DLBWP.1.1	As specified in Table A.8.1-2
UL BWP		ULBWP.1.1	As specified in Table A.8.2-2
Timing Advance Command (T_A) value during T1		31	N _{TA_new =} N _{TA_old} for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	For SCS = 15kHz, $N_{TA_new} = N_{TA_old} + 8192*T_c$ (based on equation in TS38.213 [8] section 4.2) For SCS = 30kHz, $N_{TA_new} = N_{TA_old} + 4096*T_c$ (based on equation in TS38.213 [8] section 4.2)
T1	S	5	
T2	S	5	

- 1. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.1.
- 2. Downlink signals for NR cell are initially set up according to Annex C.1.2, C.1.3.

4.4.3.1.4.2 Test Procedure

The test consists of two cells, a single E-UTRA cell (PCell), and a single NR cell (PSCell). Cell 1 is the PCell in the primary Timing Advance Group (pTAG) and cell 2 is the PSCell is in the secondary Timing Advance Group (sTAG). The test consists of two successive time periods, with time durations of T1 and T2 respectively. In each time period, timing advance commands for sTAG are sent to the UE and Sounding Reference Signals (SRS), as specified in Table 4.4.3.1.4.1-3 and Table 4.4.3.1.5-2, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured for PSCell in sTAG. The UE Time Alignment Timer (timeAlignmentTimer IE), described in Clause 5.2 in TS 38.321[12], shall be configured so that it does not expire in the duration of the test.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. Message content are defined in clause 4.4.3.1.4.3.
- 2. Set the parameters according to values in Tables 4.4.3.1.4.1-3 and Table 4.4.3.1.5-1 as appropriate. Propagation conditions are set according to Annex C.2.2.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.

- 5. During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element for sTAG, as specified in Clause 6.1.3.4 in TS 38.321 [12]. The Timing Advance Command value shall be set to 31, which according to Clause 4.2 in TS 38.213 [8] results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance for sTAG used by the UE is established.
- 6. During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements for sTAG, with Timing Advance Command value of 39 as specified in Table 4.4.3.1.4.1-3.
- 7. This value shall result in changes of the timing advance for sTAG used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.
- 8. As specified in Clause 7.3.2.1 of TS 38.133 [6], the UE adjusts its uplink timing at slot n+k for a timing advance command received in slot n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.
- 9. The UE Time Alignment Timer, described in Clause 5.2 in TS 38.321 [12], shall be configured so that it does not expire in the duration of the test.
- 10. The result from the SRS and adjustment of the timing advance in step 7) is used to measure that the UE adjusts the timing of its transmission with a relative accuracy better than or equal to value specified in Table 4.4.3.0.1-1 to the signalled timing advance value compared to the timing of preceding uplink transmission.
- 11. If the UE adjust the timing of its transmission within a relative accuracy greater than or equal to value specified in Table 4.4.3.0.1-1 to the signalled timing advance value compared to the timing of preceding uplink transmission then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 12. The SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 13. The SS then shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 14. If any of the above Reconfiguration in Step 12 or 13 fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 15. Repeat steps 3-14 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.4.3.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1, with exceptions listed below in the Table 4.4.3.1.4.3-1

Table 4.4.3.1.4.3-1: srs-Config setup

Derivation Path: TS 38.508-1, Table 4.6.3-182			
Information Element	Value/remark	Comment	Condition
SRS-Config ::= SEQUENCE {			
srs-ResourceSetToAddModList SEQUENCE	[1 entry]		
(SIZE(0maxNrofSRS-ResourceSets)) OF			
SEQUENCE {			
srs-ResourceSetId	0		
srs-ResourceIdList SEQUENCE	1 entry		
(SIZE(1maxNrofSRS-ResourcesPerSet)) OF {			
SRS-ResourceId[1]	0		
}			
resourceType CHOICE {			
periodic SEQUENCE {			
}			
}			
Usage	Codebook		
pathlossReferenceRS CHOICE {	CCD Index		-
ssb-Index	SSB-Index		
are DecourseTe AddMedLint SESUJENISE	1 anto		
srs-ResourceToAddModList SEQUENCE	1 entry		
(SIZE(1maxNrofSRS-Resources)) OF SEQUENCE {			+
srs-Resourceld nrofSRS-Ports	0		-
	port1		+
transmissionComb CHOICE { n2 SEQUENCE {			+
combOffset-n2	0		+
cyclicShift-n2	0		
tychc3fillt-f12	0		
1			
resourceMapping SEQUENCE {			+
startPosition	0		
nrofSymbols	n1		+
repetitionFactor	n1		+
}			
freqDomainPosition	0		
freqDomainShift	0		
freqHopping SEQUENCE {			1
c-SRS	12	Config 1,2,4,5	
	24	Config 3,6	
b-SRS	0	3 - , -	
b-hop	0		
}			
groupOrSequenceHopping	neither		
resourceType CHOICE {			
periodic SEQUENCE {	periodic		
}			
periodicityAndOffset-p	sl5 : 0	Once every 5	
		Slots	
}			
}			

4.4.3.1.5 Test Requirement

The UE shall apply the signalled Timing Advance value for PSCell in sTAG to the transmission timing at the designated activation time i.e. k+1 slots after the reception of the timing advance command, where:

k = 5 for Config 1, 2, 3, 4, 5, 6

The Timing Advance adjustment accuracy for PSCell in sTAG shall be within the limits specified in clause 4.4.3.0.1.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

Table 4.4.3.1.5-1 and Table 4.4.3.1.5-2 define the primary level settings.

Table 4.4.3.1.5-1: Cell specific test parameters for timing advance

Parameter	Linit	Test1	
Parameter	Unit	T1	T2

D	Config 1,4		FDD
Duplex mode Config 2,3,5,6			TDD
	Config 1,4		Not Applicable
TDD configuration	Config 2,5		TDDConf.1.1
	Config 3,6		TDDConf.2.1
	Config 1,4		10: N _{RB,c} = 52
$BW_{channel}$	Config 2,5	MHz	10: N _{RB,c} = 52
	Config 3,6		40: N _{RB,c} = 106
	Config 1,4		10: N _{RB,c} = 52
BWP BW	Config 2,5	MHz	10: N _{RB,c} = 52
	Config 3,6		40: N _{RB,c} = 106
DRx C	!	ms	Not Applicable
	0		
	Config 1,4		SR.1.1 FDD
PDSCH Reference measurement channel	Config 2,5		SR.1.1 TDD
	Config 3,6		SR2.1 TDD
	Config 1,4		CR.1.1 FDD
CORESET Reference Channel	Config 2,5		CR.1.1 TDD
	Config 3,6		CR2.1 TDD
OCNG Patterns			OCNG pattern 1
TRS configuration	Config 1,4		TRS.1.1 FDD
	Config 2,5		TRS.1.1 TDD
	Config 3,6		TRS.1.2 TDD
0.170	Config 1,2,4,5		SMTC.1 FR1
SMTC configuration	Config 3,6		SMTC.2 FR1
PDSCH/PDCCH	Config 1,2,4,5		15 kHz
subcarrier spacing	Config 3,6	kHz	30 kHz
PUCCH/PUSCH	Config 1,2,4,5	_	15 kHz
subcarrier spacing	Config 3,6	kHz	30 kHz
EPRE ratio of F	PSS to SSS		
EPRE ratio of PBCI	H DMRS to SSS		
EPRE ratio of PBCH			
EPRE ratio of PDCC EPRE ratio of PDCCH			_
EPRE ratio of PDSC	H DMRS to SSS	dB	0
EPRE ratio of PDS			
EPRE ratio of OCNG DI			
EPRE ratio of OCNG to OCNG DMRS (Note 1)			
$N_{oc}^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{^{$		dBm/15kH z	-98
N_{oc}^{Note} Config 1,2,4,5 Config 3,6			-98
		dBm/SCS	-95
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	3
\hat{E}_s/N_{oc}		dB	3
Io ^{Note3}	onfig 1,2,4,5	dBm/ 9.36MHz dBm/	-67.57
-	Config 3,6		-62.58
Propagation condition		38.16MHz -	AWGN
		cells are fully	allocated and a constant total transmitted power spectral

	density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over
	subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 3:	Io levels have been derived from other parameters for information purposes. They are not settable
	parameters themselves.

Table 4.4.3.1.5-2: Sounding Reference Symbol Configuration for timing advance

Field		Value	Comment
c-SRS	Config 1,2,4,5	12	
C-SRS	Config 3,6	24	Fraguency hopping is disabled
b-S	SRS	0	Frequency hopping is disabled
b-h	пор	0	
freqDoma	inPosition	0	Frequency domain position of SRS
freqDon	nainShift	0	
groupOrSequ	ienceHopping	neither	No group or sequence hopping
SRS-PeriodicityAndOffset		sl5=0	Once every 5 slots
pathlossReferenceRS		ssb-Index=0	SSB #0 is used for SRS path loss estimation
Usage		Codebook	Codebook based UL transmission
startP	osition	0	resourceMapping setting. SRS on last
nrofSy	/mbols	n1	symbol of slot, and 1symbols for SRS
repetition	repetitionFactor		without repetition.
combO	combOffset-n2		transmissionComb setting
cyclicS	cyclicShift-n2		transmission comb setting
nrofSRS-Ports		port1	Number of antenna ports used for SRS transmission
Note: For further information see clause 6		6.3.2 in TS 38.331.	

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.5 Signaling characteristics

4.5.1 Radio link monitoring

The requirements in this section apply for radio link monitoring on PSCell in EN-DC operation mode.

The UE shall monitor the downlink link quality based on the reference signal in the configured RLM-RS resource(s) in order to detect the downlink radio link quality of the PCell and PSCell as specified in TS 38.213 [8]. The configured RLM-RS resources can be all SSBs, or all CSI-RSs, or a mix of SSBs and CSI-RSs. UE is not required to perform RLM outside the active DL BWP.

On each RLM-RS resource, the UE shall estimate the downlink radio link quality and compare it to the thresholds Q_{out} and Q_{in} for the purpose of monitoring downlink radio link quality of the cell.

4.5.1.0 Minimum conformance requirements

4.5.1.0.1 Minimum conformance requirements for out-of-sync SSB-based RLM

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_out_SSB}}$ [ms] period becomes worse than the threshold $Q_{\text{out_SSB}}$ within $T_{\text{Evaluate_out_SSB}}$ [ms] evaluation period. The requirements in this section apply for each SSB based RLM-RS resource configured for PSCell, provided that the SSB configured for RLM is transmitted within UE active DL BWP during the entire evaluation period defined in Table 4.5.1.0.1-1.

T_{Evaluate_out_SSB} is defined in Table 4.5.1.0.1-1 for FR1.

Table 4.5.1.0.1-1: Evaluation period T_{Evaluate_out} for FR1

Configuration		T _{Evaluate_out_SSB} (ms)	
no DRX		max(200,ceil(10*P)*T _{SSB})	
DRX cycle≤320		$max(200,ceil(15*P)*max(T_{DRX},T_{SSB}))$	
DRX cycle>320		ceil(10*P)*T _{DRX}	
NOTE:	TE: T _{SSB} is the periodicity of SSB configured for RLM.		
T _{DRX} is the DRX cycle length			

For FR1,

- P=1/(1 T_{SSB}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the SSB; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB.

If the high layer in TS 38.331 [13] signaling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; otherwise $T_{SMTCperiod}$ follows smtc1.

The normative reference for this requirement is TS 38.133 [6] clause 8.1.2.

4.5.1.0.2

4.5.1.0.3 Minimum conformance requirements for out-of-sync CSI-RS based RLM

[TS 38.133, clause 8.1.3.1]

The requirements apply for each CSI-RS based RLM-RS resource configured for PSCell, provided that the CSI-RS configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in TS 38.133, clause 8.1.3.2. UE is not expected to perform radio link monitoring measurements on the CSI-RS configured as RLM-RS if the CSI-RS is not in the active TCI state of any CORESET configured in the UE active BWP.

[TS 38.133, clause 8.1.3.2]

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_out_CSI-RS}}$ [ms] period becomes worse than the threshold $Q_{\text{out_CSI-RS}}$ within $T_{\text{Evaluate_out_CSI-RS}}$ [ms] evaluation period.

- T_{Evaluate_out_CSI-RS} is defined in Table 4.5.1.0.3-1 for FR1.

For FR1,

- P=1/(1 T_{CSI-RS}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

The value of M_{out} used in Table 4.5.1.0.3-1 is defined as:

- M_{out} = 20 if the CSI-RS resource configured for RLM is transmitted with higher layer CSI-RS parameter *density* set to 3 and over the bandwidth \geq 24 PRBs.

Table 4.5.1.0.3-1: Evaluation period T_{Evaluate_out_CSI-RS} for FR1

Configuration		T _{Evaluate_out_CSI-RS} (ms)
no DRX		$max(200, ceil(M_{out} \times P) \times T_{CSI-RS})$
DRX ≤ 320ms		$max(200, ceil(1.5 \times M_{out} \times P) \times max(T_{DRX},$
		T _{CSI-RS}))
DRX > 320ms		$ceil(M_{out} \times P) \times T_{DRX}$
NOTE:	T _{CSI-RS} is the period	dicity of CSI-RS resource configured for
	ments in this table apply for T_{CSI-RS}	
		ms, 20 ms or 40 ms. T _{DRX} is the DRX
	cycle length.	

[TS 38.133, clause 8.1.3.3]

The UE is required to be capable of measuring CSI-RS for RLM without measurement gaps. The UE is required to perform the CSI-RS measurements with measurement restrictions as described in the following clauses.

For FR1, when the CSI-RS for RLM is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for RLM in the PRBs that overlap with an SSB.

For FR1, when the SSB for RLM/BFD/CBD/L1-RSRP measurement is within the active BWP and has same SCS than CSI-RS for RLM, the UE shall be able to perform CSI-RS measurement without restrictions.

For FR1, when the SSB for RLM/BFD/CBD/L1-RSRP measurement is within the active BWP and has different SCS than CSI-RS for RLM, the UE shall be able to perform CSI-RS measurement with restrictions according to its capabilities:

- If the UE supports *simultaneousRxDataSSB-DiffNumerology* the UE shall be able to perform CSI-RS measurement without restrictions.
- If the UE does not support *simultaneousRxDataSSB-DiffNumerology*, UE is required to measure one of but not both CSI-RS for RLM and SSB. Longer measurement period for CSI-RS based RLM is expected, and no requirements are defined.

For FR1, when the CSI-RS for RLM is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement, UE shall be able to measure the CSI-RS for RLM without any restriction.

[TS 38.133, clause 8.1.4 and 8.1.5]

When the UE transitions between DRX and no DRX or when DRX cycle periodicity changes, for each RLM-RS resource, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation period corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode for each RLM-RS resource. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of RLM-RS resources to a second configuration of RLM-RS resources that is different from the first configuration, for each RLM-RS resource present in the second configuration, for a duration of time equal to the evaluation period corresponding to the second configuration after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first configuration and the second configuration. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second configuration for each RLM-RS resource present in the second configuration. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of active TCI state of the CORESET to a second configuration of active TCI state of the CORESET, for each CSI-RS for RLM present in the second configuration, the UE shall use an evaluation period corresponding to the second configuration from the time of transition. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

The transmitter power of the UE in the monitored cell shall be turned off within 40ms after expiry of T310 timer as specified in TS 38.331.

[TS 38.133, clause 8.1.6]

When the downlink radio link quality on all the configured RLM-RS resources is worse than Q_{out} , Layer 1 of the UE shall send an out-of-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 38.331.

The out-of-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 in TS 38.213. Two successive indications from Layer 1 shall be separated by at least $T_{Indication\ interval}$.

When DRX is not used $T_{Indication_interval}$ is max(10ms, $T_{RLM-RS,M}$), where $T_{RLM,M}$ is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to T_{SSB} specified in clause 8.1.2 if the RLM-RS resource is SSB, or T_{CSI-RS} specified in clause 8.1.3 if the RLM-RS resource is CSI-RS.

In case DRX is used, $T_{Indication_interval}$ is max(10ms, 1.5*DRX_cycle_length, 1.5*T_{RLM-RS,M}) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms. Upon start of T310 timer as specified in TS 38.331 [2], the UE shall monitor the configured RLM-RS resources for recovery using the evaluation period and Layer 1 indication interval corresponding to the no DRX mode until the expiry or stop of T310 timer.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 8.1.3, 8.1.4, 8.1.5 and 8.1.6.

4.5.1.0.4 Minimum conformance requirements for in-sync CSI-RS based RLM

[TS 38.133, clause 8.1.3.1]

The requirements apply for each CSI-RS based RLM-RS resource configured for PSCell, provided that the CSI-RS configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in TS 38.133 clause 8.1.3.2. UE is not expected to perform radio link monitoring measurements on the CSI-RS configured as RLM-RS if the CSI-RS is not in the active TCI state of any CORESET configured in the UE active BWP.

[TS 38.133, clause 8.1.3.2]

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_in_CSI-RS}}$ [ms] period becomes better than the threshold $Q_{\text{in_CSI-RS}}$ within $T_{\text{Evaluate_in_CSI-RS}}$ [ms] evaluation period.

- T_{Evaluate_in_CSI-RS} is defined in Table 8.1.3.2-1 for FR1.

For FR1,

- P=1/(1 T_{CSI-RS}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

The value of $M_{\mbox{\scriptsize in}}$ used in Table 8.1.3.2-1 is defined as:

- M_{in} = 10, if the CSI-RS resource configured for RLM is transmitted with higher layer CSI-RS parameter *density* set to 3 and over the bandwidth \geq 24 PRBs.

Table 8.1.3.2-1: Evaluation period T_{Evaluate_in_CSI-RS} for FR1

Configuration		T _{Evaluate_in_CSI-RS} (ms)
no DRX		$max(100, ceil(M_{in} \times P) \times T_{CSI-RS})$
DRX ≤ 320ms		$max(100, ceil(1.5 \times M_{in} \times P) \times max(T_{DRX}, T_{CSI})$
		RS))
DRX > 320ms		$ceil(M_{in} \times P) \times T_{DRX}$
NOTE: T _{CSI-RS} is the period		dicity of CSI-RS resource configured for
RLM. The requirem		ments in this table apply for T _{CSI-RS} equal to 5
	ms, 10ms, 20 ms	or 40 ms. T _{DRX} is the DRX cycle length.

[TS 38.133, clause 8.1.3.3]

The UE is required to be capable of measuring CSI-RS for RLM without measurement gaps. The UE is required to perform the CSI-RS measurements with measurement restrictions as described in the following clauses.

For FR1, when the CSI-RS for RLM is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for RLM in the PRBs that overlap with an SSB.

For FR1, when the SSB for RLM/BFD/CBD/L1-RSRP measurement is within the active BWP and has same SCS than CSI-RS for RLM, the UE shall be able to perform CSI-RS measurement without restrictions.

For FR1, when the SSB for RLM/BFD/CBD/L1-RSRP measurement is within the active BWP and has different SCS than CSI-RS for RLM, the UE shall be able to perform CSI-RS measurement with restrictions according to its capabilities:

- If the UE supports <code>simultaneousRxDataSSB-DiffNumerology</code> the UE shall be able to perform CSI-RS measurement without restrictions.
- If the UE does not support *simultaneousRxDataSSB-DiffNumerology*, UE is required to measure one of but not both CSI-RS for RLM and SSB. Longer measurement period for CSI-RS based RLM is expected, and no requirements are defined.

For FR1, when the CSI-RS for RLM is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement, UE shall be able to measure the CSI-RS for RLM without any restriction.

[TS 38.133, clause 8.1.4 and 8.1.5]

When the UE transitions between DRX and no DRX or when DRX cycle periodicity changes, for each RLM-RS resource, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation period corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode for each RLM-RS resource. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of RLM-RS resources to a second configuration of RLM-RS resources that is different from the first configuration, for each RLM-RS resource present in the second configuration, for a duration of time equal to the evaluation period corresponding to the second configuration after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first configuration and the second configuration. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second configuration for each RLM-RS resource present in the second configuration. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of active TCI state of the CORESET to a second configuration of active TCI state of the CORESET, for each CSI-RS for RLM present in the second configuration, the UE shall use an evaluation period corresponding to the second configuration from the time of transition. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

The transmitter power of the UE in the monitored cell shall be turned off within 40ms after expiry of T310 timer as specified in TS 38.331 [2].

[TS 38.133, clause 8.1.6]

When the downlink radio link quality on at least one of the configured RLM-RS resources is better than Q_{in} , Layer 1 of the UE shall send an in-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the in-sync indications as specified in TS 38.331 [2].

The in-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 in TS 38.213 [3]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval}$.

When DRX is not used $T_{Indication_interval}$ is max(10ms, $T_{RLM-RS,M}$), where $T_{RLM,M}$ is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to T_{SSB} specified in clause 8.1.2 if the RLM-RS resource is SSB, or T_{CSI-RS} specified in clause 8.1.3 if the RLM-RS resource is CSI-RS.

In case DRX is used, $T_{Indication_interval}$ is max(10ms, 1.5*DRX_cycle_length, 1.5* $T_{RLM-RS,M}$) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms. Upon start of T310 timer as specified in TS 38.331 [2], the UE shall monitor the configured RLM-RS resources for recovery using

the evaluation period and Layer 1 indication interval corresponding to the no DRX mode until the expiry or stop of T310 timer.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 8.1.3, 8.1.4, 8.1.5 and 8.1.6.

4.5.1.1 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

4.5.1.1.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell configured with SSB-based RLM RS in non-DRX mode. This test will partly verify the FR1 PSCell radio link monitoring requirements in TS 38.133 [6] section 8.1.2.

4.5.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.5.1.1.3 Minimum conformance requirement

The minimum requirements are specified in clause 4.5.1.0.1. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.1.

4.5.1.1.4 Test description

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1 as defined in 38.133 [6]. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 4.5.1.1.4-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

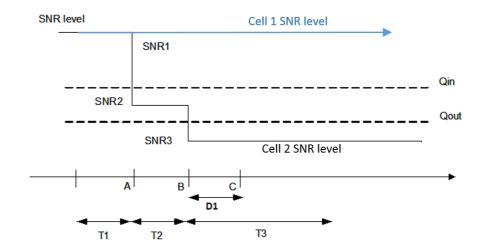


Figure 4.5.1.1.4-1: SNR variation for out-of-sync testing

4.5.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.1.1.4.1-1.

Table 4.5.1.1.4.1-1: EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode supported test configurations

Test Case ID	Description		
4.5.1.1.4.1-1	LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.1.4.1-2	LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.1.4.1-3	LTE FDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.5.1.1.4.1-4	LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.1.4.1-5	LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.1.4.1-6	LTE TDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is	Note: The UE is only required to pass in one of the supported test configurations in FR1		

Configure the test equipment and the DUT according to the parameters in Table 4.5.1.1.4.1-2

Table 4.5.1.1.4.1-2: Initial conditions for EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Parameter	Value		Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As	s specified in Annex E.1.1, Table E.2	2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration		on selected from Table 4.5.1.1.4.1-1
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part A.3.1.7.1		As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part		

PDCCH transmission parameters are given in Table 4.5.1.1.4.1-3

Table 4.5.1.1.4.1-3: PDCCH transmission parameters for out-of-sync

Attribute	Value for BLER Configuration #0
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	4dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	4dB
Bandwidth (PRBs)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 4.5.1.1.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The test parameters are given in Table 4.5.1.1.4.1-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.2, C.1.3.

Table 4.5.1.1.4.1-4: General test parameters for FR1 out-of-sync testing in non-DRX mode

	Parai	neter	Unit	Value
				Test 1
Active E-UTRA PCell				Cell 1
E-UTRA RF Channel Number				1
Active PSCell	Active PSCell			Cell 2
RF Channel Numb	er			2
Duplex mode		Config 1, 4		FDD
		Config 2, 3, 5, 6		TDD
BW _{channel}		Config 1, 4	MHz	10: N _{RB,c} = 52
		Config 2, 5	<u> </u>	10: N _{RB,c} = 52
		Config 3, 6		40: N _{RB,c} = 106
DL initial BWP con		Config 1, 2, 3, 4, 5, 6		DLBWP.0.1
DL dedicated BWF configuration	•	Config 1, 2, 3, 4, 5, 6		DLBWP.1.1
UL initial BWP con	figuration	Config 1, 2, 3, 4, 5, 6		ULBWP.0.1
UL dedicated BWF		Config 1, 2, 3, 4, 5, 6		
configuration				ULBWP.1.1
TDD Configuration	1	Config 1, 4		Not Applicable
J		Config 2, 5		TDDConf.1.1
		Config 3, 6		TDDConf.2.1
CORESET Refere	nce	Config 1, 4		CR.1.1 FDD
Channel		Config 2, 5		CR.1.1 TDD
		Config 3, 6		CR.2.1 TDD
SSB Configuration	1	Config 1, 4		SSB.1 FR1
		Config 2, 5		SSB.1 FR1
		Config 3, 6		SSB.2 FR1
SMTC Configuration	on	Config 1, 2, 4, 5		SMTC.1
		Config 3, 6		SMTC.1
PDSCH/PDCCH s	ubcarrier	Config 1, 2, 4, 5		15 KHz
spacing		Config 3, 6		30 KHz
PRACH Configura	tion	Config 1, 2, 4, 5		Table A.3.8.2.4-1
		Config 3, 6		Table A.3.8.2.4-1
SSB index assigne		RS		0
OCNG parameters	5			OP.1
CP length				Normal
Correlation Matrix				2x2 Low
Out of sync	DCI forma			1-0
transmission		f Control OFDM symbols		2
parameters	Aggregation		CCE	8
	Ratio of hy	pothetical PDCCH RE energy SSS RE energy	dB	4
		/pothetical PDCCH DMRS	dB	4
		average SSS RE energy	l ab	
		coder granularity		REG bundle size
	REG bund			6
DRX				OFF
Gap pattern ID				gp0
Layer 3 filtering				Enabled
T310 timer			ms	0
T311 timer			ms	1000
N310				1
N311				1
CSI-RS configurat	ion	Config 1, 4		CSI-RS.1.3 FDD
-		Config 2, 5		CSI-RS.1.3 TDD
Config 3, 6			CSI-RS.2.3 TDD	
CSI-RS for trackin	CSI-RS for tracking Config 1, 4			TRS.1.1 FDD
		Config 2, 5		TRS.1.1 TDD
		Config 3, 6		TRS.1.2 TDD
T1			S	1
T2			S	0.6
T3			S	0.6
D1			S	0.44
		re assigned to the UE prior to the		period T1.
Note 2: UE-spe	cific PDCCF	I is not transmitted after T1 start	S.	

Note 3: E-UTRAN is in non-DRX mode under test.

4.5.1.1.4.2 Test Procedure

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CSI reporting in PUCCH format 2 with a reporting periodicity as mentioned in the above table 4.5.1.1.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.5.1.1.5-1 for subtest 1 and 2. Propagation conditions are set according to Annex C.2.2. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.1.5-1 for subtests 1 and 2. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.1.5-1 for subtests 1 and 2. T3 starts.
- 5. If the SS:
 - a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each subframe configured for CSI transmission (according to configured CSI periodicity on PUCCH format 2) during the period from time point A to time point B

and

b) does not detect any uplink power higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (D1 after the start of T3) until T3 expires,

the number of successful tests is increased by one.

- 6. Otherwise the number of failed tests is increased by one and proceed to Step 10.
- 7. When T3 expires the SS shall change the SNR value to T1 as specified in Table 4.5.1.1.5-1.
- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 9. The SS then shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 and clause 7.3.1.

Table 4.5.1.1.4.3-1: Common Exception messages for EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode test requirement

Default Message Contents			
Common contents of system information blocks			
exceptions			
Default RRC messages and information	Table H.3.4-5		
elements contents exceptions	Table H.3.5-1		
·	Table H.3.5-2		
	Table H.3.5-3		
	Table H.3.5-4		

Table 4.5.1.1.4.3-2: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
Duration	2		
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 4.5.1.1.4.3-3: RLF-TimersAndConstant

Derivation Path: TS 38.508-1 [14], Table 4.6.3-150			
Information Element	Value/remark	Comment	Condition
RLF-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
n311	n1		
t311-v1530	ms1000		
}			

Table 4.5.1.1.4.3-4: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33				
Information Element	Value/remark	Comment	Condition	
CSI-FrequencyOccupation ::= SEQUENCE {				
startingRB	0			
nrofRBs	52	10 MHz (Test 1, 2,		
		4, 5)		
	106	40 MHz (Test 3, 6)		
}				

4.5.1.1.5 Test Requirement

Table 4.5.1.1.5-1 defines the cell specific primary level settings.

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

Table 4.5.1.1.5-1: Cell specific test parameters for FR1 (Cell 2) for out-of-sync radio link monitoring tests in non-DRX mode

Parameter	Unit		Test 1	
		T1	T2	Т3
EPRE ratio of PDCCH DMRS to SSS	dB		4	
EPRE ratio of PDCCH to PDCCH DMRS	dB		0	
EPRE ratio of PBCH DMRS to SSS	dB			
EPRE ratio of PBCH to PBCH DMRS	dB			
EPRE ratio of PSS to SSS	dB			
EPRE ratio of PDSCH DMRS to SSS	dB	0		
EPRE ratio of PDSCH to PDSCH DMRS	dB			
EPRE ratio of OCNG DMRS to SSS	dB			
EPRE ratio of OCNG to OCNG DMRS	dB			
SNR Config 1, 4	dB	1.9	-6.1	-15.9
Config 2, 5		1.9	-6.1	-15.9
Config 3, 6	1.9		-6.1	-15.9
N _{oc} Config 1, 4	dBm/15 -98			
Config 2, 5	KHz	-98		·
Config 3, 6		-98		
Propagation condition		Т	DL-C 300ns 100l	-lz

Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.

Note 4: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 from D.4.1.1 is -18 -TT, which is -18.9dB (including test tolerances)

Table 4.5.1.1.5-2: Measurement gap configuration for out-of-sync tests in non-DRX mode

Field		Test 1
		Value
gapOffset 0		0
Note 1: E-UTRAN PCell and PSCell are SFN-synchronous and frame boundary aligned. (Ensure		
that RLM RS is partially overlapped with measurement gap).		

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.5.1.2 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

4.5.1.2.1 Test purpose

The purpose of this test is to verify that the UE properly detects in sync, for the purpose of monitoring downlink radio link quality of the PSCell, when DRX is not used. This test will partly verify the FR1 PSCell radio link monitoring requirements in clause 8.1.2.

4.5.1.2.2 Test applicability

This test applies to all types of E-UTRA UEs Release 15 and forward supporting EN-DC

4.5.1.2.3 Minimum conformance requirements

The minimum requirements are specified in clause 4.5.1.0.2. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.2.

4.5.1.2.4 Test description

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.4.5.1.2.1-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

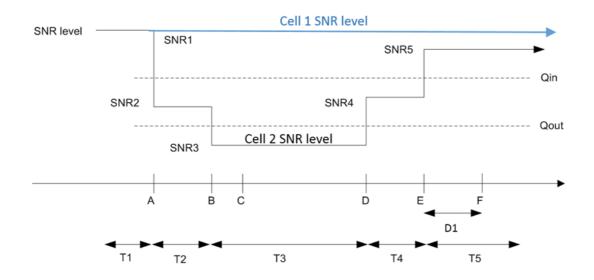


Figure 4.5.1.2.4-1: SNR variation for in-sync testing

4.5.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.1.2.4.1-1.

Table 4.5.1.2.4.1-1: Supported test configurations for FR1 PSCell

Configuration	Description	
1	LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
2	LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
3	LTE FDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
4	LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
5	LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
6 LTE TDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is only required to pass in one of the supported test configurations in FR1		

Configure the test equipment and the DUT according to the parameters in Table 4.5.1.2.4.1-2.

Table 4.5.1.2.4.1-2: Initial conditions for EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Parameter		Value	Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As		2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.5.1.2.5-1		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part		

PDCCH transmission parameters are given in Table 4.5.1.2.4.1-3.

Table 4.5.1.2.4.1-3: PDCCH transmission parameters for in-sync

Attribute	Value for BLER Configuration #0
DCI payload size	1-0
Number of control OFDM	_
symbols	2
Aggregation level (CCE)	4
Ratio of hypothetical PDCCH	
RE energy to average SSS	0dB
RE energy	02
Ratio of hypothetical PDCCH	
DMRS energy to average	0dB
SSS RE energy	
Bandwidth (PRBs)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 4.5.1.3.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The general test parameters are given in Table 4.5.1.2.5-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.

Table 4.5.1.2.4.1-4: General test parameters for FR1 in-sync testing in non-DRX mode

Parameter		Unit	Value	
A . (* E	LITEAROUN		Test 1	
Active E-UTRA PCell			Cell 1	
	E-UTRA RF Channel Number		1	
	ve PSCell		Cell 2	
	annel Number		2	
Duplex mode	Config 1, 4		FDD	
	Config 2, 3, 5, 6		TDD	
BW _{channel}	Config 1, 4	MHz	10: N _{RB,c} = 52	
	Config 2, 5		10: N _{RB,c} = 52	
	Config 3, 6		40: N _{RB,c} = 106	
DL initial BWP configuration	Config 1, 2, 3, 4, 5, 6		DLBWP.0.1	
DL dedicated BWP configuration	3 . , , , .		DLBWP.1.1	
UL initial BWP configuration	Config 1, 2, 3, 4, 5, 6		ULBWP.0.1	
UL dedicated BWP configuration	Config 1, 2, 3, 4, 5, 6		ULBWP.1.1	
TDD Configuration			Not Applicable	
	Config 2, 5		TDDConf.1.1	
	Config 3, 6		TDDConf.2.1	
CORESET Reference			CR.1.1 FDD	
Channel	Config 2, 5		CR.1.1 TDD	
	Config 3, 6		CR.2.1 TDD	
SSB Configuration			SSB.1 FR1	
	Config 2, 5		SSB.1 FR1	
	Config 3, 6		SSB.2 FR1	
SMTC Configuration			SMTC.1	
Ciri C Coringaration	Config 3, 6		SMTC.1	
PDSCH/PDCCH	Config 1, 2, 4, 5		15 KHz	
subcarrier spacing			30 KHz	
PRACH Configuration	on Config 1, 2, 4, 5		Table A.3.8.2.4-1	
ū	Config 3, 6		Table A.3.8.2.4-1	
	ssigned as RLM RS		0	
	parameters		OP.1	
	Plength		Normal	
	nd Antenna Configuration		2x2 Low	
In sync	DCI format		1-0	
transmission parameters	Number of Control OFDM symbols		2	
	Aggregation level	CCE	4	
	Ratio of hypothetical PDCCH RE energy to average SSS RE energy	dB	0	
	Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	dB	0	
	DMRS precoder granularity		REG bundle size	
	REG bundle size		6	
Out of sync	DCI format		1-0	
transmission parameters	Number of Control OFDM symbols		2	
	Aggregation level	CCE	8	
	Ratio of hypothetical PDCCH RE energy to average SSS RE energy	dB	4	

	Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	dB	4
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
	DRX		OFF
Gap	pattern ID		N.A.
Laye	er 3 filtering		Enabled
T3	310 timer	ms	1000
T3	311 timer	ms	1000
	N310		1
	N311		1
CSI-RS	Config 1, 4		CSI-RS.1.3 FDD
configuration	Config 2, 5		CSI-RS.1.3 TDD
	Config 3, 6		CSI-RS.2.3 TDD
CSI-RS for tracking	Config 1, 4		TRS.1.1 FDD
	Config 2, 5		TRS.1.1 TDD
	Config 3, 6		TRS.1.2 TDD
	T1	S	0.2
	T2	S	0.2
	T3	S	0.24
	T4	S	0.2
	T5	S	0.88
	D1	S	0.84

Note 1: All configurations are assigned to the UE prior to the start of time period T1.

Note 2: UE-specific PDCCH is not transmitted after T1 starts.

Note 3: E-UTRAN is in non-DRX mode under test.

4.5.1.2.4.2 Test procedure

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CSI reporting in PUCCH format 2 with a reporting periodicity as mentioned in the above table 4.5.1.2.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.5.1.2.4-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.
- 3. When T1 expires, the SS shall change the SNR value to T2 as specified in Table 4.5.1.2.5-1. T2 starts.
- 4. When T2 expires, the SS shall change the SNR value to T3 as specified in Table 4.5.1.2.5-1. T3 starts.
- 5. When T3 expires, the SS shall change the SNR value to T3 as specified in Table 4.5.1.2.5-1. T4 starts.
- 6. When T4 expires, the SS shall change the SNR value to T3 as specified in Table 4.5.1.2.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than the minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in the subframe according the configured CSI reporting during the period from time point A to time point F (D1 after the start of time duration T5) the number of successful tests is increased by one.
 - Otherwise the number of failed tests is increased by one.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.2.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 and clause 7.3.1 with the following exceptions.

Table 4.5.1.2.4.3-1: Common Exception messages for EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode test requirement

Default Message Contents			
Common contents of system information blocks			
exceptions			
Default RRC messages and information	Table H.3.4-5		
elements contents exceptions	Table H.3.5-1		
·	Table H.3.5-2		
	Table H.3.5-3		
	Table H.3.5-4		

Table 4.5.1.1.4.3-2: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162				
Information Element	Value/remark	Comment	Condition	
SearchSpace ::= SEQUENCE {				
monitoringSlotPeriodicityAndOffset CHOICE {				
sl1	NULL			
}				
duration	2			
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1		
nrofCandidates SEQUENCE {				
aggregationLevel1	n0			
aggregationLevel2	n0			
aggregationLevel4	n0			
aggregationLevel8	n1	AL8		
aggregationLevel16	n0			
}				
searchSpaceType CHOICE {				
ue-Specific SEQUENCE {			USS	
dci-Formats	formats0-0-And-1-0	DCI Format 1_0		
}				
}				
}				

Table 4.5.1.2.4.3-2: RLF-TimersAndConstant

Derivation Path: TS 38.508-1 [14], Table 4.6.3-150			
Information Element	Value/remark	Comment	Condition
RLF-TimersAndConstants ::= SEQUENCE {			
t310	ms2000		
n310	n1		
n311	n1		
t311-v1530	ms1000		
}			

Table 4.5.1.2.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	52	10 MHz (Test 1, 2,	
		4, 5)	
	106	40 MHz (Test 3, 6)	
}			

4.5.1.2.5 Test Requirement

The requirements in this section apply for each SSB based RLM-RS resource configured for PCell or PSCell, provided that the SSB configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in section 4.5.1.2.3.

Table 4.5.1.2.5-1 defines the cell specific primary level settings.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence interval of 95%.

Parameter		Unit	Test 1				
			T1	T2	Т3	T4	T5
EPRE r	atio of PDCCH DMRS to SSS	dB			4		
EPRE r	atio of PDCCH to PDCCH DMRS	dB			0		
EPRE r	atio of PBCH DMRS to SSS	dB					
EPRE r	atio of PBCH to PBCH DMRS	dB					
EPRE r	atio of PSS to SSS	dB					
EPRE r	atio of PDSCH DMRS to SSS	dB			0		
EPRE r	atio of PDSCH to PDSCH DMRS	dB					
	atio of OCNG DMRS to SSS	dB					
EPRE r	atio of OCNG to OCNG DMRS	dB					
SNR	Config 1, 4	dB	1.9	-6.1	- 15. 9	-5.4	1.9
	Config 2, 5		1.9	-6.1	- 15. 9	-5.4	1.9
	Config 3, 6		1.9	-6.1	- 15. 9	-5.4	1.9
N_{oc}	Config 1, 4	dBm/		•	-98	•	
- · oc	Config 2, 5	15	-98				
	Config 3, 6	KHz	-98				
Propag	ation condition			TDL-C	300ns	100Hz	
Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.							
Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.							
	Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.						
Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.4.5.1.2.1-1.							
Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in section D.4.1.1							

4.5.1.3 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode

4.5.1.3.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell configured with SSB-based RLM RS when DRX is used. This test will partly verify the NR cell radio link monitoring requirements in TS 38.133 [6] section 8.1.

4.5.1.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.5.1.3.3 Minimum conformance requirement

The minimum requirements are specified in clause 4.5.1.0.1. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.3.

4.5.1.3.4 Test description

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1 as defined in 38.133 [6]. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 4.5.1.3.4-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

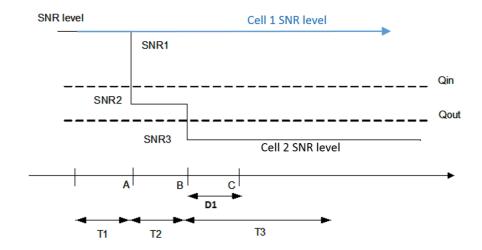


Figure 4.5.1.3.4-1: SNR variation for out-of-sync testing

4.5.1.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.1.3.4.1-1.

Table 4.5.1.3.4.1-1: EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode supported test configurations

Test Case ID	Description		
4.5.1.3.4.1-1	LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.3.4.1-2	LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.3.4.1-3	LTE FDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.5.1.3.4.1-4	LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.3.4.1-5	LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.3.4.1-6	LTE TDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is	Note: The UE is only required to pass in one of the supported test configurations in FR1		

Configure the test equipment and the DUT according to the parameters in Table 4.5.1.3.4.1-2

Table 4.5.1.3.4.1-2: Initial conditions for EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode

Parameter	Value		Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As	s specified in Annex E.1.1, Table E.2	2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.5.1.3.4.1-1		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part		

PDCCH transmission parameters are given in Table 4.5.1.3.4.1-3

Table 4.5.1.3.4.1-3: PDCCH transmission parameters for out-of-sync

Attribute	Value for BLER Configuration #0
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	4dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	4dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 4.5.1.3.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The test parameters are given in Table 4.5.1.3.4.1-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.2, C.1.3.

Table 4.5.1.3.4.1-4: General test parameters for FR1 out-of-sync testing in DRX mode

Parameter		Unit	Value
			Test 1
Active E-UTRA PCell	Active E-UTRA PCell		Cell 1
E-UTRA RF Channel	Number		1
Active PSCell			Cell 2
RF Channel Number	RF Channel Number		2
Duplex mode	Config 1, 4		FDD
	Config 2, 3, 5, 6		TDD
BW _{channel}	Config 1, 4	MHz	10: N _{RB,c} = 52
	Config 2, 5		10: N _{RB,c} = 52
	Config 3, 6		40: N _{RB,c} = 106
DL initial BWP Config 1, 2, 3, 4, 5, 6 configuration			DLBWP.0.1

DL dedicated BWP configuration	Config 1, 2, 3, 4, 5, 6		DLBWP.1.1
UL initial BWP	Config 1, 2, 3, 4, 5, 6		
configuration	Corning 1, 2, 3, 4, 5, 6		ULBWP.0.1
UL dedicated BWP configuration	Config 1, 2, 3, 4, 5, 6		ULBWP.1.1
TDD Configuration	Config 1, 4		Not Applicable
g	Config 2, 5		TDDConf.1.1
	Config 3, 6		TDDConf.2.1
CORESET Reference	Config 1, 4		CR.1.1 FDD
Channel	Config 2, 5		CR.1.1 TDD
Chamer	Config 3, 6		CR.2.1 TDD
CCD Configuration			
SSB Configuration	Config 1, 4		SSB.1 FR1
	Config 2, 5		SSB.1 FR1
-	Config 3, 6		SSB.2 FR1
SMTC Configuration	Config 1, 2, 4, 5		SMTC.1
	Config 3, 6		SMTC.1
PDSCH/PDCCH	Config 1, 2, 4, 5		15 KHz
subcarrier spacing	Config 3, 6		30 KHz
PRACH Configuration	Config 1, 2, 4, 5		Table A.3.8.2.4-1
	Config 3, 6		Table A.3.8.2.4-1
SSB index assigned as			0
OCNG parameters	112111110		OP.1
CP length			Normal
Correlation Matrix and A	Antenna Configuration		2x2 Low
Out of sync	DCI format		
transmission			1-0
	Number of Control OFDM		2
parameters	symbols		
	Aggregation level	CCE	8
	Ratio of hypothetical	dB	4
	PDCCH RE energy to		
	average SSS RE energy		
	Ratio of hypothetical	dB	4
	PDCCH DMRS energy to		
	average SSS RE energy		
	DMRS precoder		REG bundle size
	granularity		
	REG bundle size		6
DRX Configuration			DRX.4
Gap pattern ID			N.A.
Layer 3 filtering			Enabled
T310 timer		ms	0
T311 timer		ms	1000
N310		1113	1
N311			1
CSI-RS configuration	Config 1 4		CSI-RS.1.3 FDD
CSI-RS COIIIIguration	Config 1, 4		
	Config 2, 5		CSI-RS.1.3 TDD
001 00 (Config 3, 6		CSI-RS.2.3 TDD
CSI-RS for tracking	Config 1, 4		TRS.1.1 FDD
	Config 2, 5		TRS.1.1 TDD
	Config 3, 6		TRS.1.2 TDD
T1		S	4
T2		S	3
T3		S	3
D1		S	2.44
		·	

Note 1: All configurations are assigned to the UE prior to the start of time period T1.

Note 2: UE-specific PDCCH is not transmitted after T1 starts.

Note 3: E-UTRAN is in non-DRX mode under test.

4.5.1.3.4.2 Test Procedure

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 4.5.1.3.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.5.1.3.5-1 for subtest 1 and 2. Propagation conditions are set according to Annex C.2.2. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.3.5-1 for subtests 1 and 2. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.3.5-1 for subtests 1 and 2. T3 starts.
- 5. If the SS:

a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each subframe configured for CQI transmission (according to configured CQI periodicity on PUCCH [format 1]) during the period from time point A to time point B

and

- b) does not detect any uplink power higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (240 ms after the start of T3) until T3 expires, the number of successful tests is increased by one.
- 6. Otherwise the number of failed tests is increased by one, and proceed to Step 10.
- 7. When T3 expires the SS shall change the SNR value to T1 as specified in Table 4.5.1.3.5-1.
- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure that PSCell is released...
- 9. The SS then shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.3.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1.

Table 4.5.1.3.4.3-1: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
searchSpaceId	0	SearchSpaceId with condition CSS	CSS
controlResourceSetId	0	ControlResourceS etId	
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
duration	2		
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
common SEQUENCE {			CSS, SISS
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 4.5.1.3.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200)		
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		
}			

Table 4.5.1.3.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	52	10 MHz (Test 1, 2,	
		4, 5)	
	106	40 MHz (Test 3, 6)	
}			

4.5.1.3.5 Test Requirement

Table 4.5.1.3.5-1 defines the cell specific primary level settings.

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration

The rate of correct events observed during repeated tests shall be at least 90%.

Table 4.5.1.3.5-1: Cell specific test parameters for FR1 (Cell 2) for out-of-sync radio link monitoring tests in DRX mode

Parameter	Unit		Test 1	
		T1	T2	T3
EPRE ratio of PDCCH DMRS to SSS	dB		4	
PRE ratio of PDCCH to PDCCH DMRS	dB		0	
EPRE ratio of PBCH DMRS to SSS	dB		0	
EPRE ratio of PBCH to PBCH DMRS	dB			
EPRE ratio of PSS to SSS	dB			
EPRE ratio of PDSCH DMRS to SSS	dB			
EPRE ratio of PDSCH to PDSCH DMRS	dB			
EPRE ratio of OCNG DMRS to SSS	dB			
EPRE ratio of OCNG to OCNG DMRS	dB			
SNR Config 1, 4	dB	1.9	-6.1	-15.9
Config 2, 5		1.9	-6.1	-15.9
Config 3, 6		1.9	-6.1	-15.9
N _{oc} Config 1, 4	dBm/15	-98		-
Config 2, 5	KHz	-98		
Config 3, 6			-98	
Propagation condition		TDL-C 300ns 100Hz		

- transmitted power spectral density is achieved for all OFDM symbols.
- The signal contains PDCCH for UEs other than the device under test as part of OCNG. Note 2:
- SNR levels correspond to the signal to noise ratio over the SSS REs. Note 3:
- The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Note 4: Figure A.4.5.1.3.1-1.
- The SNR values are specified for testing a UE which supports 2RX on at least one band. For Note 5: testing of a UE which supports 4RX on all bands, the SNR during T3 from D.4.1.1, is -18dB-TT = -18.9dB (including test tolerances).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.5.1.4 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode

4.5.1.4.1 Test purpose

The purpose of this test is to verify that the UE properly detects in sync for the purpose of monitoring downlink radio link quality of the PSCell when DRX is used. This test will partly verify the FR1 radio link monitoring requirements.

4.5.1.4.2 Test applicability

This test applies to all types of E-UTRA Ues Release 15 and forward supporting EN-DC

4.5.1.4.3 Minimum conformance requirements

The minimum requirements are specified in clause 4.5.1.0.2. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.4.

4.5.1.4.4 **Test Description**

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.4.5.1.4.1-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-ofsync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

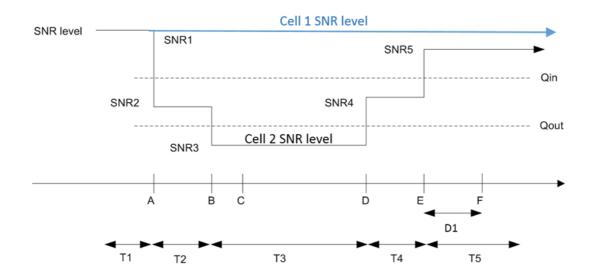


Table 4.5.1.4.4-1 - SNR variation for in-sync testing

4.5.1.4.4.1 Initial Conditions

Note:

This test shall be tested using any of the test configurations in Table 4.5.1.4.4.1-1.

ConfigurationDescription1LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode2LTE FDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode3LTE FDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode4LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, FDD duplex mode5LTE TDD, NR 15 KHz SSB SCS, 10MHz bandwidth, TDD duplex mode

LTE TDD, NR 30 KHz SSB SCS, 40MHz bandwidth, TDD duplex mode

Table 4.5.1.4.4.1-1: Supported test configurations for FR1 PSCell

Configure the test equipment and the DUT according to the parameters in Table 4.5.1.4.4.1-2

Table 4.5.1.4.4.1-2: Initial conditions for EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode

The UE is only required to pass in one of the supported test configurations in FR1

Parameter		Value	Comment	
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As	As specified in Annex E.1.1, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1.		
Channel bandwidth		As specified by the test configuration selected from Table 4.5.1.4.4.1-1		
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		

Exceptions to	For 4Rx capable UEs without any 2 Rx RF	
connection	bands use A.3.2.5.2 for DUT part and	
diagram	A.3.1.8.4 for TE Part	

PDCCH transmission parameters are given in Table 4.5.1.4.4.1-3

Table 4.5.1.4.4.1-3: PDCCH transmission parameters for in-sync

Attribute	Value for BLER Configuration #0
DCI payload size	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	4
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	0dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	0dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 4.5.1.3.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The general test parameters are given in Table 4.5.1.4.5-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.

Parameter		Unit	Value	
				Test 1
Active E-UTRA PCell				Cell 1
E-UTRA RF Channel Number			1	
Active PSCell				Cell 2
RF Channel Number		1		2
Duplex mode		Config 1, 4		FDD
		Config 2, 3, 5, 6		TDD
BW _{channel}		Config 1, 4	MHz	10: N _{RB,c} = 52
		Config 2, 5	-	10: N _{RB,c} = 52
DI initial DMD configuration		Config 3, 6		40: N _{RB,c} = 106
DL initial BWP configuration DL dedicated BWP	OH	Config 1, 2, 3, 4, 5, 6 Config 1, 2, 3, 4, 5, 6		DLBWP.0.1
configuration				DLBWP.1.1
UL initial BWP configuration	on	Config 1, 2, 3, 4, 5, 6		ULBWP.0.1
UL dedicated BWP configuration		Config 1, 2, 3, 4, 5, 6		ULBWP.1.1
TDD Configuration		Config 1, 4		Not Applicable
TDD Comiguration		Config 2, 5		TDDConf.1.1
		Config 3, 6		TDDConf.2.1
CORESET Reference Cha	annel	Config 1, 4		CR.1.1 FDD
CONTEGET Reference on	armer	Config 2, 5		CR.1.1 TDD
		Config 3, 6		CR.2.1 TDD
SSB Configuration		Config 1, 4		SSB.1 FR1
3		Config 2, 5		SSB.1 FR1
		Config 3, 6		SSB.2 FR1
SMTC Configuration		Config 1, 2, 4, 5		SMTC.1
_		Config 3, 6		SMTC.1
PDSCH/PDCCH subcarrie	er	Config 1, 2, 4, 5		15 KHz
spacing		Config 3, 6		30 KHz
PRACH Configuration		Config 1, 2, 4, 5		Table A.3.8.2.4-1
		Config 3, 6		Table A.3.8.2.4-1
SSB index assigned as R	LM RS	!		0
OCNG parameters				OP.1
CP length				Normal
Correlation Matrix and An	tenna C	configuration		2x2 Low
In sync transmission	DCI fo	ormat		1-0
parameters	Numb	per of Control OFDM		2
		gation level	CCE	4
	Ratio	of hypothetical PDCCH nergy to average SSS	dB	0
	DMR	of hypothetical PDCCH S energy to average RE energy	dB	0
	DMRS precoder granularity			REG bundle size
	 	bundle size		6
Out of sync transmission	DCI format Number of Control OFDM symbols			1-0
parameters				2
	Aggre	gation level	CCE	8
	RE er		dB	4
	Ratio DMR	of hypothetical PDCCH S energy to average RE energy	dB	4
	DMR:	S precoder granularity		REG bundle size
	REG bundle size			6

DRX Configuration			Table A.3.3.3-1
Gap pattern ID			N.A.
Layer 3 filtering			Enabled
T310 timer	T310 timer		2000
T311 timer		ms	1000
N310			1
N311			1
CSI-RS configuration	Config 1, 4		CSI-RS.1.3 FDD
	Config 2, 5		CSI-RS.1.3 TDD
	Config 3, 6		CSI-RS.2.3 TDD
T1		S	4
T2		S	1.6
T3		S	1.36
T4		S	0.4
T5		S	1.4
D1		S	1

Note 1: All configurations are assigned to the UE prior to the start of time period T1.

Note 2: UE-specific PDCCH is not transmitted after T1 starts.

Note 3: E-UTRAN is in non-DRX mode under test.

4.5.1.4.4.2 Test Procedure

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 4.5.1.4.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.5.1.4.4-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than the minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5in the On-duration part of every DRX cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point F (1120 ms after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.4.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions.

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions.

Table 4.5.1.1.4.3-2: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
searchSpaceId	0	SearchSpaceId with condition CSS	CSS
controlResourceSetId	0	ControlResourceS etId	
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
duration	2		
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
common SEQUENCE {			CSS, SISS
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 4.5.1.1.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200

Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		
}			

Table 4.5.1.1.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33

Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	52	10 MHz (Test 1, 2,	
		4, 5)	
	106	40 MHz (Test 3, 6)	
}			

4.5.1.4.5 Test Requirement

The requirements in this section apply for each SSB based RLM-RS resource configured for PCell or PSCell, provided that the SSB configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in section 4.5.1.4.3.

Table 4.5.1.4.5-1 defines the cell specific primary level settings.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence interval of 95%.

Parameter		Test 1				
		T1	T2	Т3	T4	T5
EPRE ratio of PDCCH DMRS to SSS	dB			4		
EPRE ratio of PDCCH to PDCCH DMRS	dB			0		
EPRE ratio of PBCH DMRS to SSS	dB					
EPRE ratio of PBCH to PBCH DMRS	dB					
EPRE ratio of PSS to SSS	dB					
EPRE ratio of PDSCH DMRS to SSS	dB			0		
EPRE ratio of PDSCH to PDSCH DMRS	dB					
EPRE ratio of OCNG DMRS to SSS	dB					
EPRE ratio of OCNG to OCNG DMRS	dB					
SNR Config 1, 4	dB	1.9	-6.1	-15.9	-5.4	1.9
Config 2, 5		1.9	-6.1	-15.9	-5.4	1.9
Config 3, 6		1.9	-6.1	-15.9	-5.4	1.9
N _{oc} Config 1, 4	dBm/15	-98				
Config 2, 5	KHz	-98				
Config 3, 6		-98				
Propagation condition				-C 300ns 1		
Note 1: OCNG shall be used such that the					a constant to	otal
transmitted power spectral density						
Note 2: The signal contains PDCCH for U					of OCNG.	
	Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.					
Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and					4 and	
SNR5 respectively in Figure A.4.5						_
Note 5: The SNR values are specified for						
testing of a UE which supports 4R	x on all ba	nas, the SN	NK during T	3 and 14 is	s modified a	ıs
specified in section D4.1.1.						

4.5.1.5 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode

4.5.1.5.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when no DRX is used. This test will partly verify the FR1 PSCell CSI-RS Out-of-sync radio link monitoring requirements in TS 38.133 clause 8.1.

4.5.1.5.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC and CSI-RS based RLM.

4.5.1.5.3 Minimum conformance requirements

The minimum requirements are specified in clause 4.5.1.0.3. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.5.

4.5.1.5.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 4.5.1.5.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

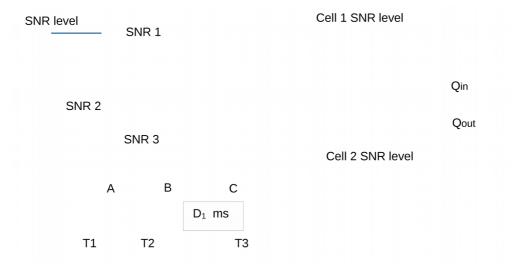


Figure 4.5.1.5.4-1: SNR variation for out-of-sync testing

4.5.1.5.4.1 Initial conditions

Test 4.5.1.5 can be run in one of the configurations defined in Table 4.5.1.5.4.1-1.

Table 4.5.1.5.4.1-1: Supported test configurations for FR1 PSCell

Configuration	Description		
4.5.1.5-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.5-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.5-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.5.1.5-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.5-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.5-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is only required to pass in one of the supported test configurations in FR1			

Configure the test equipment and the DUT according to the parameters in Table 4.5.1.5.4.1-2

Table 4.5.1.5.4.1-2: Initial conditions for CSI-RS In-sync radio link monitoring in non-DRX mode

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified in Annex E, table E.2-1 and TS 38.508-1 [14] clause 4.3.1.			
Channel	As specified by the test configuration selected from Table 4.5.1.6.4.1-1.			
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2.	
conditions				
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to	N/A			
connection				
diagram				

- 1. The test parameters are given in Table 4.5.1.5.4.1-2 below.
- 2. Message contents are defined in clause 4.5.1.5.4.3.

3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to TS 38.133 [6] Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 4.5.1.5.4.1-3: General test parameters for FR1 PSCell for CSI-RS out-of-sync testing in non-DRX mode

	Parameter	Unit	Value
			Test 1
Active E-UTRA PO	Cell		Cell 1
E-UTRA RF Chan			1
Active PSCell			Cell 2
RF Channel Numl	ber		2
Duplex mode	Config 1, 4		FDD
	Config 2, 3, 5, 6		TDD
TDD	Config 1, 4		Not Applicable
Configuration	Config 2, 5		TDDConf.1.1
	Config 3, 6		TDDConf.2.1
DL initial BWP configuration	Config 1, 2, 3, 4, 5, 6		DLBWP.0.1
DL dedicated BWP configuration	Config 1, 2, 3, 4, 5, 6		DLBWP.1.1
UL initial BWP configuration	Config 1, 2, 3, 4, 5, 6		ULBWP.0.1
UL dedicated BWP configuration	Config 1, 2, 3, 4, 5, 6		ULBWP.1.1
RMC CORESET	Config 1, 4		CCR.1.1 FDD
Reference	Config 2, 5		CCR.1.1 TDD
Channel	Config 3, 6		CCR.2.1 TDD
SSB	Config 1, 4		SSB.1 FR1
Configuration	Config 2, 5		SSB.1 FR1
	Config 3, 6		SSB.2 FR1
SMTC	Config 1, 2, 4, 5		SMTC.1
Configuration	Config 3, 6		SMTC.1
PDSCH/PDCCH	Config 1, 2, 4, 5		15 KHz
subcarrier spacing	Config 3, 6		30 KHz
TRS	Config 1, 4		TRS.1.1 FDD
configuration	Config 2, 5		TRS.1.1 TDD
	Config 3, 6		TRS.1.2 TDD

CSI-RS for RLM	Config 1, 4		Resource #4 in TRS.1.1 FDD
	Config 2, 5		Resource #4 in TRS.1.1 TDD
	Config 3, 6		Resource #4 in TRS.1.2 TDD
TCI configuration	for PDCCH/PDSCH		TCI.State.0
OCNG paramete			OP.1
CP length			Normal
	x and Antenna Configuration		2x2 Low
Out of sync	DCI format		1-0
transmission parameters	Number of Control OFDM symbols		2
•	Aggregation level	CCE	8
	Ratio of hypothetical PDCCH RE energy to average CSI- RS RE energy	dB	4
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	4
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
DRX			OFF
Gap pattern ID			gp0
Layer 3 filtering			Enabled
T310 timer		ms	0
T311 timer		ms	1000
N310			1
N311			1
CSI-RS	Config 1, 4		CSI-RS 1.1 FDD
configuration	Config 2, 5		CSI-RS.1.1 TDD
	Config 3, 6		CSI-RS.2.1 TDD
T1		S	0.2
T2		S	0.48
T3		S	0.48
T3			

Table 4.5.1.5.4.1-4: Measurement gap configuration for FR1 CSI-RS out-of-sync radio link monitoring in non-DRX mode

			Test 1
	Field	Value	
	gapOffset		0
Note 1: E-UTRAN PCell and PSCell are SFN-synchronous and frame boundary aligned.			

4.5.1.5.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms). In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 2 according to T1 in Table 4.5.1.5.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.5.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.5.5-1. T3 starts.
- 5. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (D1 after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 4.5.1.5.5-1.
- 7. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 8. The SS then shall transmit *RRCConnectionReconfiguration* message with condition *MCG_and_SCG* according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 9. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 10. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.1.5.4.3-1: Common Exception messages

	Default Message Contents
Common contents of system information	
blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED;
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1 and RLM for
	configuration 4.5.1.5-1, 4.5.1.5-2, 4.5.1.5-4, and 4.5.1.5-5
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.2 FR1 and RLM for
	configuration 4.5.1.5-3 and 4.5.1.5-6
	Table H.3.1-4 with a3-offset = -4.5dB;
	Table H.3.1-8 with Condition CSI RLM
	Table 11.5.1-0 With Condition Con Kelvi
	Table H.3.1-9

Table 4.5.1.5.4.3-2: MeasConfig for E-UTRAN PCell

Derivation Path: TS 36.508, Table 4.6.6-1 with condition RF					
Information Element	Value/remark	Comment	Condition		
MeasConfig-DEFAULT ::= SEQUENCE {					
reportConfigToAddModList	Not present				
measIdToAddModList	Not present				
measGapConfig	MeasGapConfig-GP1	TS 36.508, table			
		Table 4.6.6-1A			
}					

4.5.1.5.5 Test requirement

Tables 4.5.1.5.4.1-2 and 4.5.1.5.5-1 define the primary level settings including test tolerances for Radio Link Monitoring Out-of-sync Test for FR1 PSCell configured with CSI-RS-based RLM in non-DRX mode.

Table 4.5.1.5.5-1: Cell specific test parameters for FR1 for CSI-RS out-of-sync radio link monitoring in non-DRX mode

Par	ameter	Unit	Test 1		
			T1	T2	T3
PDCCH_beta	a	dB	4		
PDCCH_DM	RS_beta	dB		4	
PBCH_beta		dB			
PSS_beta		dB			
SSS_beta	SSS_beta			0	
PDSCH_beta	a	dB			
OCNG_beta		dB			
SNR on	Config 1, 4	dB	1.9	-6.1	-15.9
RLM-RS	Config 2, 5		1.9	-6.1	-15.9
	Config 3, 6		1.9	-6.1	-15.9
SNR on	Config 1, 4	dB		1	
other	Config 2, 5			1	
channels	Config 3, 6			1	
and signals					
N_{oc}	Config 1, 4	dBm/15K		-98	
	Config 2, 5	Hz		-98	
	Config 3, 6			-98	
Propagation				TDL-C 300ns 100Hz	
				2 are fully allocated	
				for all OFDM symbo	
		s for CSI rep	orting are assigned	to the UE prior to th	ie start of time
	eriod T1.	oo oot oonfin	uration for CCI rana	erting are assigned t	o the LIC prior to
	e start of time peri		uration for CSI repo	orting are assigned to	o the OE phor to
			is assigned to the L	JE prior to the start o	of time period T1
				re configured prior t	
	eriod T1.	i o intering it	siated parameters a	re cornigured prior t	o the start of time
		PDCCH for I	UEs other than the o	device under test as	nart of OCNG
			anal to noise ratio o		part or o'citto.
				s SNR1, SNR2 and	SNR3
	spectively in figure			,	
				n supports 2RX on a	it least one band.
Fo	or testing of a UE v	which suppo	rts 4RX on all bands	s, the SNR during T3	3 is [A.3.6].

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all slots configured for CQI transmission according the configured CQI reporting mode on PUCCH.

The UE shall stop transmitting uplink signal no later than time point C (D1 after the start of time duration T3).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal
- UE output power equal to or less than Transmit OFF power (as defined in TS 38.521-1 [17] clause 6.3.2.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode

4.5.1.6.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when no DRX is used. This test will partly verify the FR1 PSCell CSI-RS in-sync radio link monitoring requirements in TS 38.133 clause 8.1.

4.5.1.6.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC and CSI-RS based RLM.

4.5.1.6.3 Minimum conformance requirements

The minimum requirements are specified in clause 4.5.1.0.4. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.6.

4.5.1.6.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 4.5.1.6.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

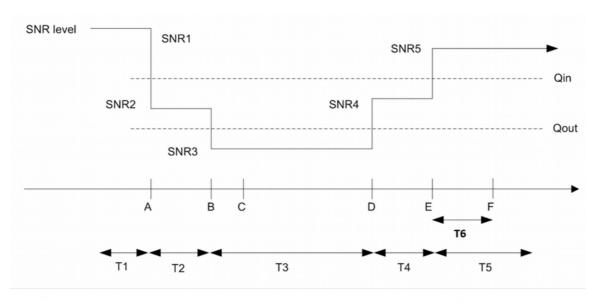


Figure 4.5.1.6.4-1: SNR variation for In-sync testing

4.5.1.6.4.1 Initial conditions

Test 4.5.1.6 can be run in one of the configurations defined in Table 4.5.1.6.4.1-1.

Table 4.5.1.6.4.1-1: Supported test configurations for FR1 PSCell

Configuration	Description		
4.5.1.6-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.6-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.6-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.5.1.6-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.1.6-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.1.6-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is only required to pass in one of the supported test configurations in FR1			

Configue the test equipment and the DUT according to the parameters in Table 4.5.1.6.4.1-2

Table 4.5.1.6.4.1-2: Initial conditions for CSI-RS In-sync radio link monitoring in non-DRX mode

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.5.1.6.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

- 1. The test parameters are given in Table 4.5.1.6.4.1-2 below.
- 2. Message contents are defined in clause 4.5.1.6.4.3.
- 3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 4.5.1.6.4.1-3: General test parameters for FR1 PSCell for CSI-RS In-sync testing in non-DRX mode

Parame	eter	Unit	Value
			Test 1
Active E-UTRA PCell			Cell 1
E-UTRA RF Channel Num	oer		1
Active PSCell			Cell 2
RF Channel Number			2
Duplex mode	Config 1, 4		FDD
	Config 2, 3, 5, 6]	TDD
TDD Configuration	Config 1, 4		Not Applicable
	Config 2, 5]	TDDConf.1.1
	Config 3, 6]	TDDConf. 2.1
DL initial BWP	Config 1, 2, 3, 4, 5,		DLBWP.0.1
configuration	6		
DL dedicated BWP	Config 1, 2, 3, 4, 5,		DLBWP.1.1
configuration	6		
UL initial BWP	Config 1, 2, 3, 4, 5,		ULBWP.0.1
configuration	6		
UL dedicated BWP	Config 1, 2, 3, 4, 5,		ULBWP.1.1
configuration	6		
RMC CORESET	Config 1, 4		CCR.1.1 FDD
Reference Channel	Config 2, 5		CCR.1.1 TDD
	Config 3, 6		CCR.2.1 TDD

SSB Configuration	Config 1, 4		SSB.1 FR1
	Config 2, 5		SSB.1 FR1
	Config 3, 6		SSB.2 FR1
SMTC Configuration	Config 1, 2, 4, 5		SMTC.1
	Config 3, 6		SMTC.1
PDSCH/PDCCH	Config 1, 2, 4, 5		15 KHz
subcarrier spacing	Config 3, 6		30 KHz
TRS configuration	Config 1, 4		TRS.1.1 FDD
	Config 2, 5		TRS.1.1 TDD
	Config 3, 6		TRS.1.2 TDD
	Config 1, 4		Resource #4 in TRS.1.1 FDD
CSI-RS for RLM	Config 2, 5		Resource #4 in TRS.1.1 TDD
	Config 3, 6		Resource #4 in TRS.1.2 TDD
TCI configuration for PDCCH/PDSCH		TCI.State.0	

OCNG parameters			OP.1
CP length			Normal
Correlation Matrix and Antenna Configuration			2x2 Low
Out of sync	DCI format		1-0
transmission	Number of Control OFDM		2
parameters	symbols		
	Aggregation level	CCE	8
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	dB	4
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	4
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
In sync	DCI format		1-0
transmission parameters	Number of Control OFDM		2
parameters	symbols Aggregation level	CCE	4
	Ratio of hypothetical	dB	0
	PDCCH RE energy to average CSI-RS RE energy	ub	
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	0
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
DRX			OFF
Gap pattern ID			N.A.
Layer 3 filtering			Enabled
T310 timer		ms	1000
T311 timer		ms	1000
N310			1
N311			1
CSI-RS for reporting	Config 1, 4		CSI-RS.1.1 FDD
22.1.2.3.1000.0119	Config 2, 5	1	CSI-RS.1.1 TDD
	Config 3, 6	1	CSI-RS.2.1 TDD
T1	, - y -, -	s	0.2
T2		S	0.2
T3		S	0.44
T4		S	0.2
T5		S	0.88
T6		s	0.84
	PDCCH is not transmitted a	after T1 starts.	
Note 2: E-UTRAN	is in non-DRX mode under te	est.	

4.5.1.6.4.2 Test procedure and Test Mode *On*

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is not enabled. In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 2 according to T1 in Table 4.5.1.6.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.

- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.6.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.6.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 4.5.1.6.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 4.5.1.6.5-1. T5 starts.
- 7. If the SS detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point F (T6 after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 9. The SS then shall transmit *RRCConnectionReconfiguration* message with condition *MCG_and_SCG* according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.1.6.4.3-1: Common Exception messages

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ, L3 FILTERING NEEDED;
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1 and RLM for
	configuration 4.5.1.6-1, 4.5.1.6-2, 4.5.1.6-4, and 4.5.1.6-5
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1 and RLM for
	configuration 4.5.1.5-3 and 4.5.1.5-6
	Table H.3.1-4 with a3-offset = -4.5dB;
	Table H.3.1-6 with Condition RLM;
	Table H.3.1-7 with Condition INTRA-FREQ
	Table H.3.1-8 with Condition CSI RLM
	Table H.3.1-9

4.5.1.6.5 Test requirement

Tables 4.5.1.6.4.1-2 and 4.5.1.6.5-1 define the primary level settings including test tolerances for Radio Link Monitoring In-sync Test for FR1 PSCell configured with CSI-RS-based RLM in non-DRX mode.

Table 4.5.1.6.5-1: Cell specific test parameters for FR1 for CSI-RS In-sync radio link monitoring in non-DRX mode

Parameter	Unit			Test 1		
		T1	T2	T3	T4	T5

PDCCH_beta		dB			4			
PDCCH_DMR	S_beta	dB	4					
PBCH_beta		dB						
PSS_beta	PSS beta							
SSS_beta		dB	0					
PDSCH_beta		dB]					
OCNG_beta		dB						
SNR on	Config 1, 4	dB	1.9	-6.1	-15.9	-5.4	1.9	
RLM-RS (Config 2, 5		1.9	-6.1	-15.9	-5.4	1.9	
	Config 3, 6		1.9	-6.1	-15.9	-5.4	1.9	
SNR on other	Config 1, 4	dB			1			
channels and	Config 2, 5				1	1		
signals	Config 3, 6				1			
N_{oc}	Config 1, 4	dBm/15KHz	dBm/15KHz -98					
- 000	Config 2, 5		-98					
	Config 3, 6		-98					
Propagation co	ndition			TD	L-C 300ns 10	0Hz		
		all the filter and a second			.11		*** *	

- Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.
- Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.
- Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.4.5.1.6.1-1.
- Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (T6 after the start of time duration T5) the UE shall transmit uplink signal at least in all slots configured for CQI transmission according to the configured CQI reporting mode on PUCCH.

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode

4.5.1.7.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when DRX is used. This test will partly verify the FR1 PSCell CSI-RS Out-of-sync radio link monitoring requirements in TS 38.133 clause 8.1.

4.5.1.7.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC, CSI-RS based RLM and long DRX cycle.

4.5.1.7.3 Minimum conformance requirements

The minimum requirements are specified in clause 4.5.1.0.3. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.7.

4.5.1.7.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 4.5.1.7.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

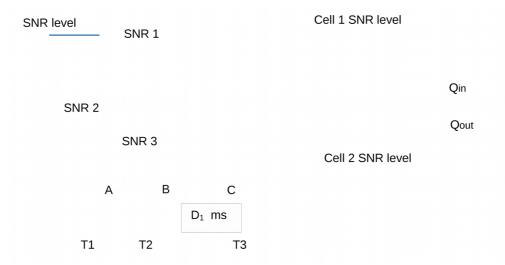


Figure 4.5.1.7.4-1: SNR variation for out-of-sync testing

4.5.1.7.4.1 Initial conditions

Test 4.5.1.7 can be run in one of the configurations defined in Table 4.5.1.7.4.1-1.

Configuration Description LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode 4.5.1.7-1 LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode 4.5.1.7-2 LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode 4.5.1.7-3 LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode 4.5.1.7-4 LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode 4.5.1.7-5 LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode 4.5.1.7-6 Note: The UE is only required to pass in one of the supported test configurations in FR1

Table 4.5.1.7.4.1-1: Supported test configurations for FR1 PSCell

Configue the test equipment and the DUT according to the parameters in Table 4.5.1.7.4.1-2

Table 4.5.1.7.4.1-2: Initial conditions for CSI-RS out-of-sync radio link monitoring in DRX mode

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel	As specified by the test configuration selected from Table 4.5.1.7.4.1-1.		
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. The test parameters are given in Table 4.5.1.7.4.1-3 below.
- 2. Message contents are defined in clause 4.5.1.7.4.3.
- 3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 4.5.1.7.4.1-3: General test parameters for FR1 PSCell for CSI-RS out-of-sync testing in DRX mode

Parameter		Unit	Value
			Test 1
Active E-UTRA PCell			Cell 1
E-UTRA RF Channel N	umber		1
Active PSCell			Cell 2
RF Channel Number			2
Duplex mode	Config 1, 4		FDD
	Config 2, 3, 5, 6		TDD
TDD Configuration	Config 1, 4		Not Applicable
	Config 2, 5		TDDConf.1.1
	Config 3, 6	1	TDDConf.2.1
DL initial BWP	Config 1, 2, 3, 4, 5,		DLBWP.0.1
configuration	6		
DL dedicated BWP	Config 1, 2, 3, 4, 5,		DLBWP.1.1
configuration	6		
UL initial BWP	Config 1, 2, 3, 4, 5,		ULBWP.0.1
configuration	6		
UL dedicated BWP	Config 1, 2, 3, 4, 5,		ULBWP.1.1
configuration	6		
CORESET Reference	Config 1, 4		CCR.1.1 FDD
Channel	Config 2, 5		CCR.1.1 TDD
	Config 3, 6	1	CCR.2.1 TDD
SSB Configuration	Config 1, 4		SSB.1 FR1
	Config 2, 5]	SSB.1 FR1
	Config 3, 6	1	SSB.2 FR1
SMTC Configuration	Config 1, 2, 4, 5		SMTC.1
	Config 3, 6	1	SMTC.1
PDSCH/PDCCH	Config 1, 2, 4, 5		15 KHz
subcarrier spacing	Config 3, 6		30 KHz
TRS configuration	Config 1, 4		TRS.1.1 FDD
	Config 2, 5		TRS.1.1 TDD
	Config 3, 6		TRS.1.2 TDD
	Config 1, 4		Resource #4 in TRS.1.1 FDD
CSI-RS for RLM	Config 2, 5		Resource #4 in TRS.1.1 TDD
	Config 3, 6		Resource #4 in TRS.1.2 TDD
TCI configuration for PI	DCCH/PDSCH		TCI.State.0
OCNG parameters			OP.1
CP length			Normal
Correlation Matrix and	Antenna		2x2 Low
Configuration			
Out of sync	DCI format		1-0
transmission	Number of Control		2
parameters	OFDM symbols		
	Aggregation level	CCE	8
	Ratio of	dB	4
	hypothetical		
	PDCCH RE energy		
	to average CSI-RS		
	RE energy		
	Ratio of	dB	4
	hypothetical		
	PDCCH DMRS		
	energy to average		
	CSI-RS RE energy		

	DMRS precoder granularity		REG bundle size		
	REG bundle size		6		
DRX			DRX.7		
Gap pattern ID			N.A.		
Layer 3 filtering			Enabled		
T310 timer		ms	0		
T311 timer	T311 timer		1000		
N310	N310		1		
N311			1		
CSI-RS for	Config 1, 4		CSI-RS.1.1 FDD		
reporting	Config 2, 5		CSI-RS.1.1 TDD		
	Config 3, 6		CSI-RS.2.1 TDD		
T1		S	0.2		
T2	T2				1.28
T3		S	1.28		
D1		S	1.24		
	ecific PDCCH is not transm AN is in non-DRX mode ur				

4.5.1.7.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is enabled in PSCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 2 according to T1 in Table 4.5.1.7.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.7.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.7.5-1. T3 starts.
- 5. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in the On-duration part of every DRX cycle in the slots configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (D1 after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 4.5.1.7.5-1.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.7.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.1.7.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions Ta cco Ta cco Ta Ta Ta Ta Ta	able H.3.1-2 with Condition INTRA-FREQ, L3 FILTERING NEEDED; able H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1 and RLM for onfiguration 4.5.1.7-1, 4.5.1.7-2, 4.5.1.7-4, and 4.5.1.7-5 able H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1 and RLM for onfiguration 4.5.1.7-3 and 4.5.1.7-6 able H.3.1-4 with a3-offset = -4.5dB; able H.3.1-6 with Condition RLM; able H.3.1-7 with Condition INTRA-FREQ; able H.3.1-8 with Condition CSI RLM; able H.3.1-9; able H.3.7-1 with condition DRX.3				

4.5.1.7.5 Test requirement

Tables 4.5.1.7.4.1-2 and 4.5.1.7.5-1 define the primary level settings including test tolerances for Radio Link Monitoring Out-of-sync Test for FR1 PSCell configured with CSI-RS-based RLM in DRX mode.

Table 4.5.1.7.5-1: Cell specific test parameters for FR1 for CSI-RS out-of-sync radio link monitoring in DRX mode

Parameter	Unit	Test 1		
		T1	T2	T3

PDCCH b	eta	dB		4		
	MRS beta	dB	4			
PBCH bet		dB	4			
PSS beta	α	dB				
SSS beta		dB	0			
PDSCH b		dB		U		
OCNG be		dB				
SNR on	Config 1, 4	dB	1.9	-6.1	-15.9	
RLM-RS	Config 2, 5	l db	1.9	-6.1	-15.9	
KLIVI-KS						
0115	Config 3, 6	15	1.9	-6.1	-15.9	
SNR on	Config 1, 4	dB		11		
other	Config 2, 5			1		
channels	Config 3, 6			1		
and signals		dDm/1 FI/LI=		00		
N_{oc}	Config 1, 4	dBm/15KHz	-98			
	Config 2, 5			-98		
Dranagatia	Config 3, 6 Propagation condition		-98 TDL-C 300ns 100Hz			
			,			
				ources in Cell 2 are fully allocated and a constant y is achieved for all OFDM symbols.		
	The uplink resource					
	period T1.	s ioi CSi reportinț	g are assigned to	the OE phor to th	e start or time	
	NZP CSI-RS resour	co cot configuration	on for CSI roportin	na are accianed to	the LIE prior to	
	the start of time per		on for CSI reportin	ig are assigned it	the OE phot to	
	Measurement gap of		signed to the LIE r	orior to the start o	f time neriod	
	т1.	ornigaration is as	signed to the OL	onor to the start o	r unic penda	
	The timers and laye	r 3 filtering related	l parameters are o	configured prior to	the start of	
	time period T1.	. O mitoring rolated	· parametere are t	oormgaroa prior t	o ti lo otalit oi	
		PDCCH for UEs of	other than the dev	rice under test as	part of OCNG.	
				p		
					SNR3	
	The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.1.7.1-1.					
	The SNR values are		ing a UE which su	upports 2RX on a	t least one	
	band. For testing of					
	[A.3.6].	• • • • • • • • • • • • • • • • • • • •			=	

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the slots configured for CQI transmission according the configured CQI reporting mode on PUCCH.

The UE shall stop transmitting uplink signal no later than time point C (D1 after the start of time duration T3).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal
- UE output power equal to or less than Transmit OFF power (as defined in TS 38.521-1 [17] clause 6.3.2.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode

4.5.1.8.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when DRX is used. This test will partly verify the FR1 PSCell CSI-RS in-sync radio link monitoring requirements in TS 38.133 clause 8.1.

4.5.1.8.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC, CSI-RS based RLM and long DRX cycle.

4.5.1.8.3 Minimum conformance requirements

The minimum requirements are specified in clause 4.5.1.0.4. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.1.8.

4.5.1.8.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 4.5.1.8.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

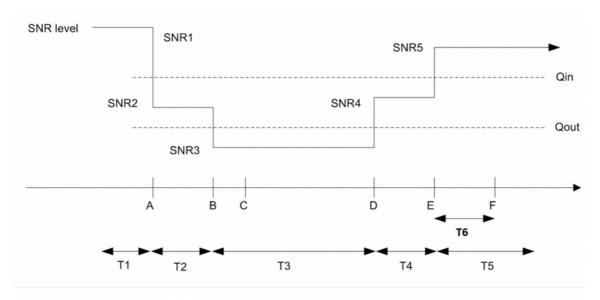


Figure 4.5.1.8.4-1: SNR variation for In-sync testing

4.5.1.8.4.1 Initial conditions

Test 4.5.1.8 can be run in one of the configurations defined in Table 4.5.1.8.4.1-1.

Table 4.5.1.8.4.1-1: Supported test configurations for FR1 PSCell

Configuration	Description			
4.5.1.8-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
4.5.1.8-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
4.5.1.8-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
4.5.1.8-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
4.5.1.8-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
4.5.1.8-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
Note: The UE is only required to pass in one of the supported test configurations in FR1				

Configue the test equipment and the DUT according to the parameters in Table 4.5.1.8.4.1-2

Table 4.5.1.8.4.1-2: Initial conditions for CSI-RS In-sync radio link monitoring in DRX mode

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.5.1.8.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

- 1. The test parameters are given in Table 4.5.1.8.4.1-2 below.
- 2. Message contents are defined in clause 4.5.1.8.4.3.
- 3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 4.5.1.8.4.1-3: General test parameters for FR1 PSCell for CSI-RS In-sync testing in DRX mode

Parameter	Unit	Value
		Test 1

			1
Active E-UTRA P			Cell 1
	E-UTRA RF Channel Number		1
Active PSCell			Cell 2
RF Channel Num			2
Duplex mode	Config 1, 4		FDD
	Config 2, 3, 5, 6		TDD
TDD	Config 1, 4		Not Applicable
Configuration	Config 2, 5		TDDConf.1.1
	Config 3, 6		TDDConf.2.1
DL initial BWP	Config 1, 2, 3, 4, 5, 6		DLBWP.0.1
configuration			
DL dedicated	Config 1, 2, 3, 4, 5, 6		DLBWP.1.1
BWP			
configuration			
UL initial BWP	Config 1, 2, 3, 4, 5, 6		ULBWP.0.1
configuration			
UL dedicated	Config 1, 2, 3, 4, 5, 6		ULBWP.1.1
BWP			
configuration			
RMC	Config 1, 4		CCR.1.1 FDD
CORESET	Config 2, 5		CCR.1.1 TDD
Reference	Config 3, 6		CCR.2.1 TDD
Channel			
SSB	Config 1, 4		SSB.1 FR1
Configuration	Config 2, 5		SSB.1 FR1
	Config 3, 6		SSB.2 FR1
SMTC	Config 1, 2, 4, 5		SMTC.1
Configuration	Config 3, 6		SMTC.1
PDSCH/PDCCH	Config 1, 2, 4, 5		15 KHz
subcarrier	Config 3, 6	-	30 KHz
spacing			
TRS configuration	Config 1, 4		TRS.1.1 FDD
Comiguration	Config 2, 5		TRS.1.1 TDD
	Config 3, 6		TRS.1.2 TDD
	Config 1, 4		Resource #4 in TRS.1.1 FDD
CSI-RS for RLM	Config 2, 5		Resource #4 in TRS.1.1 TDD
	Config 3, 6		Resource #4 in TRS.1.2 TDD
TCI configuration	for PDCCH/PDSCH		TCI.State.0
OCNG parameter	rs		OP.1
CP length			Normal
Correlation Matrix	c and Antenna		2x2 Low
Configuration			
Out of sync	DCI format		1-0
transmission	Number of Control		2
parameters	OFDM symbols		
	Aggregation level	CCE	8
	Ratio of hypothetical	dB	4
	PDCCH RE energy to		
	average CSI-RS RE		
	energy		
	Ratio of hypothetical	dB	4
	PDCCH DMRS energy		
	to average CSI-RS RE		
	energy		
	DMRS precoder		REG bundle size
	granularity		
	REG bundle size		6
In sync	DCI format		1-0
transmission	Number of Control		2
parameters	OFDM symbols		-
	Aggregation level	CCE	4
	Ratio of hypothetical	dB	0
	PDCCH RE energy to		
	average CSI-RS RE		
	energy		
1	رق٠٠٠ - ا	1	1

	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	0	
	DMRS precoder granularity		REG bundle size	
	REG bundle size		6	
DRX			DRX.3	
Gap pattern ID			gp0	
Layer 3 filtering			Enabled	
T310 timer	T310 timer		0	
T311 timer	T311 timer		1000	
N310	N310		1	
N311			1	
CSI for	Config 1, 4		CSI-RS.1.1 FDD	
reporting	Config 2, 5		CSI-RS.1.1 TDD	
	Config 3, 6		CSI-RS.2.1 TDD	
T1		S	0.2	
T2		S	0.2	
T3	T3		1.24	
T4		S	0.2	
T5		S	1.88	
T6		S	1.84	
Note 1: UE-specific PDCCH is not transmitted after T1 starts.				

Note 2: E-UTRAN is in non-DRX mode under test.

Table 4.5.1.8.4.1-4: Measurement gap configuration for FR1 CSI-RS In-sync radio link monitoring in DRX mode

	Field	Test 1		
	Field			
	gapOffset	0		
Note 1:	te 1: E-UTRAN PCell and PSCell are SFN-			
synchronous and frame boundary				
	aligned.			

4.5.1.8.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is enabled in PSCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms). In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 2 according to T1 in Table 4.5.1.8.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.8.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.8.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 4.5.1.8.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 4.5.1.8.5-1. T5 starts.
- 7. If the SS detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in the On-duration part of every DRX cycle in the configured slots for CQI

transmission (according CQI reporting on PUCCH) during the period from time point A to time point F (T6 after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 9. The SS then shall transmit *RRCConnectionReconfiguration* message with condition *MCG_and_SCG* according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-7 for both subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.1.8.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.1.8.4.3-1: Common Exception messages

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED;
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1 and RLM for configuration 4.5.1.8-1, 4.5.1.8-2, 4.5.1.8-4, and 4.5.1.8-5 Table H.3.1-3 with Condition INTER-FREQ MO, SSB.2 FR1 and RLM for configuration 4.5.1.8-3 and 4.5.1.8-6
	Table H.3.1-4 with a3-offset = -4.5dB;
	Table H.3.1-8 with Condition CSI RLM
	Table H.3.1-9
	Table H.3.7-1 with condition DRX.3

Table 4.5.1.8.4.3-2: MeasConfig for E-UTRAN PCell

Derivation Path: TS 36.508, Table 4.6.6-1 with condition RF					
Information Element	Value/remark	Comment	Condition		
MeasConfig-DEFAULT ::= SEQUENCE {					
reportConfigToAddModList	Not present				
measIdToAddModList	Not present				
measGapConfig	MeasGapConfig-GP1	TS 36.508, table			
		Table 4.6.6-1A			
}					

4.5.1.8.5 Test requirement

Tables 4.5.1.8.4.1-2 and 4.5.1.8.5-1 define the primary level settings including test tolerances for Radio Link Monitoring In-sync Test for FR1 PSCell configured with CSI-RS-based RLM in DRX mode.

Table 4.5.1.8.5-1: Cell specific test parameters for FR1 for CSI-RS In-sync radio link monitoring in DRX mode

Parameter	Unit	Test 1				
		T1	T2	Т3	T4	T5

PDCCH b	oto	dB			4		
	PDCCH DMRS beta		4				
	PBCH beta				4		
PSS beta		dB dB					
SSS beta		dB			0		
PDSCH b		dВ		U			
OCNG be		dB					
SNR on	Config 1, 4	dB	1.9	-6.1	-15.9	-5.4	1.9
RLM-RS	Config 2, 5	uВ	1.9	-6.1	-15.9	-5.4	1.9
I KEW KO	Config 3, 6		1.9	-6.1	-15.9	-5.4	1.9
SNR on	Config 1, 4		1.9	-0.1	1	-5.4	1.9
other	Config 2, 5				1		
channels	Config 3, 6	dB			<u>+</u> 1		
and	Coming 5, 0	u D			1		
signals							
N_{oc}	Config 1, 4	dBm/15KHz			-98		
1 oc	Config 2, 5				-98		
	Config 3, 6		-98				
Propagation	on condition			TDL-	C 300ns 1	00Hz	
	OCNG shall be us	sed such that the	resources	in Cell 2 a	re fully allo	cated and	a
		nsmitted power spectral density is achieved for all OFDM symbols.					
		ces for CSI reporting are assigned to the UE prior to the start of time					
	period T1.						
	NZP CSI-RS reso		ation for C	SI reporting	g are assig	ned to the	UE prior
	to the start of time	•					
	Measurement gap	o configuration is	assigned t	o the UE p	rior to the s	start of time	e period
	T1.	var 2 filtaring rale	tod narom	otoro oro o	antiquead :	ariar ta tha	otort of
	The timers and la time period T1.	yer 3 ilitering rela	ileu param	elers are c	oningureu p	onor to the	Start or
			e other the	an tha davi	ca undar ta	act ac nart	of
	The signal contains PDCCH for UEs other than the device under test as part of OCNG.						
	SNR levels correspond to the signal to noise ratio over the SSS REs.						
	The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3,						
	SNR4 and SNR5 respectively in figure A.4.5.1.8.1-1.						
	, , ,						
	band. For testing	of a UE which su	pports 4R>	on all bar	nds, the SN	NR during T	3 is
	[A.3.6].						

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (T6 after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the ON-duration part of the cycle in the slots configured for CQI transmission according to the configured CQI reporting mode on PUCCH.

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

4.5.2 Interruption

4.5.2.0 Minimum conformance requirements

4.5.2.0.1 Minimum conformance requirements for interruptions at transitions between active and non-active during DRX.

[TS 38.133, clause 8.2.1.2.1]

Interruption on PSCell and the activated SCell if configured due to E-UTRA PCell transitions between active and non-active druing DRX when PSCell or SCell is in non-DRX are allowed with up to 1% probability of missed ACK/NACK when the configured E-UTRA PCell DRX cycle is less than 640 ms, and 0.625% probability of missed ACK/NACK is

allowed when the configured E-UTRA PCell DRX cycle is 640 ms or longer. Each interruption shall not exceed X slot as defined in table 8.2.1.2.1-1.

Each interruption shall not exceed X slot as defined in table 8.2.1.2.1-1.

Table 8.2.1.2.1-1: Interruption length X at transition between active and non-active during DRX

11	NR Slot	Interruptio	n length X
	length (ms)	Sync	Async
0	1	1	2
1	0.5	1	2
2	0.25	3	
3	0.125	5	

When both E-UTRA PCell and PSCell are in DRX, no interruption is allowed.

The normative reference for this requirement is TS 38.133 [6] clause 8.2.1.2.1.

4.5.2.0.2 Minimum conformance requirements for interruptions during measurements on deactivated NR SCC

[TS 38.133, clause 8.2.1.2.5.1]

Interruption on PSCell and other active NR SCell(s) during measurement on the deactivated NR SCC shall meet requirements in clause 8.2.2.2.3, where the term PCell in clause 8.2.2.2.3 shall be deemed to be replaced with PSCell.

[TS 38.133, clause 8.2.2.2.3]

Interruptions on PCell due to measurements when an SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 8.2.2.2.1 if the PCell is not in the same band as the deactivated SCell. Each interruption shall not exceed requirement in Table 8.2.2.2.2.2 if the PCell is in the same band as the deactivated SCell.

Interruptions on active SCell due to measurements when an SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 8.2.2.2.1 if the active SCell is not in the same band as the deactivated SCell. Each interruption shall not exceed requirement in Table 8.2.2.2.2.2 if the active SCell is in the same band as the deactivated SCell.

[TS 38.133, clause 8.2.2.2.2]

Table 8.2.2.2.2-1: Interruption duration for SCell activation/deactivation for inter-band CA

μ	NR Slot length (ms)	Interruption length
0	1	1
1	0.5	1
2	0.25	2
3	0.125	4

Table 8.2.2.2.2: Interruption duration for SCell activation/deactivation for intra-band CA

μ	NR Slot length (ms)	Interruption length	
0	1	1 + T _{SMTC_duration}	
1	0.5	1 + T _{SMTC_duration}	
2	0.25	2 + T _{SMTC_duration}	
3	0.125	4 + T _{SMTC_duration}	
- 6 b - 6	T _{SMTC_duration} is - the longest SMTC duration among all above activated serving cells and the SCell being activated when one SCell is activated; - the longest SMTC duration among all activated serving cells in the same band when one SCell is deactivated.		

The normative reference for this requirement is TS 38.133 [6] clause 8.2.1.2.5.1.

4.5.2.0.3 Minimum conformance requirements for interruptions during measurements on deactivated E-UTRAN SCC

[TS 38.133 clause 8.2.1.2.5.2]

When one E-UTRA SCell in MCG is deactivated, the UE is allowed due to measurements on the E-UTRA SCC with the deactivated E-UTRA SCell:

- an interruption on PSCell or any activated SCell with up to 0.5% probability of missed ACK/NACK when any of the configured *measCycleSCell* [2] for the deactivated E-UTRA SCells is 640 ms or longer.
- an interruption on PSCell or any activated SCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated E-UTRA SCells if indicated by the network using IE *allowInterruptions* [2].

Each interruption shall not exceed

- X3 slot, if the PSCell or activated SCell is not in the same band as the E-UTRA deactivated SCC being measured. or
- Y3 slot + SMTC duration, if the PSCell or activated SCell is in the same band as the E-UTRA deactivated SCC being measured, provided the cell specific reference signals from the PSCell or activated SCell and the E-UTRA deactivated SCC being measured are available in the same slot.

Table 8.2.1.2.5-1: Interruption length X3 and Y3 at measurements on deactivated E-UTRA SCC

μ	NR Slot length (ms)	Interruption length X3 slot	Interruption length Y3 slot
0	1	1	1
1	0.5	1	1
2	0.25	2	2
3	0.125	4	4

The normative reference for this requirement is TS 38.133 [6] clause 8.2.1.2.5.1.

4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

4.5.2.1.1 Test purpose

The purpose of this test is to verify that when LTE PCell is in DRX and NR PSCell is in non-DRX, NR PSCell interruptions due to transitions from active to non-active and from non-active to active during LTE PCell DRX the UE missed ACK/NACK does not exceed the limits This test will verify the missed ACK/NACK rate for NR PSCell in ENDC.

4.5.2.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.5.2.1.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.2.1.

4.5.2.1.4 Test description

4.5.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.2.1.4.1-1.

Table 4.5.2.1.4.1-1: Supported test configurations

Configuration	Description	
4.5.2.1-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.1-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.1-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
4.5.2.1-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.1-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.1-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.5.2.1.4.1-2.

Table 4.5.2.1.4.1-2: Initial conditions for EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] sclause 4.3.1.		
Channel	As specified by the test configuration selected from Table 4.7.1.1.2-1.		
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 4.5.2.1.4.1-3.
- 2. Message contents are defined in clause 4.5.2.1.4.3.
- 3. There are one E-UTRAN carrier and one NR carrier and two cells in the test. Cell 1 is PCell on the E-UTRAN carrier, Cell 2 is PSCell on the NR carrier, Cell 1 is the cell used for connection setup with the power levels set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 4.5.2.1.4.1-3: General test parameters for E-UTRAN – NR FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1 2	One is E-UTRAN RF channel and the other
		1, 2	is NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Configured PSCell		Cell2	PSCell on NR RF channel number 2.
CP length		Normal	Applicable to Cell1 and Cell 2
DRX		DRX.4	DRX related parameters are defined in TS
		DRA.4	38.133 Table A.3.3.4-1
Measurement gap pattern		OFF	
Id		OFF	
T1	S	10	

4.5.2.1.4.2 Test procedure

The test consists of two cells: Cell1 and Cell2. Cell1 is LTE PCell and Cell2 is NR PSCell. The test consists of one time period, with duration of T1. During T1, NR PSCell is continuously scheduled in DL while LTE PCell is not scheduled and has DRX configured. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. Prior to start of T1 the DRX inactivity timer for the LTE PCell has already expired.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On*according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an RRCConnectionReconfiguration message to configure PCell (Cell1) and PSCell (Cell2) on the MCG and SCG as per TS 36.508 [7] clause 4.6 with the message content exceptions defined in clause 4.5.2.1.4.3.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS would ensure continuous transmission on PSCell, while not scheduling on PCell at least for 200 ms to ensure inactivity timer is expired on the UE for LTE PCell.
- 5. Set the parameters according to T1 in Table 4.5.2.1.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict. If all events pass, the test passes. If one event fails, the test fails.

4.5.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.2.1.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	Table H.3.7-2 with			
elements contents exceptions	Condition DRX.4			

4.5.2.1.5 Test requirement

Table 4.5.2.1.5-1 defines the NR cell specific primary level settings including test tolerances for E-UTRAN – NR FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC test.

Table 4.5.2.1.5-1: NR Cell specific test parameters for E-UTRAN – NR FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Parameter		Unit	Cell 2
Frequency Range			FR1
Duplex mode Config 1,4			FDD
·	Config 2,3,5,6	7	TDD
TDD configuration	Config 1,4		Not Applicable
3	Config 2,5	7	TDDConf.1.1
	Config 3,6	7	TDDConf.2.1
BW _{channel}	Config 1,4		10: N _{RB,C} = 52
_ · · chamer	Config 2,5	†	10: N _{RB,c} = 52
	Config 3,6	†	40: N _{RB,C} = 106
Initial BWP	Config 1,4	1	DLBWP.0.2 ^{Note5}
Configuration	Config 2,5	+	DLBWP.0.2 ^{Note5}
Comgaration	Config 3,6	+	DLBWP.0.2 ^{Note5}
PDSCH Reference	Config 1,4		SR.1.1 FDD
measurement channel	Config 2,5	+	SR.1.1 TDD
lileasurement channel	Config 2,5	+	SR.2.1 TDD
RMSI CORESET			
	Config 1,4	+	CR.1.1 FDD
parameters	Config 2,5	+	CR.1.1 TDD
DDOOLL CODECET	Config 3,6		CR.2.1 TDD
PDCCH CORESET	Config 1,4	4	CCR.1.1 FDD
parameters	Config 2,5	4	CCR.1.1 TDD
	Config 3,6		CCR.2.1 TDD
OCNG Patterns			OP.1
SMTC Configuration	-		SMTC.1
TRS configuration	Config 1,4		TRS.1.1 FDD
	Config 2,5		TRS.1.1 TDD
	Config 3,6		TRS.1.2 TDD
SSB Configuration	Config 1,2,4,5		SSB.1 FR1
	Config 3,6		SSB.2 FR1
	Correlation Matrix and Antenna		1x2 Low
Configuration			
EPRE ratio of PSS to SSS		_	
EPRE ratio of PBCH DMRS		4	
EPRE ratio of PBCH to PBC		-	
EPRE ratio of PDCCH DMF EPRE ratio of PDCCH to PI		dB	0
EPRE ratio of PDSCH DMF		- UB	O O
EPRE ratio of PDSCH to PI		†	
EPRE ratio of OCNG DMRS		†	
EPRE ratio of OCNG to OC		7	
N _{oc} ^{Note 2}		dBm/15	104
		kHz	-104
SS-RSRP Note 3	SS-RSRP Note 3		0.7
		dBm/15 kHz	-87
\hat{E}_{s}/I_{ot}		dB	17
Ê _s /N _{oc}		dB	17
IO ^{Note3}		dBm/	-58.96
10	Config 1,2,4,5	9.36MHz	-50.90
	Config 3,6	dBm/	-52.86
		38.16MHz	
Time offset to cell1 Note 4		μs	33
Propagation Condition			AWGN

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power
	spectral density is achieved for all OFDM symbols.

- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for Noc to be fulfilled.
- Note 3 SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.
- Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells
- Note 5: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2 defined in TS 38.213 [3] section 12.

The UE shall be continuously scheduled in NR PSCell during the entire length of T1. UE shall not be scheduled in LTE PCell during T1. During the time duration T1 the UE shall transmit at least 99% of ACK/NACK on NR PSCell.

Interruption on NR PSCell shall not exceed X slots as defined in Table 4.5.2.1.5-2.

Table 4.5.2.1.5-2: Interruption length X at transition between active and non-active during DRX

μ	NR Slot length (ms)	Interruption length X
0	1	1
1	0.5	1

The rate of correct events observed during repeated tests shall be at least 90%.

4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

4.5.2.2.1 Test purpose

The purpose of this test is to verify that when LTE PCell is in DRX and NR PSCell is in non-DRX, NR PSCell interruptions due to transitions from active to non-active and from non-active to active during LTE PCell DRX the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for NR PSCell in ENDC.

4.5.2.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.5.2.2.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.2.2.

4.5.2.2.4 Test description

4.5.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.2.2.4.1-1.

Table 4.5.2.2.4.1-1: Supported test configurations

Configuration	Description	
4.5.2.2-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.2-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.2-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
4.5.2.2-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.2-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.2-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.5.2.2.4.1-2.

Table 4.5.2.2.4.1-2: Initial conditions for EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.1-1 and TS 38.	508-1 [14] sclause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.7.1.1.2-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

- 1. The general test parameter settings are set up according to Table 4.5.2.2.4.1-3.
- 2. Message contents are defined in clause 4.5.2.2.4.3.
- 3. There are one E-UTRAN carrier and one NR carrier and two cells in the test. Cell 1 is PCell on the E-UTRAN carrier, Cell 2 is PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power levels set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 4.5.2.2.4.1-3: General test parameters for E-UTRAN – NR FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other is NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Configured PSCell		Cell2	PSCell on NR RF channel number 2.
CP length		Normal	Applicable to Cell1 and Cell 2
DRX		DRX.4	DRX related parameters are defined in TS 38.133 table A.3.3.4-1
Measurement gap pattern Id		OFF	
T1	S	10	

4.5.2.2.4.2 Test procedure

The test consists of two cells: Cell1 and Cell2. Cell1 is LTE PCell and Cell2 is NR PSCell. The test consists of one time period, with duration of T1. During T1, NR PSCell is continuously scheduled in DL while LTE PCell is not scheduled and has DRX configured. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. Prior to start of T1 the DRX inactivity timer for the LTE PCell has already expired.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an RRCConnectionReconfiguration message to configure PCell (Cell1) and PSCell (Cell2) on the MCG and SCG as per TS 36.508 [7] clause 4.6 with the message content exceptions defined in clause 4.5.2.2.4.3.
- 4. The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 5. The SS would ensure continuous transmission on PSCell, while not scheduling on PCell at least for 200 ms to ensure inactivity timer is expired on the UE for LTE PCell.
- 5. Set the parameters according to T1 in Table 4.5.2.2.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict. If all events pass, the test passes. If one event fails, the test fails.

4.5.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.2.2.4.3-1: Common Exception messages

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information	Table H.3.7-2 with		
elements contents exceptions	Condition DRX.4		

4.5.2.2.5 Test requirement

Table 4.5.2.2.5-1 define the NR cell specific primary level settings including test tolerances for E-UTRAN - NR FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC test.

Table 4.5.2.2.5-1: NR Cell specific test parameters for E-UTRAN – NR FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Parameter		Unit	Cell 2
Frequency Range			FR1
Duplex mode Config 1,4			FDD
	Config 2,3,5,6	1	TDD
TDD configuration	Config 1,4		Not Applicable
3	Config 2,5	1	TDDConf.1.1
	Config 3,6	1	TDDConf.2.1
BW _{channel}	Config 1,4		10: N _{RB,c} = 52
S.I.d.III.O.	Config 2,5	1	10: N _{RB,C} = 52
	Config 3,6	1	40: N _{RB,c} = 106
Initial BWP	Config 1,4		DLBWP.0.2 ^{Note5}
Configuration	Config 2,5	1	DLBWP.0.2 ^{Note5}
3	Config 3,6	1	DLBWP.0.2 ^{Note5}
PDSCH Reference	Config 1,4		SR.1.1 FDD
measurement channel	Config 2,5	1	SR.1.1 TDD
	Config 3,6	-	SR2.1 TDD
RMSI CORESET	Config 1,4		CR.1.1 FDD
parameters	Config 2,5	1	CR.1.1 TDD
parameters	Config 3,6	-	CR2.1 TDD
PDCCH CORESET	Config 1,4		CCR.1.1 FDD
parameters	Config 1,4	-	CCR.1.1 TDD
parameters	Config 2,5	-	CCR.2.1 TDD
OCNG Patterns	Corning 3,0		OP.1
			SMTC.1
SMTC Configuration	Config 1 4		
TRS configuration	Config 1,4		TRS.1.1 FDD
	Config 2,5		TRS.1.1 TDD
CCD Configuration	Config 3,6		TRS.1.2 TDD
SSB Configuration	Config 1,2,4,5	-	SSB.1 FR1
Config 3,6 Correlation Matrix and Antenna			SSB.2 FR1
	ntenna		1x2 Low
Configuration EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS	S to SSS	-	
EPRE ratio of PBCH to PBC		-	
EPRE ratio of PDCCH DMF		1	
EPRE ratio of PDCCH to PI		dB	0
EPRE ratio of PDSCH DMF	RS to SSS		
EPRE ratio of PDSCH to PI			
EPRE ratio of OCNG DMRS		_	
EPRE ratio of OCNG to OC	NG DMRS (Note 1)	ID /4.5	
N _{oc} ^{Note 2}		dBm/15	-104
CC DCDD Note 3		kHz	
SS-RSRP Note 3		dBm/15	-87
Ê		kHz	
Ê _s /l _{ot} Ê /N		dB	17
Ë _s /N _{oc} N _{oc} ^{Note 2}	Config 1 0 4 F	dB	17
IN _{oc} .	Config 1,2,4,5	-104	-104
IO ^{Note3}	Config 3,6	dD/	-101 -50.00
IU	Config 1,2,4,5	dBm/	-58.96
Config 3,6		9.36MHz	E2 00
		dBm/ 38.16MHz	-52.86
Time offset to Cell1 Note 4			E00
		μs	500
Propagation Condition			AWGN

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{cc} to be fulfilled.
Note 3:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.
Note 4:	Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells
Note 5:	For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2 defined in TS 38.213 [3] section 12.

The UE shall be continuously scheduled in NR PSCell during the entire length of T1. UE shall not be scheduled in LTE PCell during T1. During the time duration T1 the UE shall transmit at least 99% of ACK/NACK on NR PSCell.

Interruption on NR PSCell shall not exceed X slots as defined in Table 4.5.2.2.5-2.

Table 4.5.2.2.5-2: Interruption length X at transition between active and non-active during DRX

μ	NR Slot length (ms)	Interruption length X
0	1	2
1	0.5	2

The rate of correct events observed during repeated tests shall be at least 90%.

4.5.2.3 EN-DC FR1 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Editor's note:

- TT analysis is missing.

4.5.2.3.1 Test purpose

The purpose of this test is:

- To verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC.

4.5.2.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.5.2.3.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.2.3.

4.5.2.3.4 Test description

4.5.2.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.2.3.4.1-1.

Table 4.5.2.3.4.1-1: Supported test configurations

Configuration	Description
4.5.2.3-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
4.5.2.3-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
4.5.2.3-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
4.5.2.3-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
4.5.2.3-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
4.5.2.3-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
Note: The UE is only re	equired to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 4.5.2.3.4.1-2.

Table 4.5.2.3.4.1-2: Initial conditions for EN-DC FR1 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.1-1 and TS 38.	508-1 [14] sclause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 4.7.1.1.2-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 4.5.2.3.4.1-3.
- 2. Message contents are defined in clause 4.5.2.3.4.3.
- 3. There are one E-UTRAN carrier and two NR carriers and three cells specified in the test. Cell 1 is the PCell on E-UTRAN carrier, Cell 2 is the PSCell on one NR carrier and Cell 3 is the NR SCell on the other NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 4.5.2.3.4.1-3: General test parameters for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other
		1, 2	two are NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Active PSCell		Cell2	PSCell on NR RF channel number 2.
Configured deactivated		Cell3	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to cell1, cell 2 and cell3
DRX		OFF	
Measurement gap pattern		OFF	
Id		OFF	
SCell measurement cycle	mc	640	
(measCycleSCell)	ms	040	
T1	S	10	

4.5.2.3.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 is E-UTRAN PCell, Cell2 is NR PSCell and Cell3 is deactivated NR SCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as NR deactivated SCell. The point in time at which the RRC message including *measCycleSCell* for the deactivated NR SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCReconfiguration* message including *measCycleSCell* for the deactivated NR SCell.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. Set the parameters according to T1 in Table 5.5.2.3.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

4.5.2.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.2.3.4.3-1: Common Exception messages

	Default Message Contents				
Common contents of system information					
blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-1;				
·	Table H.3.1-2 with Condition Deactivated SCell;				
	Table H.3.1-3 with Condition Deactivated SCell, SSB.1 FR1 and SMTC.1 for configuration 4.5.2.3-1, 4.5.2.3-2, 4.5.2.3-4 and 4.5.2.3-5;				
	Table H.3.1-3 with Condition Deactivated SCell, SSB.2 FR1 and SMTC.1 for configuration 4.5.2.3-3 and 4.5.2.3-6;				
	Table H.3.1-4 with A3-offset = -4.5dB;				
	'				
	Table H.3.1-7 with Condition Deactivated SCell;				

4.5.2.3.5 Test requirement

Table 4.5.2.3.5-1 defines the primary level settings including test tolerances for E-UTRAN – NR FR1 interruptions during measurements on deactivated NR SCC in synchronous EN-DC test configurations.

Table 4.5.2.3.5-1: NR cell specific test parameters for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Parame	ter	Unit	Cell 2	Cell 3
Frequency Range			FR1	FR1
Duplex mode	Config 1,4	j L	FDD	FDD
	Config 2,3,5,6		TDD	TDD
TDD configuration	Config 1,4	J L	Not Applicable	Not Applicable
	Config 2,5		TDDConf.1.1	TDDConf.1.1
	Config 3,6		TDDConf.2.1	TDDConf.2.1
BW _{channel}	Config 1,4		10: N _{RB,c} = 52	10: N _{RB,c} = 52
	Config 2,5	1 Γ	10: N _{RB,c} = 52	10: N _{RB,c} = 52
	Config 3,6	1 [40: N _{RB,c} = 106	40: N _{RB,c} = 106
Initial DL BWP	Config 1,4		DLBWP.0.1	DLBWP.0.1
Configuration	Config 2,5	1	DLBWP.0.1	DLBWP.0.1
3	Config 3,6	1	DLBWP.0.1	DLBWP.0.1
Dedicated DL BWP	Config 1,4		DLBWP.1.1	DLBWP.1.1
Configuration	Config 2,5	1	DLBWP.1.1	DLBWP.1.1
Comgaration	Config 3,6	† -	DLBWP.1.1	DLBWP.1.1
Initial UL BWP	Config 1,4		ULBWP.0.1	ULBWP.0.1
Configuration	Config 2,5	 	ULBWP.0.1	ULBWP.0.1
Comgulation		 		
Dadia stad III DWD	Config 3,6		ULBWP.0.1	ULBWP.0.1
Dedicated UL BWP	Config 1,4		ULBWP.1.1	ULBWP.1.1
Configuration	Config 2,5	↓	ULBWP.1.1	ULBWP.1.1
	Config 3,6		ULBWP.1.1	ULBWP.1.1
PDSCH Reference	Config 1,4		SR.1.1 FDD	-
measurement channel	Config 2,5	<u> </u>	SR.1.1 TDD	-
	Config 3,6		SR 2.1 TDD	-
RMSI CORESET	Config 1,4	J L	CR.1.1 FDD	CR.1.1 FDD
parameters	Config 2,5		CR.1.1 TDD	CR.1.1 TDD
	Config 3,6	Ι Γ	CR 2.1 TDD	CR 2.1 TDD
PDCCH CORESET	Config 1,4		CCR.1.1 FDD	CCR.1.1 FDD
parameters	Config 2,5	1 [CCR.1.1 TDD	CCR.1.1 TDD
•	Config 3,6	1	CCR.2.1 TDD	CCR.2.1 TDD
TRS configuration	Config 1,4		TRS.1.1 FDD	TRS.1.1 FDD
garamer	Config 2,5	1	TRS.1.1 TDD	TRS.1.1 TDD
	Config 3,6	1	TRS.1.1 TDD	TRS.1.1 TDD
OCNG Patterns	Tooming O,O		OP.1	OP.1
SMTC Configuration			SMTC.1	SMTC.1
TCI state			TCI.State.0	TCI.State.0
SSB Configuration	Config 1,2,4,5		SSB.1 FR1	SSB.1 FR1
33B Configuration	Config 3,6	 	SSB.2 FR1	SSB.2 FR1
Correlation Matrix and A		+	1x2 Low	1x2 Low
Configuration	пеша		1X2 LOW	TXZ LOW
EPRE ratio of PSS to SSS		<u> </u>		
EPRE ratio of PBCH DMRS				
EPRE ratio of PBCH to PBC		1		
EPRE ratio of PDCCH DMF			•	
EPRE ratio of PDCCH to P		dB	0	0
EPRE ratio of PDSCH DMF		-		
EPRE ratio of PDSCH to PI EPRE ratio of OCNG DMR		- I		
EPRE ratio of OCNG DMR		1		
N _{oc} ^{Note 2}	ING DIVIRS (Note 1)	dBm/15	-104+TT	-104 +TT
SS-RSRP Note 3		kHz	201:11	201.11
SS-RSRP Note 3		dBm/15 kHz	-87 +TT	-87 +TT
Ê _s /I _{ot}		dB	17+TT	17+TT
Ê _s /N _{oc}		dB	17+TT	17+TT
J00				
IO ^{Note3}		dD/	E7.0 : TT	E7.0 . TT
10	Config 1,2,4,5	dBm/ 9.36MHz	-57.9 +TT	-57.9 +TT
	Config 3,6	dBm/ 38.16MHz	-51.8 +TT	-51.8+TT
Time offset to cell1 Note 4		μs	33	33

Time offs	Time offset to cell2 Note 5 µs		-	3
Propagation Condition			AWGN	AWGN
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power sp			transmitted power spectral	
	density is achieved for all OFDM s	ymbols.		
Note 2:	Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for Noc to be fulfilled.			
Note 3:	Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.			purposes. They are not
Note 4:	timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells			error between the two cells
Note 5:				o cells at the UE antenna

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table 4.5.2.3.5-2 if the NR PSCell is not in the same band as the deactivated SCell or Table 4.5.2.3.5-3 if the NR PSCell is in the same band as the deactivated SCell.

Table 4.5.2.3.5-2: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)	
0	1	1	
1	0.5	1	

Table 4.5.2.3.5-3: Interruption duration if the NR PSCell is in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)	
0	1	1+SMTC duration	
1	0.5	1+SMTC duration	

Each interruption on E-UTRAN PCell shall not exceed 1ms + SMTC duration subframes for synchronous intraband EN-DC, 1 subframe for synchronous interband EN-DC.

The rate of correct events observed during repeated tests shall be at least 90%.

4.5.2.4 EN-DC FR1 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Editor's note:

- TT analysis is missing.

4.5.2.4.1 Test purpose

The purpose of this test is:

- To verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC

4.5.2.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.5.2.4.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.2.4.

4.5.2.4.4 Test description

4.5.2.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.2.4.4.1-1.

Table 4.5.2.4.4.1-1: Supported test configurations

Configuration	Description		
4.5.2.4-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.2.4-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.2.4-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.5.2.4-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.5.2.4-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.5.2.4-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is only required to be tested in one of the supported test configurations			

Configure the test equipment and the DUT according to the parameters in Table 4.5.2.4.4.1-2.

Table 4.5.2.4.4.1-2: Initial conditions for EN-DC FR1 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.1-1 and TS 38.	508-1 [14] sclause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.7.1.1.2-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

- 1. The general test parameter settings are set up according to Table 4.5.2.4.4.1-3.
- 2. Message contents are defined in clause 4.5.2.4.4.3.
- 3. There are one E-UTRAN carrier and two NR carriers and three cells specified in the test. Cell 1 is the PCell on E-UTRAN carrier, Cell 2 is the PSCell on one NR carrier and Cell 3 is the SCell on the other NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 4.5.2.4.4.1-3: General test parameters for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other
		1, 2	two are NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Active PSCell		Cell2	PSCell on NR RF channel number 2.
Configured deactivated		Cell3	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to cell1, cell 2 and cell3
DRX		OFF	
Measurement gap pattern		OFF	
Id		OFF	
SCell measurement cycle	mc	640	
(measCycleSCell)	ms	040	
T1	S	10	

4.5.2.4.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 is E-UTRAN PCell, Cell2 is NR PSCell and Cell3 is deactivated NR SCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as NR deactivated SCell. The point in time at which the RRC message including *measCycleSCell* for the deactivated NR SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCReconfiguration* message including *measCycleSCell* for the deactivated NR SCell.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. Set the parameters according to T1 in Table 5.5.2.3.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

4.5.2.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.2.4.4.3-1: Common Exception messages

	Default Message Contents				
Common contents of system information					
blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-1;				
·	Table H.3.1-2 with Condition Deactivated SCell;				
	Table H.3.1-3 with Condition Deactivated SCell, SSB.1 FR1 and SMTC.1 for configuration 4.5.2.4-1, 4.5.2.4-2, 4.5.2.4-4 and 4.5.2.4-5;				
	Table H.3.1-3 with Condition Deactivated SCell, SSB.2 FR1 and SMTC.1 for configuration 4.5.2.4-3 and 4.5.2.4-6;				
	Table H.3.1-4 with A3-offset = -4.5dB;				
	Table H.3.1-7 with Condition Deactivated SCell;				

4.5.2.4.5 Test requirement

Table 4.5.2.4.5-1 defines the primary level settings including test tolerances for E-UTRAN – NR FR1 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC test configurations.

Table 4.5.2.4.5-1: NR cell specific test parameters for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Parameter		Unit	Cell 2	Cell 3
Frequency Range			FR1	FR1
Duplex mode	Config 1,4		FDD	FDD
	Config 2,3,5,6		TDD	TDD
TDD configuration	Config 1,4] [Not Applicable	Not Applicable
	Config 2,5		TDDConf.1.1	TDDConf.1.1
	Config 3,6		TDDConf.2.1	TDDConf.2.1
BW _{channel}	Config 1,4		10: $N_{RB,c} = 52$	10: N _{RB,c} = 52
	Config 2,5] [10: $N_{RB,c} = 52$	10: N _{RB,c} = 52
	Config 3,6		40: N _{RB,c} = 106	40: N _{RB,c} = 106
Initial DL BWP	Config 1,4		DLBWP.0.1	DLBWP.0.1
Configuration	Config 2,5		DLBWP.0.1	DLBWP.0.1
	Config 3,6	Ι Γ	DLBWP.0.1	DLBWP.0.1
Dedicated DL BWP	Config 1,4		DLBWP.1.1	DLBWP.1.1
Configuration	Config 2,5	1 [DLBWP.1.1	DLBWP.1.1
_	Config 3,6	1 [DLBWP.1.1	DLBWP.1.1
Initial UL BWP	Config 1,4		ULBWP.0.1	ULBWP.0.1
Configuration	Config 2,5	1 [ULBWP.0.1	ULBWP.0.1
	Config 3,6	1 [ULBWP.0.1	ULBWP.0.1
Dedicated UL BWP	Config 1,4		ULBWP.1.1	ULBWP.1.1
Configuration	Config 2,5	1	ULBWP.1.1	ULBWP.1.1
	Config 3,6	1	ULBWP.1.1	ULBWP.1.1
PDSCH Reference	Config 1,4		SR.1.1 FDD	-
measurement channel	Config 2,5	1 1	SR.1.1 TDD	-
	Config 3,6	1	SR2.1 TDD	-
RMSI CORESET	Config 1,4		CR.1.1 FDD	CR.1.1 FDD
parameters	Config 2,5	i t	CR.1.1 TDD	CR.1.1 TDD
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Config 3,6	i t	CR2.1 TDD	CR2.1 TDD
PDCCH CORESET	Config 1,4		CCR.1.1 FDD	CCR.1.1 FDD
parameters	Config 2,5	i t	CCR.1.1 TDD	CCR.1.1 TDD
Paris and a second	Config 3,6	1	CCR.2.1 TDD	CCR.2.1 TDD
TRS configuration	Config 1,4		TRS.1.1 FDD	TRS.1.1 FDD
Tro samgaranan	Config 2,5	1	TRS.1.1 TDD	TRS.1.1 TDD
	Config 3,6	1	TRS.1.1 TDD	TRS.1.1 TDD
OCNG Patterns	T Commig C,C		OP.1	OP.1
SMTC Configuration			SMTC.1	SMTC.1
SSB Configuration	Config 1,2,4,5		SSB.1 FR1	SSB.1 FR1
COD Cormgaration	Config 3,6	1	SSB.2 FR1	SSB.2 FR1
TCI state	Coming 0,0		TCI.State.0	TCI.State.0
Correlation Matrix and Ar	ntenna		1x2 Low	1x2 Low
Configuration	iterina		IAZ LOW	INZ LOW
EPRE ratio of PSS to SSS				
EPRE ratio of PBCH DMRS	to SSS	1		
EPRE ratio of PBCH to PBC		j		
EPRE ratio of PDCCH DMR]		
EPRE ratio of PDCCH to PD		dB	0	0
EPRE ratio of PDSCH DMR		<u> </u>		
EPRE ratio of PDSCH to PD				
EPRE ratio of OCNG DMRS				
EPRE ratio of OCNG to OC	ING DINIK2 (NOTE 1)	dBm/15		
INOC	N _{oc} Note 2		-104+TT	-104 +TT
SS-RSRP Note 3		kHz dBm/15		
		kHz	-87 +TT	-87 +TT
Ê _s /I _{ot}		dB	17+TT	17+TT
Es/Tot Ês/Noc		dВ	17+TT	17+TT
LS/1NOC		ub	1/711	1/TII
		- I		
Io ^{Note3}	+	dBm/	-57.9+TT	-57.9+TT
10	Config 1,2,4,5	9.36MHz	-51.8-11	
		dBm/	-51.8+TT	-51.8+TT
	Config 3,6	38.16MHz	-31.0111	-51.0+11
Time offset to cell1 Note 4	I.	μS	3	3
1.1110 011301 10 00111		μο	J	J

Time offs	set to cell2 Note 5	μs	-	3
Propagat	tion Condition		AWGN	AWGN
Note 1:	Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral de			smitted power spectral density
	is achieved for all OFDM symbols.			
Note 2:	2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers			
	and time and shall be modeled as AWGN of appropriate power for N_{∞} to be fulfilled.			
Note 3:				rposes. They are not settable
	parameters themselvess.			
Note 4:	··· · · · · · · · · · · · · · · · · ·			
	boundary of PSCell at the UE antenna connector including time alignment error between the two cells			
Note 5:				ells at the UE antenna connector
	including time alignment error between the two cells.			

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table 4.5.2.4.5-2 if the NR PSCell is not in the same band as the deactivated SCell or Table 4.5.2.4.5-3 if the NR PSCell is in the same band as the deactivated SCell.

Table 4.5.2.4.5-2: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
0	1	1
1	0.5	1

Table 4.5.2.4.5-3: Interruption duration if the NR PSCell is in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
0	1	1+SMTC duration
1	0.5	1+SMTC duration

Each interruption on E-UTRAN PCell shall not exceed 2 subframes for asynchronous interband EN-DC. The rate of correct events observed during repeated tests shall be at least 90%.

4.5.2.5 EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Editor's note:

- Test tolerance is missing.

4.5.2.5.1 Test purpose

The purpose of this test is:

- To verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated E-UTRAN SCC, the UE missed ACK/NACK does not exceed the limits.
- This test will verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC.

4.5.2.5.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.5.2.5.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.2.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.2.5.

4.5.2.5.4 Test description

4.5.2.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.2.5.4.1-1.

Table 4.5.2.5.4.1-1: Supported test configurations

Configuration	Description	
4.5.2.5-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.5-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.5-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
4.5.2.5-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.5-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.5-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.5.2.5.4.1-2 and Table 4.5.2.5.4.1-3.

Table 4.5.2.5.4.1-2: Initial conditions for EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] sclause 4.3.1.		
Channel	As specified by the test configuration selected from Table 4.7.1.1.2-1.		
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 4.5.2.5.4.1-3.
- 2. Message contents are defined in clause 4.5.2.5.4.3.
- 3. There are two E-UTRAN carriers and one NR carrier and three cells specified in the test. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR1 PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 4.5.2.5.4.1-3: General test parameters for E-UTRAN – NR FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1 2	One is E-UTRAN RF channel and the other
		1, 2	two are NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Active PSCell		Cell2	PSCell on NR RF channel number 2.
Configured deactivated		Cell3	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to cell1, cell 2 and cell3
DRX		OFF	
Measurement gap pattern		OFF	
Id		OFF	
SCell measurement cycle	ms	640	
(measCycleSCell)	1115	040	
T1	S	10	

4.5.2.5.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR1 PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as E-UTRAN deactivated SCell. The point in time at which the RRC message including *measCycleSCell* or *allowInterruptions* for the E-UTRAN SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message including *measCycleSCell* or *allowInterruptions* for the deactivated E-UTRAN SCell to perform measurements on the deactivated SCC.
- 4. The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 5. Set the parameters according to T1 in Table 5.5.2.3.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

4.5.2.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.2.5.4.3-1: Common Exception messages

Default Message Contents		
Common contents of system information		
blocks exceptions		
Default RRC messages and information		
elements contents exceptions		

Table 4.5.2.5.4.3-2: MeasObjectEUTRA for E-UTRA deactivated SCell

Derivation Path: 36.508 Table 4.6.6-2			
Information Element	Value/remark	Comment	Condition
MeasObjectEUTRA ::= SEQUENCE {			
carrierFreq	Downlink EARFCN for E-		
	UTRAN SCell		
measCycleSCell-r10	sf640		
}			

4.5.2.5.5 Test requirement

Table 4.5.2.5.5-1 defines the primary level settings including test tolerances for E-UTRAN – NR FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC test configurations.

Table 4.5.2.5.5-1: NR cell specific test parameters for E-UTRAN – NR FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Parameter		Unit	Cell 2
Frequency Range			FR1
Duplex mode Config 1,4			FDD
	Config 2,3,5,6		TDD
TDD configuration	Config 1,4		Not Applicable
	Config 2,5	1	TDDConf.1.1
	Config 3,6	1	TDDConf.2.1
BW _{channel}	Config 1,4	MHz	10: N _{RB,c} = 52
	Config 2,5]	10: N _{RB,c} = 52
	Config 3,6]	40: N _{RB,c} = 106
Initial DL BWP	Config 1,4		DLBWP.0.1
Configuration	Config 2,5]	DLBWP.0.1
	Config 3,6		DLBWP.0.1
Dedicated DL BWP	Config 1,4		DLBWP.1.1
Configuration	Config 2,5		DLBWP.1.1
	Config 3,6		DLBWP.1.1
Initial UL BWP	Config 1,4		ULBWP.0.1
Configuration	Config 2,5		ULBWP.0.1
	Config 3,6		ULBWP.0.1
Dedicated UL BWP	Config 1,4		ULBWP.1.1
Configuration	Config 2,5]	ULBWP.1.1
	Config 3,6		ULBWP.1.1
PDSCH Reference	Config 1,4		SR.1.1 FDD
measurement channel	Config 2,5		SR.1.1 TDD
	Config 3,6		SR.2.1 TDD
RMSI CORESET	Config 1,4		CR.1.1 FDD
parameters	Config 2,5		CR.1.1 TDD
	Config 3,6		CR.2.1 TDD
PDCCH CORESET	Config 1,4		CCR.1.1 FDD
parameters	Config 2,5	_	CCR.1.1 TDD
	Config 3,6		CCR.2.1 TDD
OCNG Patterns			OP.1
SMTC Configuration			SMTC.1
TCI state	T = #		TCI.State.0
SSB Configuration	Config 1,2,4,5	1	SSB.1 FR1
	Config 3,6		SSB.2 FR1
Correlation Matrix and A Configuration	ntenna		1x2 Low
EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS	S to SSS		
EPRE ratio of PBCH to PBC	CH DMRS		
EPRE ratio of PDCCH DMF			_
EPRE ratio of PDCCH to P		dB	0
EPRE ratio of PDSCH DMF EPRE ratio of PDSCH to PI		-	
		-	
EPRE ratio of OCNG DMRS to SSS(Note 1) EPRE ratio of OCNG to OCNG DMRS (Note 1)		†	
N _{oc} ^{Note 2}		dBm/15	404 : ***
• • • • • • • • • • • • • • • • • • • •		kHz	-104 +TT
SS-RSRP Note 3		dBm/15	-87 +TT
Ê II		kHz	
Ê _s /I _{ot}		dB	17+TT
Ê _s /N _{oc}		dB	17+TT
		-	
Io ^{Note3}		dBm/	-57.9 +TT
10	Config 1,2,4,5	9.36MHz	37.3 111
	0	dBm/	-51.8 +TT
Config 3,6		38.16MHz	
Time offset to cell1 Note 4		μs	33
Propagation Condition			AWGN
1 Topagation Condition			

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power
	spectral density is achieved for all OFDM symbols.
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N _{oc} to be fulfilled.
Note 3:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.
Note 4:	Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells
Note 5:	For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2 defined in TS 38.213 [3] section 12.

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed X defined in Table 4.5.2.5.5-2 if the NR PSCell is not in the same band as the E-UTRAN deactivated SCell or Y in Table Table 4.5.2.5.5-2 if the NR PSCell is in the same band as the E-UTRAN deactivated SCell.

Table 4.5.2.5.5-2: Interruption length X and Y at measurements on deactivated E-UTRA SCC

μ	NR Slot length (ms)	Interruption length X (slot)	Interruption length Y (slot)
0	1	1	1 + SMTC duration
1	0.5	1	1 + SMTC duration

Each interruption on E-UTRAN PCell shall not exceed 1 subframe if the PCell is not in the same band as the deactivated SCell, or 5 subframes if the PCell is in the same band as the deactivated SCell.

The rate of correct events observed during repeated tests shall be at least 90%.

4.5.2.6 EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Editor's note:

- Test tolerance is missing.

4.5.2.6.1 Test purpose

The purpose of this test is:

- To verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC.

4.5.2.6.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.5.2.6.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.2.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.2.6.

4.5.2.6.4 Test description

4.5.2.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.2.6.4.1-1.

Table 4.5.2.6.4.1-1: Supported test configurations for EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Configuration	Description	
4.5.2.6-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.6-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.6-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
4.5.2.6-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
4.5.2.6-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
4.5.2.6-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.5.2.6.4.1-2.

Table 4.5.2.6.4.1-2: Initial conditions for EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.5	508-1 [14] clause 4.3.1.		
Channel	As specified	by the test configuration selected fr	om Table 4.5.2.6.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.1.		
conditions					
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to	N/A	•			
connection					
diagram					

- 1. The general test parameter settings are set up according to Table 4.5.2.6.4.1-3.
- 2. Message contents are defined in clause 4.5.2.6.4.3.
- 3. There are two E-UTRAN carriers and one NR carrier and three cells specified in the test. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR1 PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 4.5.2.6.4.1-3: General test parameters for EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number	Number		One is E-UTRAN RF channel and the other
		1, 2	two are NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Active PSCell		Cell2	PSCell on NR RF channel number 2.
Configured deactivated		Cell3	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to cell1, cell 2 and cell3
DRX		OFF	
Measurement gap pattern		OFF	
Id		OFF	
SCell measurement cycle	ms	640	
(measCycleSCell)	1115	040	
T1	S	10	

4.5.2.6.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR1 PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN

PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as E-UTRAN deactivated SCell. The point in time at which the RRC message including *measCycleSCell* or *allowInterruptions* for the E-UTRAN SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message including *measCycleSCell* or *allowInterruptions* for the deactivated E-UTRAN SCell to perform measurements on the deactivated SCC.
- 4. The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 5. Set the parameters according to T1 in Table 5.5.2.3.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

4.5.2.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.2.6.4.3-1: Common Exception messages

Default Message Co	ntents
Common contents of system information	
blocks exceptions	
Default RRC messages and information	
elements contents exceptions	

Table 4.5.2.6.4.3-2: MeasObjectEUTRA for E-UTRAN deactivated SCell

Derivation Path: 36.508 Table 4.6.6-2			
Information Element	Value/remark	Comment	Condition
MeasObjectEUTRA ::= SEQUENCE {			
carrierFreq	Downlink EARFCN for E-		
	UTRAN SCell		
measCycleSCell-r10	sf640		
}			

4.5.2.6.5 Test requirement

Table 4.5.2.6.5-1 defines the primary level settings including test tolerances for EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC test configurations.

Table 4.5.2.6.5-1: NR cell specific test parameters for EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Parameter		Unit	Cell 2
Frequency Range			FR1
Duplex mode	Config 1,4		FDD
	Config 2,3,5,6		TDD
TDD configuration	Config 1,4		Not Applicable
	Config 2,5		TDDConf.1.1
	Config 3,6		TDDConf.2.1
BW _{channel}	Config 1,4	MHz	10: N _{RB,c} = 52
	Config 2,5		10: N _{RB,c} = 52
	Config 3,6		40: N _{RB,c} = 106
Initial DL BWP	Config 1,4		DLBWP.0.1
Configuration	Config 2,5		DLBWP.0.1
	Config 3,6		DLBWP.0.1
Dedicated DL BWP	Config 1,4		DLBWP.1.1
Configuration	Config 2,5		DLBWP.1.1
Latitude Brade	Config 3,6		DLBWP.1.1
Initial UL BWP	Config 1,4		ULBWP.0.1
Configuration	Config 2,5		ULBWP.0.1
D. Frank J. H. D.AKD	Config 3,6		ULBWP.0.1
Dedicated UL BWP	Config 1,4		ULBWP.1.1
Configuration	Config 2,5		ULBWP.1.1 ULBWP.1.1
DDCCII Deference	Config 3,6		SR.1.1 FDD
PDSCH Reference measurement channel	Config 1,4	-	SR.1.1 FDD SR.1.1 TDD
lineasurement channel	Config 2,5	-	SR.1.1 TDD SR.2.1 TDD
RMSI CORESET	Config 3,6 Config 1,4		CR.1.1 FDD
parameters	Config 2,5		CR.1.1 FDD
parameters	Config 3,6		CR.2.1 TDD
PDCCH CORESET	Config 1,4		CCR.1.1 FDD
parameters	Config 2,5		CCR.1.1 TDD
parameters	Config 3,6		CCR.2.1 TDD
TRS configuration	Config 1,4		TRS.1.1 FDD
110 comiguration	Config 2,5		TRS.1.1 TDD
	Config 3,6		TRS.1.1 TDD
OCNG Patterns	Coming 0,0		OP.1
SMTC Configuration			SMTC.1
TCI state			TCI.State.0
SSB Configuration	Config 1,2,4,5		SSB.1 FR1
	Config 3,6		SSB.2 FR1
Correlation Matrix and Ar			1x2 Low
Configuration			
EPRE ratio of PSS to SS			
EPRE ratio of PBCH DM			
EPRE ratio of PBCH to F			
EPRE ratio of PDCCH D			
EPRE ratio of PDCCH to		dB	0
EPRE ratio of PDSCH D			
EPRE ratio of PDSCH to			
EPRE ratio of OCNG DM			
EPRE ratio of OCNG to 0	OCNG DMRS NOTE 1	ID . // =	
N _{oc} ^{Note 2}		dBm/15 kHz	-104+TT
SS-RSRP Note 3		dBm/15	-87 +TT
Ê //		kHz dB	17, TT
\hat{E}_s/I_{ot} \hat{E}_s/N_{oc}		dB dB	17+TT 17+TT
⊏s/IN _{0C}		ub	1/+11
		1	
IO ^{Note3}	Config 1,2,4,5	dBm/ 9.36MHz	-57.9 +TT
	Config. 2.6	dBm/	-51.8 +TT
	Config 3,6	38.16MHz	

Time offs	Time offset to cell1 Note 4		500	
Propagat	Propagation Condition		AWGN	
Note 1:	OCNG shall be used such that bot	th cells are full	y allocated and a constant total transmitted power	
	spectral density is achieved for all			
		oise sources not specified in the test is assumed to be constant over modeled as AWGN of appropriate power for N_{oc} to be fulfilled.		
			other parameters for information purposes. They are	
Note 4:			een subframe timing boundary of E-UTRA PCell and a connector including time alignment error between the	

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on E-UTRAN PCell and NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on E-UTRAN PCell and NR PSCell shall not exceed the value defined in Table 4.5.2.6.5-2 and Table 4.5.2.6.5-3.

Table 4.5.2.6.5-2: Interruption duration if the NR PSCell is not in the same band as the E-UTRAN deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
0	1	2
1	0.5	2

Table 4.5.2.6.5-3: Interruption duration if the NR PSCell is in the same band as the E-UTRAN deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
0	1	2 + SMTC duration
1	0.5	2 + SMTC duration

Each interruption on E-UTRAN PCell shall not exceed 1 subframe if the PCell is not in the same band as the deactivated SCell, or 5 subframes if the PCell is in the same band as the deactivated SCell.

The rate of correct events observed during repeated tests shall be at least 90%.

4.5.3 SCell activation and deactivation delay

4.5.3.0 Minimum conformance requirements

4.5.3.0.1 Minimum conformance requirements for SCell activation and deactivation delay

The requirements in this clause shall apply for the UE configured with one downlink SCell in EN-DC, or in standalone NR carrier aggregation or in NE-DC or in NR-DC and when one SCell is being activated.

The delay within which the UE shall be able to activate the deactivated SCell depends upon the specified conditions.

Upon receiving SCell activation command in slot n, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command for the SCell being activated no later than in slot , where:

T_{HARQ} (in ms) is the timing between DL data transmission and acknowledgement as specified in 38.213 [8].

T_{activation_time} is the SCell activation delay in millisecond.

If the SCell is known and belongs to FR1, T_{activation_time} is:

- $T_{FirstSSB}$ + 5ms, if the SCell measurement cycle is equal to or smaller than 160ms.
- $T_{SMTC\ MAX} + T_{rs} + 5ms$, if the SCell measurement cycle is larger than 160ms.

If the SCell is unknown and belongs to FR1, T_{activation_time} is:

- $2*T_{SMTC,MAX} + 2*T_{rs} + 5$ ms provided the SCell can be successfully detected on the first attempt.

If the SCell being activated belongs to FR2, and if there is at least one active serving cell on that FR2 band, then $T_{\text{activation_time}}$ is T_{FirstSSB} + 5ms provided:

- The UE is provided with SMTC for the target SCell, and
- The SSBs in the serving cell(s) and the SSBs in the SCell fulfil the condition defined in TS 38.133 [6] clause 3.6.3.

If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, if the UE is not provided with any SMTC for the target SCell, T_{activation time} is 3ms.

If the SCell being activated belongs to FR2 and if there is no active serving cell on that FR2 band provided that PCell or PSCell is FR1:

If the target SCell is known to UE and semi-persistent CSI-RS is used for CSI reporting, then Tactivation_time is:

- T_{FineTiming} + 5ms], if UE receives the SCell activation command, semi-persistent CSI-RS activation command and TCI state activation command at the same time.
- $max (3ms, T_{uncertainty}) + T_{HARQ} + T_{FineTiming} + 5ms$, if UE receives TCI state activation command after SCell activation command.

If the target SCell is known to UE and periodic CSI-RS is used for CSI reporting, then Tactivation_time is:

- $max(T_{uncertainty_MAC} + 5ms + T_{FineTiming}, T_{uncertainty_RRC} + T_{RRC_delay})$

If the target SCell is unknown to UE and semi-persistent CSI-RS is used for CSI reporting, then $T_{activation_time}$ is:

- $8ms+24*T_{rs} + T_{uncertainty_MAC} + T_{L1-RSRP, measure} + T_{L1-RSRP, report} + T_{HARQ} + T_{FineTiming}$

If the target SCell is unknown to UE and periodic CSI-RS is used for CSI reporting, then Tactivation time is:

- $3ms + 24*T_{rs} + T_{L1-RSRP, measure} + T_{L1-RSRP, report} + max ((T_{HARQ} + T_{uncertainty_MAC} + 5ms + T_{FineTiming}), (T_{uncertainty_RRC} + T_{RRC delav})).$

Where,

T_{SMTC MAX}:

- In FR1, in case of intra-band SCell activation, T_{SMTC_MAX} is the longer SMTC periodicity between
 active serving cells and SCell being activated provided the cell specific reference signals from the
 active serving cells and the SCells being activated or released are available in the same slot; in case of
 inter-band SCell activation, T_{SMTC_MAX} is the SMTC periodicity of SCell being activated.
- In FR2, T_{SMTC_MAX} is the longer SMTC periodicity between active serving cells and SCell being activated provided that in Rel-15 only support FR2 intra-band CA.
- T_{SMTC_MAX} is bounded to a minimum value of 10ms.
- T_{rs} is the SMTC periodicity of the SCell being activated if the UE has been provided with an SMTC configuration for the SCell in SCell addition message, otherwise T_{rs} is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement which involves T_{rs} is applied with T_{rs} = 5ms assuming the SSB transmission periodicity is 5ms. There is no requirements if the SSB transmission periodicity is not 5ms.

 T_{FirstSSB} : Is the time to first SSB indicated by the SMTC after n + T_{HARQ} +3ms.

 $T_{\text{FineTiming}}$ is the time period between UE finish processing the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and semi-persistent CSI-RS (when applicable) and the timing of first complete available SSB corresponding to the TCI state

T_{uncertainty} is the time period between reception of SCell activation MAC-CE and TCI activation MAC-CE for known case. For unknown case, uncertainty is the time between the first L1-RSRP reporting and when UE receives TCI activation MAC-CE.

 $T_{L1\text{-RSRP},measure}$ is L1-RSRP measurement delay $T_{L1\text{-RSRP},measurement},Period_SSB}$ (ms) or $T_{L1\text{-RSRP},measurement},Period_CSI-RS}$ based on applicability as defined in TS 38.133 [6] clause 9.5 assuming M=1.

T_{L1-RSRP,report} is delay of acquiring CSI reporting resources.

T_{uncertainty_MAC} is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and semi-persistent CSI-RS for CQI reporting (when applicable) relative to

- SCell activation command for known case;
- First valid L1-RSRP reporting for unknown case.

T_{uncertainty_RRC} is the time period between reception of the RRC configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) relative to

- SCell activation command for known case:
- First valid L1-RSRP reporting for unknown case.

 T_{RRC_delay} is the RRC procedure delay as specified in [13].

T_{CSI_reporting} is the delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing time for CSI reporting and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [13].

SCell in FR1 is known if it has been meeting the following conditions:

- During the period equal to max([5] measCycleSCell, [5] DRX cycles) for FR1 before the reception of the SCell activation command:
 - the UE has sent a valid measurement report for the SCell being activated and
 - the SSB measured remains detectable according to the cell identification conditions specified in TS 38.133 [6] section 9.2 and 9.3.
- the SSB measured during the period equal to max([5] measCycleSCell, [5] DRX cycles) also remains detectable during the SCell activation delay according to the cell identification conditions specified in TS 38.133 [6] section 9.2 and 9.3.

Otherwise SCell in FR1 is unknown.

For the first SCell activation in FR2 bands, the SCell is known if it has been meeting the following conditions:

- During the period equal to [4s] for UE supporting power class1 and [3s] for UE supporting power class 2/3/4 before UE receives the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and semi-persistent CSI-RS for CQI reporting (when applicable):
 - the UE has sent a valid L3-RSRP measurement report with SSB index
 - SCell activation command is received after L3-RSRP reporting and no later than the time when UE receives MAC-CE command for TCI activation
- During the period from L3-RSRP reporting to the valid CQI reporting, the reported SSBs with indexes remain detectable according to the cell identification conditions specified in TS 38.133 [6] clause 9.2 and 9.3, and the TCI state is selected based on one of the latest reported SSB indexes.

Otherwise, the first SCell in FR2 band is unknown. The requirement for unknown SCell applies provided that the activation commands for PDCCH TCI, PDSCH TCI (when applicable), semi-persistent CSI-RS for CQI reporting (when applicable), and configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) are based on the latest valid L1-RSRP reporting.

If the UE has been provided with higher layer in TS 38.331 [13] signaling of smtc2 prior to the activation command, T_{SMTC_Scell} follows smtc1 or smtc2 according to the physical cell ID of the target cell being activated. T_{SMTC_MAX} follows smtc1 or smtc2 according to the physical cell IDs of the target cells being activated and the active serving cells.

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in [13] for a SCell at the first opportunities for the corresponding actions once the SCell is activated.

The interruption on PSCell or any activated SCell in SCGfor EN-DC mode specified in TS 38.133 [6] clause 8.2 shall not occur before slot $n+1+[T_{HARO}]$ and not occur after slot $n+1+[T_{HARO}]$ and $n+1+[T_{HARO}]$ and not occur after slot $n+1+[T_{HARO}]$ and $n+1+[T_{HARO}]$ a

The interruption on PCell or any activated SCell in MCG for NR standalone mode specified in TS 38.133 [6] clause 8.2 shall not occur before slot $n+1+[T_{HARO}]$ and not occur after slot $n+1+[T_{HARO}]$ and $n+1+[T_{HARO}]$ and not occur after slot $n+1+[T_{HARO}]$ and $n+1+[T_{H$

Starting from the slot specified in clause 4.3 of TS 38.213 [8] (timing for secondary Cell activation/deactivation) and until the UE has completed the SCell activation, the UE shall report out of range if the UE has available uplink resources to report CQI for the SCell.

Starting from the slot specified in clause 4.3 of TS 38.213 [8] (timing for secondary Cell activation/deactivation) and until the UE has completed a first L1-RSRP measurement, the UE shall report lowest valid L1 SS-RSRP range if the UE has available uplink resources to report L1-RSRP for the SCell.

Upon receiving SCell deactivation command or upon expiry of the *sCellDeactivationTimer* in slot n, the UE shall accomplish the deactivation actions for the SCell being deactivated no later than in slot $n+[T_{HARQ} + 3ms]$.

The interruption on PSCell or any activated SCell in SCG for EN-DC mode specified in section 8.2 shall not occur before slot $n+1+[T_{HARO}]$ and not occur after slot $n+1+[T_{HARO}+3ms]$.

The interruption on PCell or any activated SCell in MCG for NR standalone mode specified in section 8.2 shall not occur before slot $n+1+[T_{HARO}]$ and not occur after slot $n+1+[T_{HARO}]$.

The normative reference for this requirement is TS 38.133 [6] clause 8.3.

4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle

Editor's notes: This test case is incomplete. The following aspects are either missing or TBD.

- The core requirements in TS 38.133 are between [.] or TBD;
- Test procedure and Message content are TBD;
- Test applicability Table in TS38.522 need to be updated.

4.5.3.1.1 Test purpose

This test is to verify that the SCell activation and deactivation times are within the requirements, when the SCell in FR1 is known by the UE at the time of activation.

4.5.3.1.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.5.3.1.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.3.1.

4.5.3.1.4 Test description

4.5.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.3.1.4.1-1.

Table 4.5.3.1.4.1-1: supported test configurations

Test Case ID	Description
4.5.3.1-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
4.5.3.1-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
4.5.3.1-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
4.5.3.1-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
4.5.3.1-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
4.5.3.1-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
NOTE: The U	JE is only required to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 4.5.3.1.4.1-2 and Table 4.5.3.1.4.1-3.

Table 4.5.3.1.4.1-2: Initial conditions for known FR1 SCell activation case

Parameter	Value		Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	I in Annex E, Table E.1-1 and TS 38.	.508-1 [14] sclause 4.3.1.		
Channel	As specified	by the test configuration selected fi	rom Table 4.5.3.1.5-1		
bandwidth					
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.1			
Exceptions to connection diagram	N/A				

Table 4.5.3.1.4.1-3: General test parameters for known FR1 SCell activation case, 160ms SCell measurement cycle

Parameter	Unit	Value	Comment
RF Channel Number		1,2,3	One E-UTRAN radio channel (1) and two NR radio channel (2,3) are used for this test
Active PCell		Cell 1	Primary cell on E-UTRAN RF channel number 1. As specified in section A.3.7.2.1 of TS38.133 [6]
Active PSCell		Cell 2	Primary secondary cell on NR RF channel number 2.
Configured deactivated SCell		Cell 3	Configured deactivated secondary cell on NR RF channel number 3
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on E-UTRA RF channel number	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on NR channel number	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	160	
Cell3 timing offset to cell2	μs	0	
Time alignment error between cell3 and cell2	μs	≤ Time alignment error as specified in TS 38.104 [28] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	S	7	During this time the PSCell shall be known and the SCell configured and detected.
T2	S	1	During this time the UE shall activate the SCell.
Т3	S	1	During this time the UE shall deactivate the SCell.
T _{HARQ}	ms	k	k is a number of slots and is indicated by the PDSCH-to-HARQ-timing-indicator field in the DCI format, if present, or provided by dl-DataToUL-ACK, the value of k should be the minimum value defined in TS 38.213 [8]
T _{CSI_Reporting}	ms	2	the delay uncertainty in acquiring the first available CSI reporting resources as specified in 38.331 [13]
k	ms	$k_1 + 3 \cdot N_{\text{slot}}^{\text{subframe}, \mu} + 1$	As specified in section 4.3 of TS38.213 [8]

- 1. Message contents are defined in clause 4.5.3.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in the same frequency. Cell 2 is the PSCell and Cell 3 is the deactivated SCell.

4.5.3.1.4.2 Test procedure

The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, E-UTRA has one cell, NR has two cells. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on E-UTRA and Cell 2 (PSCell) on NR, but is not aware of Cell 3 (SCell) on NR. The UE is monitoring the PCell and PSCell. The UE shall be continuously scheduled in the PCell and PSCell throughout the whole test.

The point in time at which the MAC message is received at the UE antenna connector, in a slot # denoted m, defines the start of time period T2. The UE shall be able to report valid CSI in PSCell for the activated SCell at latest in slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$. The UE shall start reporting CSI in PSCell in slot (m+k) and shall report CQI index

0 (out-of-range) until the SCell activation has been completed. Any PCell or PSCell interruption due to activation of SCell shall occur in the slot (m+1+[T_{HARQ})) to (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]).

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a slot # denoted n, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell in a slot (n+ $[T_{HARQ}+3ms]$), and any PCell and PSCell interruption due to the deactivation shall occur in the slot (n+1+ $[T_{HARQ}]$) to (n+1+ $[T_{HARQ}+3ms]$).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG and SCG according to Annex C.1 for all downlink physical channels.
- 3. Set the parameters according to T1 in Table 4.6.1.1.4.1-2. Propagation conditions are set according to Annex C clauses C.2.2. T1 starts.
- 4. SS configure SCell according to section 4.5.3.1.4.3.
- 5. The SS shall configure transmission of PDSCH with time T_{HARO} according to Table 4.5.3.1.4.1-3.
- 6. The SS activates SCC by sending the activation MAC-CE (Refer TS 38.321 [12], clauses 5.9, 6.1.3.10) in a slot # denoted m. If the SS receives ACK for MAC-CE sent by the UE, T2 starts in slot m, and the test proceeds to step 7, otherwise go to step 10.
- 7. The UE shall start sending CSI reports for SCell and the SS shall monitor CSI reports for SCell sent from the UE and ACK/NACK sent in PSCell during SCell activation.

7a. For intra-band CA UE,

- If the first CSI report for SCell is received by the SS in a slot (m+k),
 - or slot (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]+1) if the slot (m+k) was subject to interruption,
- and CSI report with non-zero CQI index is received by the SS earlier than or equal to slot (m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting}),
 - or the next available uplink resource if there are no uplink resources for reporting the valid CSI in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$
- and DTX is not observed by the SS outside the slot $(m+1+[T_{HARQ}])$ to $(m+1+[T_{HARQ}+3ms+T_{SMTC_MAX}+T_{SMTC_duration}]+k)$ up to the end of T2
- Then the number of successes for the event "Activation" is increased by one. Otherwise, count a fail for the event "Activation" and go to step 10.

7b. For inter-band CA UE,

- If the first CSI report for SCell is received by the SS in a slot (m+k),
 - or slot (m+1+[T_{HARQ}+3ms+ T_{SMTC, MAX} +T_{SMTC, duration}]+1) if the slot (m+k) was subject to interruption,
- and CSI report with non-zero CQI index is received by the SS earlier than or equal to slot (m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting}),
 - or the next available uplink resource if there are no uplink resources for reporting the valid CSI in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$
- and ≤ 2 non-consecutive DTX slots are observed by the SS during the the slot (m+1+[T_{HARQ}]) to (m+1+[T_{HARQ}+3ms+T_{SMTC_MAX}+T_{SMTC_duration}]+k) up to the end of T2
- Then the number of successes for the event "Activation" is increased by one. Otherwise, count a fail for the event "Activation" and go to step 10.

- 8. When T2 expires, the SS deactivate SCC by sending the deactivation MAC-CE (Refer TS 38.321 [12], clauses 5.9, 6.1.3.10) in a slot # denoted n. If the SS receives ACK for MAC-CE sent by the UE, T3 starts in slot n, and the test proceeds to step 9, otherwise go to step 10.
- 9. The UE shall stop sending CSI reports for SCell and the SS shall monitor CSI reports for SCell sent from the UE and ACK/NACK sent in PSCell during SCell deactivation.
 - 9a. For intra-band CA UE,
 - If the last CSI report is received by the SS earlier than or equal to slot (n+[T_{HARO}+3ms])
 - and DTX is not observed by the SS outside the slot (n+1+[T_{HARQ}]) to (n+1+[T_{HARQ}+3ms]+k) up to the end of T3,
 - Then the number of successes for the event "Deactivation" is increased by one. Otherwise, count a fail for the event "Deactivation".

9b. For intra-band CA UE,

- If the last CSI report is received by the SS earlier than or equal to slot $(n+[T_{HARQ}+3ms])$
- and \leq 2 non-consecutive DTX slots are observed by the SS during the slot (n+1+[T_{HARQ}]) to (n+1+[T_{HARQ}+3ms]+k) up to the end of T3,
- Then the number of successes for the event "Deactivation" is increased by one. Otherwise, count a fail for the event "Deactivation".
- 10. When T3 expires, or Activation in step 6 was not acknowledged, or a fail was counted for the event "Activation" in step 7, or Deactivation in step 8 was not acknowledged, the SS shall transmit a RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 11. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 12. After the RRC connection release, the SS:
 - transmits in Cell 2 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [14] clause 4.5.
- 13. Repeat steps 2-12 until a test verdict has been achieved.

Each of the events "Activation" and "Deactivation" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

4.5.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.5.3.1.5 Test requirement

Table 4.5.3.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.5.3.1.5-1: Cell specific test parameters for known FR1 SCell activation case, 160ms SCell measurement cycle

Para	ımeter	Unit		Cell 2			Cell 3	T	
		-	T1	T2	Т3	T1			
SSB ARFCN	Config 1,4			freq1		 DD	rreqz		
Duplex mode	Config 2,3,5,6					DD			
	Config 1,4		Not Applicable						
TDDfiti		- -				-			
TDD configuration	Config 2,5			TDDConf.1.1					
	Config 3,6				TDDC	onf.2.1			
	Config 1,4		10: N _{RB,c} = 52						
BW _{channel}	Config 2,5	MHz			10: N _R	_{B,c} = 52			
	Config 3,6				40: N _{PB}	s = 106			
	Config 1,4								
DIA/D DIA/		-				•			
BWP BW	Config 2,5	_							
	Config 3,6				40: N _{RB}	_{3,c} = 106			
DRx Cycle		ms			Not Ap	plicable			
DDCCH Deference	Config 1,4			SR.1.1 FD)	;	SR.1.1 FC	D	
PDSCH Reference measurement channel	Config 2,5		- (SR.1.1 TDE)	;	SR.1.1 TE	D	
	Config 3,6			SR2.1 TDD			T1 T2 freq2 D D D D D D D D D		
RMSI CORESET	Config 1,4			CR.1.1 FD					
Reference Channel	Config 2,5			CR.1.1 TDI					
Treference Offamilier	Config 3,6			CR2.1 TDD			T1 T2 T freq2 T freq2 T freq2 T freq2 T freq2 T T freq2 T T T T T T T T T		
RMC CORESET	Config 1,4			CR.1.1 FD			CCR.1.1 FDD		
Reference Channel	Config 2,5			CR.1.1 TD					
Tronorono Ondinio	Config 3,6			CR.2.1 TD			CCR.2.1 TDD TRS.1.1 FDD TRS.1.1 TDD		
	Config 1,4			RS.1.1 FD					
TRS configuration	Config 2,5			RS.1.1 TD					
CONO Delle	Config 3,6		Т	RS.1.2 TD			RS.1.2 T	DD	
OCNG Patterns				OP.1					
SMTC configuration	Config 1 2 4 E			SMTC.1 SSB.1 FR1					
SSB configuration	Config 1,2,4,5 Config 3,6	- -							
PDSCH/PDCCH	Config 1,2,4,5								
subcarrier spacing	Config 3,6	─ kHz -							
EPRE ratio of PSS to SS			30kHz						
EPRE ratio of PBCH DM		7							
EPRE ratio of PBCH to I									
EPRE ratio of PDCCH D									
EPRE ratio of PDCCH to		dB			(0			
EPRE ratio of PDSCH D	MRS to SSS								
EPRE ratio of PDSCH to									
EPRE ratio of OCNG DN									
EPRE ratio of OCNG to	OCNG DMRS (note 1)								
$N_{_{oc}$ note 2		dBm/15kHz		-104					
N.T	Config 1,2,4,5		-104						
$oldsymbol{N}_{oc}$ note 2	Config 3,6	dBm/SCS	-101						
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB		17					
\hat{E}_{s}/N_{oc}		dB				.7			
SS-RSRP note 3	Config 1,2,4,5	dBm/SCS	-87						
	Config 3,6					34			
SCH_RP note 3		dBm/15 kHz				37			
Propagation condition		-		AWGN					

NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

NOTE 3: SS-RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

NOTE 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.]

During T2 the UE shall send the first CSI report for SCell in a slot (m+k), or in a slot (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]+1) as defined in TS 38.133 [6] section 8.3 if the slot (m+k) was subject to interruption. Whether CSI report in slot (m+k) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in slot (m+k).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$, $T_{activation_time}=[T_{SMTC_SCell}+5ms]$, as defined in TS 38.133 [6] section 8.3.

Figures 4.5.3.1.5-1 shows the deriviation of the Test procedure requreiment for DTX during T2, based on the core requirements for interruption.

NOTE: The differences between activation and deactivation are as follows:

- Activation → Deactivation
- First CSI → Last CSI
- Latest valid CSI report → Not exist (no need to check since CSI report was already stopped)

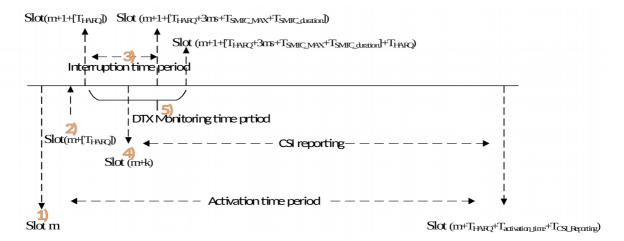


Figure 4.5.3.1.5-1: Procedure derivation for Activation

- 1) Activation command for SCell
- 2) ACK for MAC-CE for SCell1 activation
- 3) Possible interruption period by SCell1 activation
- 4) First CSI report timing (could be invalid CQI)
- 5) Possible DTX reception period on SS due to interruption by SCell1 activation

During T3 the UE shall stop sending CSI reports for SCell at latest in a slot ($n+[T_{HARQ}+3ms]$), as defined in TS 38.133 [6] section 8.3.

During T2 interruption of PCell / PSCell during SCell activation shall not happen outside the slot (m+1+[T_{HARQ}]) to (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]), as defined in TS 38.133 [6] section 8.3.

During T3 interruption of PCell / PSCell during SCell deactivation shall not happen outside the slot ($n+1+[T_{HARQ}]$) to ($n+1+[T_{HARQ}+3ms]$), as defined in TS 38.133 [6] section 8.3.

The interruption of PSCell shall not be more than the values specified for EN-DC in TS 38.133 [6] section 8.2.1.2.4.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$ as defined in TS 38.133 [6] section 8.3 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

4.5.3.2 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 320ms SCell measurement cycle

Editor's notes: This test cases is incomplete. The following aspects are either missing or TBD.

- test cases depends on completion from TC4.5.3.1
- Test procedure; Message content; Test requirement;
- Test applicability Table in TS38.522 need to be updated.

4.5.3.2.1 Test purpose

This test is to verify that the SCell activation and deactivation times are within the requirements, when the SCell in FR1 is known by the UE at the time of activation.

4.5.3.2.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.5.3.2.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.3.2.

4.5.3.2.4 Test description

4.5.3.2.4.1 Initial conditions

Same initial conditions as described in section 4.5.3.1.4.1 with following exception:

- The supported test configurations is replaced by Table 4.5.3.2.4.1-1.
- The listed parameter values in Tables 4.5.3.2.4.1-2 will replace the values of corresponding parameters in Tables 4.5.3.1.4.1-3.

Table 4.5.3.2.4.1-1: supported test configurations

Test Case ID	Description			
4.5.3.2-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
4.5.3.2-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
4.5.3.2-3	LTE FDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
4.5.3.2-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
4.5.3.2-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
4.5.3.2-6	LTE TDD, NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
NOTE: The U	JE is only required to be tested in one of the supported test configurations			

Table 4.5.3.2.4.1-2: General test parameters for known FR1 SCell activation case, 320ms SCell measurement cycle

Parameter	Unit	Value	Comment
SCell measurement cycle	ms	320	
(measCycleSCell)	1113	320	

4.5.3.2.4.2 Test procedure

Same test procedure as described in section 4.5.3.1.4.2 with following exception:

- TBD

4.5.3.2.4.3 Message contents

Same message contents as described in section 4.5.3.1.4.3 with following exception:

- TBD

4.5.3.2.5 Test requirement

Table 4.5.3.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.5.3.2.5-1: Cell specific test parameters for known FR1 SCell activation case, 320ms SCell measurement cycle

Para	ameter	Unit	Cell 2	Cell 3	
SSB ARFCN			T1 T2 T3 freq1	T1 T2 T3 freq2	
	Config 1,4		FDD FDD		
Duplex mode	Config 2,3,5,6			TDD	
	Config 1,4		Not A	pplicable	
TDD configuration	Config 2,5		TDDConf.1.1		
	Config 3,6	-		Conf.2.1	
	<u> </u>				
	Config 1,4	┥ ト		I _{RB,c} = 52	
BW _{channel}	Config 2,5	MHz		I _{RB,c} = 52	
	Config 3,6			_{RB,c} = 106	
	Config 1,4		10: N	I _{RB,c} = 52	
BWP BW	Config 2,5		10: N	I _{RB,c} = 52	
	Config 3,6		40: N _F	_{RB,c} = 106	
DRx Cycle	-	ms	Not A	pplicable	
-	Config 1,4		SR.1.1 FDD	SR.1.1 FDD	
PDSCH Reference measurement channel	Config 2,5		SR.1.1 TDD	SR.1.1 TDD	
measurement channel	Config 3,6		SR2.1 TDD	SR2.1 TDD	
RMSI CORESET	Config 1,4		CR.1.1 FDD	CR.1.1 FDD	
Reference Channel	Config 2,5	_	CR.1.1 TDD	CR.1.1 TDD	
	Config 3,6		CR2.1 TDD	CR2.1 TDD	
RMC CORESET	Config 1,4 Config 2,5		CCR.1.1 FDD CCR.1.1 TDD	CCR.1.1 FDD CCR.1.1 TDD	
Reference Channel	Config 3,6		CCR.2.1 TDD	CCR.2.1 TDD	
	Config 1,4		TRS.1.1 FDD	TRS.1.1 FDD	
TRS configuration	Config 2,5		TRS.1.1 TDD	TRS.1.1 TDD	
	Config 3,6		TRS.2.1 TDD	TRS.2.1 TDD	
OCNG Patterns				OP.1	
SMTC configuration	0			MTC.1	
SSB configuration	Config 1,2,4,5 Config 3,6	- -		3.1 FR1	
PDSCH/PDCCH	Config 1,2,4,5		SSB.2 FR1 15 kHz		
subcarrier spacing	Config 3,6	⊢ kHz		0kHz	
EPRE ratio of PSS to S					
EPRE ratio of PBCH DN					
EPRE ratio of PBCH to		_	0		
EPRE ratio of PDCCH I		_ dp			
EPRE ratio of PDSCH [dB			
EPRE ratio of PDSCH t					
EPRE ratio of OCNG D					
EPRE ratio of OCNG to	OCNG DMRS (note 1)				
$N_{_{OC}}$ note 2	$N_{oc}^{}$ note 2		-104		
NT note 2	Config 1,2,4,5		-104		
$N_{oc}^{ m note~2}$	Config 3,6	dBm/SCS	-101		
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	•	dB	17		
\hat{E}_s/N_{oc}			17		
SS-RSRP note 3	Config 1,2,4,5 Config 3,6	dBm/SCS	-87 -84		
SCH_RP note 3		dBm/15 kHz	-87		
Propagation condition		-	AWGN		

- NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- NOTE 3: SS-RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.]

During T2 the UE shall send the first CSI report for SCell in a slot (m+k), or in a slot (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]+1) as defined in TS 38.133 [6] section 8.3 if the slot (m+k) was subject to interruption. Whether CSI report in slot (m+k) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in slot (m+k).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$, $T_{activation_time}=[T_{SMTC_MAX}+T_{SMTC_SCell}+5ms]$, as defined in TS 38.133 [6] section 8.3.

During T3 the UE shall stop sending CSI reports for SCell at latest in a slot ($n+[T_{HARQ}+3ms]$), as defined in TS 38.133 [6] section 8.3.

During T2 interruption of PCell / PSCell during SCell activation shall not happen outside the slot (m+1+[T_{HARQ}]) to (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]), as defined in TS 38.133 [6] section 8.3.

During T3 interruption of PCell / PSCell during SCell deactivation shall not happen outside the slot ($n+1+[T_{HARQ}]$) to ($n+1+[T_{HARQ}+3ms]$), as defined in TS 38.133 [6] section 8.3.

The interruption of PSCell shall not be more than the values specified for EN-DC in TS 38.133 [6] section 8.2.1.2.4.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$ as defined in TS 38.133 [6] section 8.3 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

4.5.3.3 EN-DC FR1 SCell activation and deactivation of unknown SCell in non-DRX

Editor's notes: This test case is incomplete. The following aspects are either missing or TBD.

- test cases depends on completion from TC4.5.3.1;
- The core requirements in TS 38.133 are between [.] or TBD;
- Test procedure and Message content are TBD;
- Test applicability Table in TS38.522 need to be updated.

4.5.3.3.1 Test purpose

This test is to verify that the SCell activation and deactivation times are within the requirements, when the SCell in FR1 is unknown by the UE at the time of activation.

4.5.3.3.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.5.3.3.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.5.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.3.3.

4.5.3.3.4 Test description

4.5.3.3.4.1 Initial conditions

Same initial conditions as described in section 4.5.3.1.4.1 with following exception:

- The supported test configurations is replaced by Table 4.5.3.3.4.1-1.
- The listed parameter values in Tables 4.5.3.3.4.1-2 will replace the values of corresponding parameters in Tables 4.5.3.1.4.1-3.

Table 4.5.3.3.4.1-1: supported test configurations

Test Case ID	Description				
4.5.3.3-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode				
4.5.3.3-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
4.5.3.3-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode				
4.5.3.3-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode				
4.5.3.3-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
4.5.3.3-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode				
NOTE: The UE is only required to be tested in one of the supported test configurations					

Table 4.5.3.3.4.1-2: General test parameters for unknown FR1 SCell activation case, 160ms SCell measurement cycle

Parameter	Unit	Value	Comment	
T1	ms 100		During this time the PSCell shall be known and the SCell configured, but not detected.	

4.5.3.3.4.2 Test procedure

The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, E-UTRA has one cell, NR has two cells. Cell 1 and Cell 2 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on E-UTRAN and Cell 2 (PSCell) on NR, but is not aware of Cell 3 (SCell) on NR. The UE is monitoring the PCell and PSCell. The UE shall be continuously scheduled in the PCell and PSCell throughout the whole test.

During T2 the Test procedure requires the UE to send the first CSI report for SCell1 in a subframe (m+[k]), but also allows a subframe not happen outside the slot ($m+1+[T_{HARQ}]$) to ($m+1+[T_{HARQ}+3ms+T_{SMTC_MAX}+T_{SMTC_duration}]$) if the subframe (m+[k]) was subject to interruption. The SS determines whether the CSI report in subframe (m+[k]) was interrupted or not by monitoring ACK/NACK sent in PSCell in subframe (m+[k]).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. TBD.

4.5.3.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.5.3.3.5 Test requirement

Table 4.5.3.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.5.3.3.5-1: Cell specific test parameters for unknown FR1 SCell activation case

Para	ameter	Unit	Cell 2 T1 T2 T3	Cell 3 T1 T2 T3	
SSB ARFCN		+	freq1	freq2	
	Config 1,4		•	DD	
Duplex mode	Config 2,3,5,6	-		DD .	
	Config 1,4		Not Applicable		
TDD configuration					
TDD configuration	Config 2,5	-	TDDConf.1.1		
	Config 3,6		TDDC	onf.2.1	
	Config 1,4		10: N _R	_{B,c} = 52	
$BW_channel$	Config 2,5	MHz	10: N _R	_{B,c} = 52	
	Config 3,6		40: N _{RB,c} = 106		
	Config 1,4		10: N _R	_{B,c} = 52	
BWP BW	Config 2,5		10: N _R	_{B,c} = 52	
	Config 3,6		40: N _{RB}	,c = 106	
DRx Cycle		ms	Not Ap	plicable	
PDSCH Reference	Config 1,4		SR.1.1 FDD	SR.1.1 FDD	
measurement channel	Config 2,5		SR.1.1 TDD	SR.1.1 TDD	
measurement channel	Config 3,6]	SR2.1 TDD	SR2.1 TDD	
DMCI CODECET	Config 1,4		CR.1.1 FDD	CR.1.1 FDD	
RMSI CORESET	Config 2,5	7 [CR.1.1 TDD	CR.1.1 TDD	
Reference Channel	Config 3,6	7	CR2.1 TDD	CR2.1 TDD	
	Config 1,4		CCR.1.1 FDD	CCR.1.1 FDD	
RMC CORESET	Config 2,5		CCR.1.1 TDD	CCR.1.1 TDD	
Reference Channel	Config 3,6		CCR.2.1 TDD	CCR.2.1 TDD	
	Config 1,4		TRS.1.1 FDD	TRS.1.1 FDD	
TRS configuration	Config 2,5		TRS.1.1 TDD	TRS.1.1 TDD	
110 comiguration	Config 3,6		TRS.2.1 TDD	TRS.2.1 TDD	
OCNG Patterns	Coming 0,0		OP.1		
SMTC configuration			SMTC.1		
	Config 1,2,4,5		SSB.1 FR1		
SSB configuration	Config 3,6	-	SSB.2 FR1		
PDSCH/PDCCH	Config 1,2,4,5		15 kHz		
subcarrier spacing	Config 3,6	– kHz	30kHz		
EPRE ratio of PSS to S					
EPRE ratio of PBCH DN					
EPRE ratio of PBCH to					
EPRE ratio of PDCCH D			0		
EPRE ratio of PDCCH to		dB			
EPRE ratio of PDSCH D					
EPRE ratio of PDSCH to					
EPRE ratio of OCNG DI					
EPRE ratio of OCNG to	, ,				
	2 2.10 2 (11010 2)	1		0.1	
$N_{oc}^{$		dBm/15kHz	-104		
AT note ?	Config 1,2,4,5		-104		
$N_{_{OC}}^{}$ note 2	Config 3,6	dBm/SCS	-101		
$\mathbf{\hat{E}}_{ ext{s}}/\mathbf{I}_{ ext{ot}}$	1	dB	17		
\hat{E}_{s}/N_{oc}		dB	1	.7	
SS-RSRP note 3	Config 1,2,4,5	dBm/SCS	-87		
	Config 3,6		-84		
SCH_RP note 3		dBm/15 kHz	-87		
Propagation condition		-	AW	'GN	

- NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- NOTE 3: SS-RSRP and SCH_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- NOTE 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.]

During T2 the UE shall send the first CSI report for SCell in a slot (m+k), or in a slot (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]+1) as defined in TS 38.133 [6] section 8.3 if the slot (m+k) was subject to interruption. Whether CSI report in slot (m+k) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in slot (m+k).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$, $T_{activation_time}=[2*T_{SMTC_MAX}+2*T_{SMTC_SCell}+5ms]$, as defined in TS 38.133 [6] section 8.3

During T3 the UE shall stop sending CSI reports for SCell at latest in a slot ($n+[T_{HARQ}+3ms]$), as defined in TS 38.133 [6] section 8.3.

During T2 interruption of PCell / PSCell during SCell activation shall not happen outside the slot (m+1+[T_{HARQ}]) to (m+1+[T_{HARQ} +3ms+ T_{SMTC_MAX} + $T_{SMTC_duration}$]), as defined in TS 38.133 [6] section 8.3.

During T3 interruption of PCell / PSCell during SCell deactivation shall not happen outside the slot ($n+1+[T_{HARQ}]$) to ($n+1+[T_{HARQ}+3ms]$), as defined in TS 38.133 [6] section 8.3.

The interruption of PSCell shall not be more than the values specified for EN-DC in TS 38.133 [6] section 8.2.1.2.4.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$ as defined in TS 38.133 [6] section 8.3 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

4.5.4 UE UL carrier RRC reconfiguration delay

4.5.5 Link recovery procedures

4.5.5.1 EN-DC FR1 SSB-based beam failure detection and link recovery in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

4.5.5.1.1 Test purpose

FFS

4.5.5.1.2 Test applicability

FFS

4.5.5.1.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.5.1.

4.5.5.1.4 Test description

4.5.5.1.4.1 Initial conditions

FFS

4.5.5.1.4.2 Test procedure

FFS

4.5.5.1.4.3 Message contents

FFS

4.5.5.1.5 Test requirements

FFS

4.5.5.2 EN-DC FR1 SSB-based beam failure detection and link recovery in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

4.5.5.2.1 Test purpose

FFS

4.5.5.2.2 Test applicability

FFS

4.5.5.2.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.5.2.

4.5.5.2.4 Test description

4.5.5.2.4.1 Initial conditions

FFS

4.5.5.2.4.2 Test procedure

FFS

4.5.5.2.4.3 Message contents

FFS

4.5.5.2.5 Test requirements

FFS

4.5.5.3

4.5.5.4 EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- RAN4 dependency: There are brackets and TBDs in core requirements and test parameters.
- TT analysis is missing

4.5.5.4.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects CSI-RS-based beam failure in the set q_0 configured for a serving PSCell and that the UE performs correct CSI-RS-based link recovery based on beam candicate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP of the PSCell, during the evaluation period, and link recovery, when DRX is used.

To partly verify the CSI-RS based beam failure detection and link recovery for an FR1 serving cell requirements in TS 38.133 [6] clause 8.5.

4.5.5.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.5.5.4.3 Minimum conformance requirements

[TS 38.133 [6], clause 8.5.3.2]

UE shall be able to evaluate whether the downlink radio link quality on the configured CSI-RS resource in set \overline{Q}_0 estimated over the last $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period becomes worse than the threshold $Q_{\text{out_LR_CSI-RS}}$ within $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period.

The value of T_{Evaluate_BFD_CSI-RS} is defined in Table 4.5.5.4.3-1 for FR1.

For FR1,

- P=1/(1 T_{CSI-RS}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

Longer evaluation period would be expected if the combination of BFD-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The values of M_{BFD} used in Table 4.5.5.4.3-1 are defined as

- M_{BFD} = 10, if the CSI-RS resource configured for BFD is transmitted with Density = 3.

Table 4.5.5.4.3-1: Evaluation period T_{Evaluate_BFD_CSI-RS} for FR1

Configuration	T _{Evaluate_BFD_CSI-RS} (ms)
no DRX	$max([50], [M_{BFD} *P] * T_{CSI-RS})$
DRX cycle ≤ 320ms	$max([50], [1.5 \times M_{BFD} *P]*max(T_{DRX}, T_{CSI-RS}))$
DRX cycle > 320ms	[M _{BFD} *P] * T _{DRX}
Note: T _{CSI-RS} is the DRX cycle le	periodicity of CSI-RS resource in the set \overline{q}_{0} . T_{DRX} is the ength.

[TS 38.133 [6], clause 8.5.4]

When the radio link quality on all the configured RS resources in set \overline{q}_0 is worse than $Q_{\text{out_LR}}$, Layer 1 of the UE shall send a beam failure instance indication to the higher layers. A Layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331 [13].

The beam failure instance evaluation for the configured RS resources in set \overline{q}_0 shall be performed as specified in section 6 in TS 38.213 [8]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval_BFD}$.

When DRX is not used, $T_{Indication_interval_BFD}$ is max(2ms, $T_{BFD-RS,M}$), where $T_{BFD-RS,M}$ is the shortest periodicity of all configured RS resources in set \overline{q}_0 for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set \overline{q}_0 or CSI-RS resource in the set \overline{q}_0 .

When DRX is used, $T_{Indication_interval_BFD}$ is max(1.5*DRX_cycle_length, 1.5* $T_{BFD-RS,M}$) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms.

[TS 38.133 [6], clause 8.5.6.2]

UE shall be able to evaluate whether the L1-RSRP measured on the configured CSI-RS resource in set \overline{q}_1 estimated over the last $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period becomes better than the threshold $Q_{\text{in_LR}}$ within $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period.

The value of $T_{\text{Evaluate_CBD_CSI-RS}}$ is defined in Table 4.5.5.4.3-2.

For FR1,

- P=1/(1 T_{CSI-RS}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

The values of M_{CBD} used in Table 4.5.5.4.3-2 is defined as

- $M_{CBD} = 3$, if the CSI-RS resource configured in the set \overline{q}_1 is transmitted with Density = 3.

Table 4.5.5.4.3-2: Evaluation period T_{Evaluate CBD CSI-RS} for FR1

Configuration		T _{Evaluate_CBD_CSI-RS} (ms)	
non-DRX		$max(TBD, ceil(M_{CBD} *P) * T_{CSI-RS})$	
DRX cycle	e ≤ 320ms	$ceil(M_{CBD} *P*N) * max(T_{DRX}, T_{CSI-RS})$	
DRX cycle	e > 320ms	ceil(M _{CBD} *P) *T _{DRX}	
	T _{csI-RS} is the p DRX cycle ler	periodicity of CSI-RS resource in the set \overline{q}_1 . T_{DRX} is the high.	

The normative reference for this requirement is TS 38.133 [6] clauses 8.5.3.2, 8.5.4, 8.5.6.2 and A.4.5.5.4.

4.5.5.4.4 Test description

The test consists of two subtests with two cells configured, cell 1 is the E-UTRAN PCell, and cell 2 is the PSCell in FR1. The difference between the two subtests is whether the measurement gap is configured on the PSCell or not. Each subtest consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure

4.5.5.4.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active PSCell to emulate CSI-RS based beam failure.



Figure 4.5.5.4.4-1: SNR variation CSI-RS for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

4.5.5.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.5.5.4.4.1-1.

Table 4.5.5.4.4.1-1: Supported test configurations for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Configuration	Description			
1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
Note: The UE is only required to pass in one of the supported test configurations in FR1				

Configure the test equipment and the DUT according to the parameters in Table 4.5.5.4.4.1-2.

Table 4.5.5.4.4.1-2: Initial conditions for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.	
Channel bandwidth	As specified by the test configuration selected from Table 4.5.5.4.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram	N/A			

- 1. The general test parameter settings are set up according to Table 4.5.5.4.4.1-3. The measurement gap configuration for sub-test 2 is according to Table 4.5.5.4.4.1-4. The NZP-CSI-RS configuration for sub-test 1 and 2 is according to Table 4.5.5.4.4.1-5. The DRX configuration for subtest 1 and 2 is according to Table 4.5.5.4.4.1-6. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.
- 2. Message contents are defined in clause 4.5.5.4.4.3.

3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 4.5.5.4.4.1-3: General test parameters for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Parameter		Unit			Comment
			Test 1	Test 2	
Active P			Cell 1	Cell 1	
	nnel Number		11	1	
Duplex mode	Config 1,		FDD	FDD	
	Config 2, 3, 5, 6		TDD	TDD	
TDD Configu	Config 1,		Not Applicable	Not Applicable	
ation	Config 2,		[TDDConf.1.1]	[TDDConf.1.1]	
	Config 3,		[TDDConf.1.2]	[TDDConf.1.2]	
CORES	E Config 1,		[CR. 1.1 FDD]	[CR. 1.1 FDD]	A.3.1.2
Referen	C Config 2,		[CR. 1.1 TDD]	[CR. 1.1 TDD]	
Channel			[CR. 2.1 TDD]	[CR. 2.1 TDD]	
SSB Configur	Config 1,		SSB.1 FR1	SSB.1 FR1	A.3.10
ation	Config 2,		SSB.1 FR1	SSB.1 FR1	
	Config 3,	1	SSB.2 FR1	SSB.2 FR1	
SMTC Configur	Config 1,		FR1 patterm 1	FR1 patterm 1	A.3.11
ation	Config 3,		FR1 patterm 2	FR1 patterm 2	
PDSCH/ PDCCH	Config 1,		15 KHz	15 KHz	
subcarri r spacin	e Config 3,		30 KHz	30 KHz	
csi-RS-I	ndex assigned n failure RS		[0]	[0]	
	parameters		TBD	TBD	A.3.2.1
CP leng			Normal	Normal	
	ion Matrix and Configuration		[2x2 Low]	[2x2 Low]	
	DCI format		1-0	1-0	
failure detecti on trans	Number of Control OFDM symbols		2	2	
missio n	Aggregation level	CC E	8	8	
param eters	Ratio of hypothetical PDCCH RE energy to average CSI- RS RE energy	dB	0	0	
	Ratio of hypothetical PDCCH DMRS energy to average CSI- RS RE energy	dB	0	0	

р	MRS recoder ranularity		REG bundle size	REG bundle size	
1 1	EG bundle ze		6	6	
DRX			640	640	
Gap patter			[N.A.]	*[<i>gp0</i>]	
csi-RS-Inde			2	2	Number of SSB indexes used for beam failure detection
hreshold	DutOfSyncT		absent	absent	When the field is absent, the UE applies the value 0. (Table 8.1.1-1).
rsrp-Thresl	noldSSB		TBD	TBD	Threshold used for Qout LR SSB
powerCont	rolOffsetSS		db0	db0	Used for deriving rsrp-ThresholdCSI-RS
beamFailu MaxCount	reInstance		[n2]	[n2]	see TS 38.321 [7], section 5.17
beamFailur Timer	reDetection		[pbfd4]	[pbfd4]	see TS 38.321 [7], section 5.17
NZP CSI-R configuration			[Resourceld 1]	[Resourceld 0]	
ZP CSI-RS configuatio	,		TBD	TBD	
CSI-IM cor			TBD	TBD	
	SI reporting		PUCCH	PUCCH	
CSI reporting	Config 1, 2, 4, 5	slot	[5]	[5]	
periodicity	Config 3,		[10]	[10]	
T1		S	1	1	During this time the the UE shall be fully synchronized to cell 1
T2		S	0.4	0.4	
T3		S	[TBD]	[TBD]	
D1		S	[0.24]	[0.44]	
Note 1: UE-specific PDCCH is not transmitted after T1 starts.					

Table 4.5.5.4.4.1-4: Measurement gap configuration for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Field	Test 2
Field	Value
gapOffset	[0]

Table 4.5.5.4.4.1-5: NZP-CSI-RS resource configuration for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Field	Resourceld Field 0	
	Value	Value
frequencyD omainAlloca tion ^{Note 1}	row1	row2
startingRB	0	0
nrofRBs	Note 2	Note 2
Note 1: TS 38.211 [7] table 7.4.1.5.3-1 Note 2: nrofRBs is derived based on the Configuration in TS 38.133 [6] Table A.4.5.1.7.1-1		

Table A.4.5.5.4.1-6: DRX-Configuration for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Field	Test 5	Test 6
Field	Value	Value
drx-onDurationTimer	[ms6]	[ms6]
drx-InactivityTimer	[ms1]	[ms1]
drx-	[sl1]	[sl1]
RetransmissionTimerDL		
drx-	[sl1]	[sl1]
RetransmissionTimerUL		
longDRX-	[ms640]	[ms40]
CycleStartOffset		
shortDRX	disable	disable

4.5.5.4.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms) in subtest 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of FR1 PSCell according to T1 in Table 4.5.5.4.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.5.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.5.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 4.5.5.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 4.5.5.4.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1
 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 1. When T5 expires the SS shall change the SNR value to T1 as specified in Table 4.5.5.4.5-1.
- 2. Wait [1s] for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within [1s] continue to step 11. Otherwise continue to step 10.
- 3. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 4. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.5.5.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.5.5.4.4.3-1: Common Exception messages for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	FFS			
elements contents exceptions				

4.5.5.4.5 Test requirement

Tables 4.5.5.4.4.1-3 and 4.5.5.4.5-1 define the primary level settings including test tolerances for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX.

Table 4.5.5.4.5-1: Cell specific test parameters for EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX

Par	ameter	Unit	Test 1 and Test 2		Test 1 and Test 2							
				CSI-RS of set q₀					-RS of s			
			T1	T2	T3	T4	T5	T1	T2	Т3	T4	T5
	tio of PSS	dB										
to SSS	tit DDOLL	-10										
	tio of PBCH	dB										
DMRS to		4D										
	tio of PBCH	dB										
to PBCH EPRE ra		dB										
	DMRS to	ub										
SSS	DIVIRS 10											
EPRE ra	tio of	dB										
	to PDCCH	ub										
DMRS	to i Deciri				0					0		
EPRE ra	tio of	dB			3					3		
	DMRS to											
SSS												
EPRE ra	tio of	dB										
	to PDSCH											
DMRS												
EPRE ra	tio of OCNG	dB										
	SSS ^(Note 1)											
	tio of OCNG	dB										
	DMRS (Note											
1)	T											
SNR_C	Config 1	dB	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
SI-RS	Config 2		TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Config 3		TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
N_{oc}	Config 1	dBm/			[-98]					[-98]		
oc .	Config 2	15K			[-98]					[-98]		
	Config 3	Hz			[-98]					[-98]		
SS-		dBm										
RSRP ^N ote 3		/SC S										
Ê _s /I _{ot}		5										
Ê _s /N _{oc}	1											
lo	config 1, 2	dBm/										
10	Coming 1, 2	9.36										
		MHz										
	Config 3,	dBm/										
	4	38.1										
		MHz										
Propagation [TDLC300] [TDLC300]												
condition												
Note 1:	OCNG shal	l ha usar	d such th	at the rec	cources in		re fully all	ocated a	nd a cons	stant tota	transmit	tod

Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q₁.

No later than time point F occurring no later than D1 = [TBD] ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

4.5.6 Active BWP switch delay

4.5.6.1 DCI-based and time-based active BWP switch

4.5.6.1.0 Minimum conformance requirements

FFS

4.5.6.1.1 EN-DC FR1 DCI-based DL active BWP switch in non-DRX in synchronous EN-DC

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

4.5.6.1.1.1 Test purpose

FFS

4.5.6.1.1.2 Test applicability

FFS

4.5.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.5.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.6.1.1.

4.5.6.1.1.4 Test description

4.5.6.1.1.4.1 Initial conditions

FFS

4.5.6.1.1.4.2 Test procedure

FFS

4.5.6.1.1.4.3 Message contents

FFS

4.5.6.1.1.5 Test requirements

FFS

4.5.6.1.2 EN-DC FR1 DCI-based DL active BWP switch with SCell in non-DRX in synchronous EN-DC

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

4.5.6.1.2.1 Test purpose

FFS

4.5.6.1.2.2 Test applicability

FFS

4.5.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.5.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.6.1.2.

4.5.6.1.2.4 Test description

4.5.6.1.2.4.1 Initial conditions

FFS

4.5.6.1.2.4.2 Test procedure

FFS

4.5.6.1.2.4.3 Message contents

FFS

4.5.6.1.2.5 Test requirements

FFS

4.5.6.2 RRC-based active BWP switch

4.5.6.2.0 Minimum conformance requirements

FFS

4.5.6.2.1 EN-DC FR1 RRC-based DL active BWP switch in non-DRX in synchronous EN-DC

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD

- Cell mapping is TBD
- Test procedure is TBD

- Test applicability needs to be added to TS 38.522

4.5.6.2.1.1 Test purpose

FFS

4.5.6.2.1.2 Test applicability

FFS

4.5.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.5.6.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.6.2.1.

4.5.6.2.1.4 Test description

4.5.6.2.1.4.1 Initial conditions

FFS

4.5.6.2.1.4.2 Test procedure

FFS

4.5.6.2.1.4.3 Message contents

FFS

4.5.6.2.1.5 Test requirements

FFS

4.5.7 PSCell addition and release delay

4.5.7.1 EN-DC FR1 addition and release delay of known PSCell

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

4.5.7.1.1 Test purpose

FFS

4.5.7.1.2 Test applicability

FFS

4.5.7.1.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.133 [6] clause A.4.5.7.1.

4.5.7.1.4 Test description

4.5.7.1.4.1 Initial conditions

FFS

4.5.7.1.4.2 Test procedure

FFS

4.5.7.1.4.3 Message contents

FFS

4.5.7.1.5 Test requirements

FFS

4.6 Measurement procedures

4.6.1 Intra-frequency measurements

4.6.1.0 Minimum conformance requirements

4.6.1.0.1 Minimum conformance requirements for event-triggered reporting without gap

The UE shall be able to identify a new detectable intra frequency cell within $T_{identify_intra_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index(reportQuantityRsIndexes or maxNrofRsIndexesToReport is not configured), or the UE is indicated that the neighbour cell is synchronous with the serving cell (deriveSSB-IndexFromCell is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within $T_{identify_intra_with_index}$. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within $T_{identify_intra_without_index}$. It is assumed that deriveSSB-IndexFromCell is always enabled for FR1 TDD and FR2.

$$T_{identify_intra_with_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}\right) ms$$

$$T_{identify_intra_with_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} + T_{SSB_time_index_intra}\right) ms$$

Where:

 T_{PSS/SSS_sync_intra} : it is the time period used in PSS/SSS detection given in table 4.6.1.0.1-1, 4.6.1.0.1-2, 4.6.1.0.1-4 (deactivated SCell) or 4.6.1.0.1-5 (deactivated SCell)

 $T_{SSB_time_index_intra}$: it is the time period used to acquire the index of the SSB being measured given in table 4.6.1.0.1-3 or 4.6.1.0.1-6 (deactivated SCell)

 $T_{SSB_measurement_period_intra}$: equal to a measurement period of SSB based measurement given in table 4.6.1.0.1-7, table 4.6.1.0.1-8 table 4.6.1.0.1-9 (deactivated Scell) or 4.6.1.0.1-10(deactivated SCell)

CSSF_{intra}: it is a carrier specific scaling factor and is determined

- according to CSSF_{outside_gap,i} in TS 38.133 [6] section 9.1.5.1 for measurement conducted outside measurement gaps, i.e. when intrafrequency SMTC is fully non overlapping or partially overlapping with measurement

gaps, or according to CSSF_{within_gap,i} in TS 38.133 [6] section 9.1.5.2 for measurement conducted within measurement gaps, i.e. when intrafrequency SMTC is fully overlapping with measurement gaps.

- if the high layer in TS 38.331 [13] signaling of *smtc2* is configured, the assumed periodicity of intrafrequency SMTC occasions corresponds to the value of higher layer parameter *smtc2*; Otherwise the assumed periodicity of intrafrequency SMTC occasions corresponds to the value of higher layer parameter *smtc1*.

 $M_{pss/sss_sync_w/o_gaps}$: For a UE supporting FR2 power class 1, M_{pss/sss_sync} =40. For a UE supporting power class 2, $M_{pss/sss_sync_w/o_gaps}$ =24. For a UE supporting FR2 power class 3, $M_{pss/sss_sync_w/o_gaps}$ =24. For a UE supporting FR2 power class 4, $M_{pss/sss_sync_w/o_gaps}$ =24.

 $M_{meas_period_w/o_gaps}$: For a UE supporting power class 1, $M_{meas_period_w/o_gaps}$ =40. For a UE supporting FR2 power class 2, $M_{meas_period_w/o_gaps}$ =24. For a UE supporting power class 3, $M_{meas_period_w/o_gaps}$ =24. For a UE supporting power class 4, $M_{meas_period_w/o_gaps}$ = 24.

When intrafrequency SMTC is fully non overlapping with measurement gaps or intrafrequency SMTC is fully overlapping with MGs, Kp=1

When intrafrequency SMTC is partially overlapping with measurent gaps, Kp = 1/(1-(SMTC period / MGRP)), where SMTC period < MGRP

If the higher layer signaling in TS38.331 [13] signaling of smtc2 is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, requirements are not specified for $T_{identify\ intra\ with\ undex}$ or $T_{identify\ intra\ with\ index}$

For FR2 when any of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap is fully overlapping with intra-frequency SMTC, $K_{layer1_measurement} = 1.5$, otherwise $K_{layer1_measurement} = 1.5$

If SCG DRX is in use, intrafrequency cell identification requirements specified in Table 4.6.1.0.1-1, Table 4.6.1.0.1-2, Table 4.6.1.0.1-3, Table 4.6.1.0.1-4, Table 4.6.1.0.1-5 and Table 4.6.1.0.1-6 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 4.6.1.0.1-1: Time period for PSS/SSS detection, (Frequency range FR1)

DRX cycle	T _{PSS/SSS_sync_intra}	
No DRX	max[600ms, ceil($5 \times K_p$) x SMTC period] note 1 x	
	CSSF _{intra}	
DRX cycle≤ 320ms	max[600ms, ceil(1.5x 5 x K_p) x max(SMTC period,DRX	
	cycle)] x CSSF _{intra}	
DRX cycle>320ms	ceil(5 x K _p) x DRX cycle x CSSF _{intra}	
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is		
the one used by the cell being identified	d ·	

Table 4.6.1.0.1-2: Time period for PSS/SSS detection, (Frequency range FR2)

DRX cycle	T _{PSS/SSS_sync_intra}	
No DRX	max(600ms, ceil(M _{pss/sss_sync_w/o_gaps} x K _p x K	
	layer1_measurement) x SMTC period) note 1 x CSSFintra	
DRX cycle≤ 320ms	max(600ms, ceil(1.5 x M _{pss/sss_sync_w/o_gaps} x K _p x K	
	layer1_measurement) x max(SMTC period,DRX cycle)) x	
	CSSF _{intra}	
DRX cycle>320ms	ceil(M _{pss/sss_sync_w/o_gaps} x K _p x K _{layer1_measurement}) x DRX	
	cycle x CSSF _{intra}	
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is		
the one used by the cell being identified.		

Table 4.6.1.0.1-3: Time period for time index detection (Frequency range FR1)

DRX cycle	T _{SSB_time_index_intra}		
No DRX	max(120ms, ceil($3 \times K_p$) x SMTC period) Note 1 x		
	CSSF _{intra}		
DRX cycle≤ 320ms	Max(120ms, ceil (1.5 x 3 x K_p) x max(SMTC		
-	period,DRX cycle)) x CSSF _{intra}		
DRX cycle>320ms	Ceil(3 x K _p) x DRX cycle x CSSF _{intra}		
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is			
the one used by the cell being identified			

Table 4.6.1.0.1-4: Time period for PSS/SSS detection, deactivated SCell (Frequency range FR1)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	5 x measCycleSCell x CSSF _{intra}
DRX cycle≤ 320ms	5 x max(measCycleSCell, 1.5xDRX cycle) x CSSF _{intra}
DRX cycle> 320ms	5 x max(measCycleSCell, DRX cycle) x CSSF _{intra}

Table 4.6.1.0.1-5: Time period for PSS/SSS detection, deactivated SCell (Frequency range FR2)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	M _{pss/sss_sync_w/o_gaps} x measCycleSCell x CSSF _{intra}
DRX cycle≤ 320ms	M _{pss/sss_sync_w/o_gaps} x max(measCycleSCell, 1.5xDRX
	cycle) x CSSF _{intra}
DRX cycle> 320ms	M _{pss/sss_sync_w/o_gaps} x max(measCycleSCell, DRX cycle) x
-	CSSF _{intra}

Table 4.6.1.0.1-6: Time period for time index detection, deactivated SCell (Frequency range FR1)

DRX cycle	$T_{SSB_time_index_intra}$
No DRX	3 x measCycleSCell x CSSF _{intra}
DRX cycle≤ 320ms	3 x max(measCycleSCell, 1.5xDRX cycle) x CSSF _{intra}
DRX cycle> 320ms	3 x max(measCycleSCell, DRX cycle) x CSSF _{intra}

The measurement period for intrafrequency measurements without gaps is as shown in table 4.6.1.0.1-7, 4.6.1.0.1-8, 4.6.1.0.1-9 (deactivated SCell) or 4.6.1.0.1-10 (deactivated SCell). If the higher layer signaling in TS38.331 [13] signaling of smtc2 is present and smtc1 is fully overlapping with measurement and smtc2 is partially overlapping with measurement gaps, requirements are not specified for $T_{SSB_measurement_period_intra}$.

If SCG DRX is in use, intrafrequency measurement period requirements specified in Table 4.6.1.0.1-7, Table 4.6.1.0.1-8, Table 4.6.1.0.1-9 and Table 4.6.1.0.1-10 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 4.6.1.0.1-7: Measurement period for intrafrequency measurements without gaps(Frequency FR1)

DRX cycle	T _{SSB_measurement_period_intra}		
No DRX	max(200ms, ceil($5 \times K_p$) x SMTC period) Note 1 x		
	CSSF _{intra}		
DRX cycle≤ 320ms	max(200ms, ceil(1.5x 5 x K _p) x max(SMTC		
	period,DRX cycle)) x CSSF _{intra}		
DRX cycle>320ms	ceil($5 \times K_p$) x DRX cycle x CSSF _{intra}		
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is			
the one used by the cell being identified.	*		

Table 4.6.1.0.1-8: Measurement period for intrafrequency measurements without gaps(Frequency FR2)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(400ms, ceil(M _{meas_period_w/o_gaps} x K _p x K
	layer1_measurement) x SMTC period) Note 1 x CSSFintra
DRX cycle≤ 320ms	max(400ms, ceil(1.5x M _{meas_period_w/o_gaps} x K _p x K
	layer1_measurement) x max(SMTC period,DRX cycle)) x
	CSSF _{intra}
DRX cycle>320ms	ceil(M _{meas_period_w/o_gaps} xK _p x K _{layer1_measurement}) x DRX cycle
	x CSSF _{intra}
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is	
the one used by the cell being identified.	

Table 4.6.1.0.1-9: Measurement period for intrafrequency measurements without gaps (deactivated SCell) (Frequency range FR1)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	5 x measCycleSCell x CSSF _{intra}
DRX cycle≤ 320ms	5 x max(measCycleSCell, 1.5xDRX cycle) x CSSF _{intra}
DRX cycle> 320ms	5 x max(measCycleSCell, DRX cycle) x CSSF _{intra}

Table 4.6.1.0.1-10: Measurement period for intrafrequency measurements without gaps (deactivated SCell) (Frequency range FR2)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	M _{meas_period with_gaps} x measCycleSCell x CSSF _{intra}
DRX cycle≤ 320ms	M _{meas_period with_gaps} x max(measCycleSCell, 1.5xDRX cycle) x CSSF _{intra}
DRX cycle> 320ms	M _{meas_period with_gaps} x max(measCycleSCell, DRX cycle) x CSSF _{intra}

The normative reference for this requirement is TS 38.133 [6] clause 9.2.5.1 and 9.2.5.2.

4.6.1.0.2 Minimum conformance requirements for event-triggered measurements with gap

TS 38.133, clause 9.2.2]

The requirements in TS 38.133 [6] Section 9.2 apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] Sections 10.1.2 and 10.1.3 for FR1 and FR2, respectively, for a corresponding Band,
- SS-RSRQ related side conditions given in TS 38.133 [6] Sections 10.1.7 and 10.1.8 for FR1 and FR2, respectively, for a corresponding Band,
- SS-SINR related side conditions given in TS 38.133 [6] Sections 10.1.12 and 10.1.13 for FR1 and FR2, respectively, for a corresponding Band,
- SSB_RP and SSB £s/Iot according to Annex B.2.2 for a corresponding Band.

[TS 38.133, clause 9.2.6.2]

The UE shall be able to identify a new detectable intra frequency cell within $T_{identify_intra_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (reportQuantityRsIndexes or maxNrofRSIndexesToReport is not configured), or the UE has been indicated that the neighbour cell is synchronous with the serving cell (deriveSSB-IndexFromCell is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within $T_{identify_intra_with_index}$. The UE shall be able to identify a new detectable intra frequency SS block of an

already detected cell within $T_{identify_intra_without_index}$. It is assumed that deriveSSB-IndexFromCell is always enabled for FR1 TDD and FR2.

$$T_{identify_intra_without_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} ms$$

$$T_{identify\ intra\ with\ index} = T_{PSS/SSS\ sync\ ntra} + T_{SSB\ measurement\ period\ intra} + T_{SSB\ time\ index\ intra}$$

Where:

Tpss/sss_sync_intra: it is the time period used in PSS/SSS detection given in table 4.6.1.0.2 or 4.6.1.0.2.

 $T_{SSB_time_index_intra}$: it is the time period used to acquire the index of the SSB being measured given in table 4.6.1.0.2.

 $T_{SSB_measurement_period_intra}$: equal to a measurement period of SSB based measurement given in table 4.6.1.0.2 or 4.6.1.0.2.

 $CSSF_{intra}$: it is a carrier specific scaling factor and is determined according to $CSSF_{within_gap,i}$ in TS 38.133 [6] section 9.1.5.2 for measurement conducted within measurement gaps.

 $M_{pss/sss_sync_with_gaps}$: For a UE supporting FR2 power class 1, $M_{pss/sss_sync_with_gaps}$ =40. For a UE supporting FR2 power class 2, $M_{pss/sss_sync_with_gaps}$ =24. For a UE supporting FR2 power class 3, $M_{pss/sss_sync_with_gaps}$ =24. For a UE supporting power class 4, $M_{pss/sss_sync_with_gaps}$ =24.

 $M_{meas_period_with_gaps}$: For a UE supporting power class 1, $M_{meas_period_with_gaps}$ =40. For a UE supporting power class 2, $M_{meas_period_with_gaps}$ =24. For a UE supporting power class 3, $M_{meas_period_with_gaps}$ =24. For a UE supporting power class 4, $M_{meas_period_with_gaps}$ =24.

If the higher layer signaling in TS 38.331 [13] signaling of smtc2 is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, requirements are not specified for $T_{identify_intra_without_index}$ or $T_{identify_intra_with_index}$.

If SCG DRX is in use, intrafrequency cell identification requirements specified in TS 38.133 [6] Table 9.2.6.1-1, Table 9.2.6.1-2, and Table 9.2.5.1-3 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 4.6.1.0.2: Time period for PSS/SSS detection (Frequency range FR1)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	max(600ms, 5 x max(MGRP, SMTC period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(600ms, ceil(1.5x 5) x max(MGRP, SMTC
·	period,DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	5 x max(MGRP, DRX cycle) x CSSF _{intra}

Table 4.6.1.0.2-2: Time period for PSS/SSS detection (Frequency range FR2)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	max(600ms, M _{pss/sss_sync_with_gaps} x max(MGRP, SMTC
	period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(600ms, ceil(1.5x M _{pss/sss_sync_with_gaps}) x max(MGRP,
	SMTC period, DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	M _{pss/sss_sync_with_gaps} x max(MGRP, DRX cycle) x CSSF _{intra}

Table 4.6.1.0.2: Time period for time index detection (Frequency range FR1)

DRX cycle	T _{SSB_time_index_intra}
No DRX	max(120ms, 3 x max(MGRP, SMTC period)) x
	CSSF _{intra}
DRX cycle≤ 320ms	max(120ms, ceil(1.5x 3) x max(MGRP, SMTC
	period,DRX cycle) x CSSF _{intra})
DRX cycle>320ms	3 x max(MGRP, DRX cycle) x CSSF _{intra}

[TS 38.133, clause 9.2.6.3]

The measurement period for FR1 intrafrequency measurements with gaps is as shown in Table 4.6.1.0.2-4.

The measurement period for FR2 intrafrequency measurements with gaps is as shown in Table 4.6.1.0.2-5.

If SCG DRX is in use, intrafrequency measurement period requirements specified in Table 4.6.1.0.2-4 and Table 4.6.1.0.2-5, shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 4.6.1.0.2-4: Measurement period for intrafrequency measurements with gaps (Frequency Range FR1)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	Max(200ms, 5 x max(MGRP, SMTC period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(200ms, ceil(1.5x 5) x max(MGRP, SMTC
	period,DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	5 x max(MGRP, DRX cycle) x CSSF _{intra}

Table 4.6.1.0.2-5: Measurement period for intrafrequency measurements with gaps (Frequency Range FR2)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(400ms, M _{meas_period with_gaps} x max(MGRP, SMTC
	period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(400ms, ceil(1.5 x M _{meas_period with_gaps}) x max(MGRP,
•	SMTC period, DRX cycle)) Note 1 x CSSF _{intra}
DRX cycle>320ms	M _{meas_period with_gaps} x max(MGRP, DRX cycle) x CSSF _{intra}

[TS 38.133, clause 9.2.4.3]

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in TS 38.133 [6] sections 10.1.2.1, 10.1.3.1, 10.1.7.1, 10.1.8.1, 10.1.12.1 and 10.1.13.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T $_{identify\ intra\ with\ index}$ or T $_{identify\ intra\ without\ index}$ defined in TS 38.133 [6] clause 9.2.5.1 or clause 9.2.6.2. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify\ intra\ without\ index}$ or $T_{identify\ intra\ with\ index}$ defined in TS 38.133 [6] clause 9.2.5.1 or clause 9.2.6.2 becomes undetectable for a period and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement_Period,\ Intra}$ provided the timing to that cell has not changed more than \pm 3200 Tc while the measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used, an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clause 9.2.2, 9.2.6.2, 9.2.6.3 and 9.2.4.3.

4.6.1.1 EN-DC FR1 event-triggered reporting without gap in non-DRX

4.6.1.1.1 Test purpose

This test is to verify the UE makes correct reporting of an event without gap within the intra-frequency cell search requirements.

4.6.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.1.1.

4.6.1.1.4 Test description

4.6.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.1.1.4.1-1.

Table 4.6.1.1.4.1-1: supported test configurations

Test Case ID Description			
4.6.1.1-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.1.1-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.1.1-3 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
NOTE: The UE is only required to be tested in one of the supported test configurations.			

Configure the test equipment and the DUT according to the parameters in Table 4.6.1.1.4.1-2 and Table 4.6.1.1.4.1-3.

Table 4.6.1.1.4.1-2: Initial conditions for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	l in Annex E, Table E.1-1 and TS 38.	.508-1 [14] sclause 4.3.1.	
Channel	As specified	by the test configuration selected fr	rom Table 4.7.1.1.2-1.	
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2.	
conditions				
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to	N/A			
connection				
diagram				

Table 4.6.1.1.4.1-3: General test parameters for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1, 2, 3	E-UTRAN Cell 1 and NR Cell 2	
Neighbour cell		1, 2, 3	NR Cell 3	Cell to be identified.
RF Channel Number		1, 2, 3	1: Cell 1 2: Cell 2 and Cell 3	
SSB configuration		2	SSB.1 FR1 SSB.1 FR1	
		3	SSB.2 FR1	
SMTC configuration		1	SMTC.2	
		2	SMTC.1	
		3	SMTC.1	
A3-Offset	dB	1, 2, 3	-4.5	
CP length		1, 2, 3	Normal	
Hysteresis	dB	1, 2, 3	0	
Time To Trigger	S	1, 2, 3	0	
Filter coefficient		1, 2, 3	0	L3 filtering is not used
DRX		1, 2, 3	N/A	OFF
Time offset between PCell and PSCell		1, 2, 3	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		2	3 μs	Synchronous cells
		3	3 μs	Synchronous cells
T1	S	1, 2, 3	5	
T2	S	1, 2, 3	5	

- 1. Message contents are defined in clause 4.6.1.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in the same frequency. Cell 2 is the PSCell and Cell 3 is the neighbour NR Cell.

4.6.1.1.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG and SCG according to Annex C.1 for all downlink physical channels.
- 3. The SS shall configure the PCell (Cell 1) and PSCell (Cell 2) on the MCG and SCG as per TS 38.508-1 [14] clause 4.5 with the message content exceptions defined in clause 4.6.1.1.4.3.
- 4. Set the parameters according to T1 in Table 4.6.1.1.4.1-2. Propagation conditions are set according to Annex C clauses C.2.2. T1 starts.
- 5. The SS shall transmit an RRCConnectionReconfiguration message with event A3 configured.
- 6. The UE shall transmit an RRCConnectionReconfigurationComplete message.
- 7. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.1.1.4.1-2.
- 8. UE shall transmit a MeasurementReport message triggered by Event A3 for Cell 3 on PCell (Cell 1). If the measurement reporting delay from the beginning of time period T2 is less than 802 the number of successful

tests is increased by one. If the UE fails to report the event within the measurement reporting delay requirement then the number of failure tests is increased by one.

- 9. The SS waits until the MeasurementReport message is received or when T2 expires.
- 10. The SS shall transmit *RRCConnectionReconfiguration* message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 11. Set Cell 3 physical cell identity = [((current cell 3 physical cell identity + 1) mod 14 + 2)] for next iteration of the test procedure loop.
- 12. The SS then shall transmit *RRCConnectionReconfiguration* message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 13. If any the reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release On according to TS 38.508-1 [14] clause 4.5].
- 14. Repeat steps 3-13 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.6.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.6.1.1.4.3-1: Common Exception messages for Additional EN-DC FR1 event-triggered reporting without gap in non-DRX test requirement

Default Message Contents			
Common contents of system information blocks	S		
exceptions			
Default RRC messages and information	Table H.3.1-1		
elements contents exceptions	Table H.3.1-2		
	Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 2 and		
	Asynchronous cells for configuration 4.6.1.1-1		
	Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 1 and		
	synchronous cells for configuration 4.6.1.1-2		
	Table H.3.1-3 with Condition SSB.2 FR1, SMTC pattern 1 and		
	synchronous cells for configuration 4.6.1.1-3		
	Table H.3.1-4 with A3-offset = -4.5dB		
	Table H.3.1-5		
	Table H.3.1-7		
	Table H.3.4-1		
	Table H.3.4-2		

4.6.1.1.5 Test requirement

Table 4.6.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.1.1.5-1: NR Cell specific test parameters for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1

Parameter	Unit	Test	Cell 2		Cell 3		
		configuration	T1	T2	T1	T2	
TDD configuration		1	N/A		N/A		
		2	TDDConf.1.1		TDDConf.1.1		
		3	TDDConf.2.1		TDDConf.2.1		
PDSCH RMC		1	SR.1.1 FDD		N/A		
configuration		2	SR.1.	1 TDD			
		3	SR.2.	1 TDD]		
RMSI CORESET		1	CR.1.	1 FDD	CR.1.1 FDD		
RMC		2	CR.1.	1 TDD	CR.1.1 TDD		
configuration		3	CR.2.	1 TDD	CR.2.	CR.2.1 TDD	
Dedicated		1	CCR.1	l l		.1 FDD	
CORESET RMC		2	CCR.1	.1 TDD	CCR.1	.1 TDD	
configuration		3	CCR.2	.1 TDD	CCR.2	CCR.2.1 TDD	
OCNG Patterns		1, 2, 3	OI	P.1	OP.1		
Initial BWP		1, 2, 3		VP.0.1	DLBWP.0.1		
configuration			ULBWP.0.1		ULBWP.0.1		
Active DL BWP		1, 2, 3	DLBWP.1.1		DLBWP.1.1		
configuration							
Active UL BWP		1, 2, 3	ULBWP.1.1		ULBWP.1.1		
configuration							
RLM-RS		1, 2, 3	SSB		SSB		
$N_{_{oC}}$ note 2	dBm/SCS	1			98		
		2				.98	
	1- 4	3	-95				
N_{oc} note 2	dBm/15 KHz	1	-98		-98		
OC		2					
•	15	3					
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	1	4	-1.46	-Infinity	-1.46	
		2 3	-				
△ /	dB	1	4	4	-Infinity	4	
\hat{E}_{s}/N_{oc}	ив	2	- 4	4	-irillinity	4	
		3	-				
SS-RSRP note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
33 13131	GDITI/OCO IXI IZ	2	-94	-94	-Infinity	-94 -94	
		3	-91	-91	-Infinity	-91	
lo	dBm/9.36 MHz	1	-64.60	-62.25	-Infinity	-62.25	
	dBm/9.36 MHz	2	-64.60	-62.25	-Infinity	-62.25	
	dBm/38.16 MHz	3	-58.50	-56.16	-Infinity	-56.16	
Propagation		1, 2, 3	AWGN				
Condition		, , -					

NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for

 $N_{\it oc}$ to be fulfilled.

NOTE 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The overall delays measured test requirement is expressed as:

 $T_{identify_intra_without_index} = (T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}) ms$

 $T_{PSS/SSS_sync_intra} = max[600ms, ceil(5~x~K_p)~x~SMTC~period]~x~CSSF_{intra} = 600ms$

 $T_{SSB_measurement_period_intra} = max[200ms, ceil(5 x K_p) x SMTC period] x CSSF_{intra} = 200 ms$

Which:

 $K_p = 1;$

SMTC period as defined in Table 4.6.1.1.4.1-3;

 $CSSF_{intra} = 1$

TTI insertion uncertainty = TTI_{DCCH} = 1 ms; $2xTTI_{DCCH}$ = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The rate of correct events observed during repeated tests shall be at least 90% with confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.1.2 EN-DC FR1 event-triggered reporting without gap in DRX

4.6.1.2.1 Test purpose

This test is to verify the UE makes correct reporting of an event without gap in DRX within the intra-frequency cell search requirements.

4.6.1.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.1.2.

4.6.1.2.4 Test description

4.6.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.1.2.4.1-1.

Table 4.6.1.2.4.1-1: supported test configurations

Test Case ID	Description				
4.6.1.2-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode				
4.6.1.2-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
4.6.1.2-3	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode				
NOTE: The L	NOTE: The UE is only required to be tested in one of the supported test configurations.				

Configure the test equipment and the DUT according to the parameters in Table 4.6.1.2.4.1-2 and Table 4.6.1.2.4.1-3.

Table 4.6.1.2.4.1-2: Initial conditions for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1 with DRX

Parameter	Value		Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] sclause 4.3.1.					
Channel	As specified by the test configuration selected from Table 4.7.1.1.2-1.					
bandwidth						
Propagation	AWGN		As specified in Annex C.2.2.			
conditions						
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to	N/A					
connection						
diagram						

Table 4.6.1.2.4.1-3: General test parameters for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1 with DRX

Parameter	Unit	Test configur	Value		Comment	
		ation	Test 1	Test 2		
Active cell		1, 2, 3	E-UTRAN Ce Cell 2	ll 1 and NR		
Neighbour cell		1, 2, 3	NR Cell 3		Cell to be identified.	
RF Channel Number		1, 2, 3	1: Cell 1 2: Cell 2 and	Cell 3		
SSB configuration		1	SSB.1 FR1			
		2	SSB.1 FR1			
		3	SSB.2 FR1			
SMTC configuration		1	SMTC.2			
		2	SMTC.1			
		3	SMTC.1			
A3-Offset	dB	1, 2, 3	-4.5			
CP length		1, 2, 3	Normal			
Hysteresis	dB	1, 2, 3	0			
Time To Trigger	S	1, 2, 3	0			
Filter coefficient		1, 2, 3	0		L3 filtering is not used	
DRX		1, 2, 3	DRX.1	DRX.2	Annex A.5 Table A.5-1	
Time offset between PCell and PSCell		1, 2, 3	3 μs		Synchronous EN-DC	
Time offset between serving and neighbour cells		1	3 ms		Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.	
		2	3 μs		Synchronous cells	
		3	3 μs		Synchronous cells	
T1	S	1, 2, 3	5			
T2	S	1, 2, 3	5	10		

- 1. Message contents are defined in clause 4.6.1.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in the same frequency. Cell 2 is the PSCell and Cell 3 is the neighbour NR Cell.

4.6.1.2.4.2 Test procedure

Same test procedure as in subclause 4.6.1.1.4.2 with Step 8 is replaced by following:

8. UE shall transmit a MeasurementReport message triggered by Event A3 for Cell 3 on PCell (Cell 1). If the overall delays measured from the beginning of time period T2 is less than 922 ms for Test 1 or less than 6402 ms

for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

4.6.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.6.1.2.4.3-1: Common Exception messages for Additional EN-DC FR1 event-triggered reporting without gap in DRX test requirement

Default Message Contents					
Common contents of system information blocks					
exceptions					
Default RRC messages and information	Table H.3.1-1				
elements contents exceptions	Table H.3.1-2				
	Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 2 and				
	Asynchronous cells for configuration 4.6.1.2-1				
	Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 1 and				
	synchronous cells for configuration 4.6.1.2-2				
	Table H.3.1-3 with Condition SSB.2 FR1, SMTC pattern 1 and				
	synchronous cells for configuration 4.6.1.2-3				
	Table H.3.1-4 with A3-offset = -4.5dB				
	Table H.3.1-5				
	Table H.3.1-7				
	Table H.3.7-1 with Condition DRX.1 for Test 1				
	Table H.3.7-1 with Condition DRX.2 for Test 2				
	Table H.3.4-1				
	Table H.3.4-2				

4.6.1.2.5 Test requirement

Table 4.6.1.2.4.1-2 and Table 4.6.1.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.1.2.5-1: NR Cell specific test parameters for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1 with DRX

Parameter	Unit	Test	Cell 2		Cell 3		
		configuration	T1	T2	T1	T2	
TDD configuration		1	N/A		N/A		
		2	TDDConf.1.1		TDDConf.1.1		
		3	TDDConf.2.1		TDDConf.2.1		
PDSCH RMC		1	SR.1.	1 FDD	N.	/A	
configuration		2	SR.1.	1 TDD			
		3	SR.2.1 TDD				
RMSI CORESET		1	CR.1.	1 FDD	CR.1.	1 FDD	
RMC		2	CR.1.	1 TDD	CR.1.1 TDD		
configuration		3	CR.2.	1 TDD	CR.2.1 TDD		
Dedicated		1		CCR.1.1 FDD CCR.1			
CORESET RMC		2	+	.1 TDD	CCR.1.1 TDD		
configuration		3		.1 TDD		CCR.2.1 TDD	
OCNG Patterns		1, 2, 3		P.1	OP.1		
Initial BWP		1, 2, 3	DLBWP. 0.1		DLBWP. 0.1		
configuration		_, _, _,	ULBWP.0.1		ULBWP.0.1		
Active DL BWP		1, 2, 3	DLBWP.1.1		DLBWP.1.1		
configuration		, ,					
Active UL BWP		1, 2, 3	ULBWP.1.1		ULBWP.1.1		
configuration							
RLM-RS		1, 2, 3	S	SB	SSB		
$N_{oc}^{$	dBm/SCS	1	-9		98 98		
oc oc		2					
		3	-95				
$N_{oc}^{$	dBm/15 KHz	1	-98				
oc		2					
		3					
$\mathbf{\hat{E}}_{_{s}}/\mathrm{I}_{_{ot}}$	dB	1	4	-1.46	-Infinity	-1.46	
s / Tot		2					
		3					
\hat{E}_{s}/N_{oc}	dB	1	4	4	-Infinity	4	
\mathbf{L}_{S} / \mathbf{I}_{OC}		2					
		3					
SS-RSRP note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
		2	-94	-94	-Infinity	-94	
		3	-91	-91	-Infinity	-91	
lo	dBm/9.36 MHz	1	-64.60	-62.25	-Infinity	-62.25	
	dBm/9.36 MHz	2	-64.60	-62.25	-Infinity	-62.25	
	dBm/38.16 MHz	3			-Infinity	-56.16	
Propagation		1, 2, 3	AWGN				
Condition							

NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

NOTE 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 922 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The overall delays measured test requirement is expressed in test 1 with DRX 40ms as:

 $T_{identify_intra_without_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}\right) \, ms$

T_{PSS/SSS_sync_intra} = max[600ms, ceil(1.5 x 5 x K_p) x max(SMTC period, DRX cycle)] x CSSF_{intra} = 600ms

 $T_{SSB_measurement_period_intra} = max[200ms, ceil(1.5 x 5 x K_p) x max(SMTC period, DRX cycle)] x CSSF_{intra} = 320 ms$

 $CSSF_{intra} = 1$

Which: $K_p = 1;$ $SMTC \ period \ as \ defined \ in \ Table \ 4.6.1.2.4.1-3;$ $DRX \ cycle = 40;$

TTI insertion uncertainty = $TTI_{DCCH} = 1$ ms; $2xTTI_{DCCH} = 2$ ms

The overall delays measured shall be less than a total of 922 ms in test 1 (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6402 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The overall delays measured test requirement is expressed in test 2 with DRX 640ms as:

```
\begin{split} T_{identify\_intra\_without\_index} &= (T_{PSS/SSS\_sync\_intra} + T_{SSB\_measurement\_period\_intra}) \ ms \\ T_{PSS/SSS\_sync\_intra} &= ceil(5 \ x \ K_p) \ x \ DRX \ cycle \ x \ CSSF_{intra} = 3200 ms \\ T_{SSB\_measurement\_period\_intra} &= ceil(5 \ x \ K_p) \ x \ DRX \ cycle \ x \ CSSF_{intra} = 3200 \ ms \\ Which: \\ K_p &= 1; \\ DRX \ cycle &= 640; \\ CSSF_{intra} &= 1 \end{split}
```

TTI insertion uncertainty = $TTI_{DCCH} = 1$ ms; $2xTTI_{DCCH} = 2$ ms

The overall delays measured shall be less than a total of 6402 ms in test 2 (note: this gives a total of 6400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90% with confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.1.3 EN-DC FR1 event-triggered reporting with gap in non-DRX

4.6.1.3.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within EN-DC intra-frequency NR cell search requirements in TS 38.133 [6] clause 9.2. This test will partly verify the TDD intra-frequency cell search requirements.

4.6.1.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.6.1.3.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.1.3.

4.6.1.3.4 Test description

4.6.1.3.4.1 Initial conditions

Test 4.6.1.3 can be run in one of the configurations defined in Table 4.6.1.3.4.1-1.

Table 4.6.1.3.4.1-1: Supported test configurations for NR FR1 Cell

Configuration Description			
4.6.1.3-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.1.3-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.1.3-3	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is only required to be tested in one of the supported test configurations.			

Configure the test equipment and the DUT according to the parameters in Table 4.6.1.5.4.1-2.

Table 4.6.1.3.4.1-2: Initial conditions for EN-DC event-triggered reporting in FR1

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] sclause 4.4.2 and 4.3.1.				
Channel	As specified	by the test configuration selected fr	om Table 4.6.1.3.4.1-1.			
bandwidth						
Propagation	AWGN		As specified in Annex C.2.2.			
conditions						
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to	N/A					
connection						
diagram						

- 1. Message contents are defined in clause 4.6.1.3.4.3.
- 2. The general test parameter settings are set up according to Table 4.6.1.3.4.1-3.
- 3. Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2. Cell 3 is powered OFF.

Table 4.6.1.3.4.1-3: General test parameters for EN-DC intra-frequency event triggered reporting with per-UE gaps for PSCell in FR1

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1, 2, 3	E-UTRAN Cell 1 and NR	
			Cell 2	
Neighbour cell		1, 2, 3	NR Cell 3	Cell to be identified.
RF Channel Number		1, 2, 3	1: Cell 1 2: Cell 2 and Cell 3	
Measurement gap type		1, 2, 3	Per-UE gaps	
Measurement gap repitition periodicity	ms	1, 2, 3	40	
Measurement gap length	ms	1, 2, 3	6	
Measurement gap offset	ms	1, 2, 3	39	
SSB configuration		1	SSB.1 FR1	
		2	SSB.1 FR1	
		3	SSB.2 FR1	
SMTC configuration		1	SMTC.2	
_		2	SMTC.1	
		3	SMTC.1	
CSI-RS parameters		1	CSI-RS.1.2 FDD	
		2	CSI-RS.1.2 TDD	
		3	CSI-RS.2.2 TDD	
A3-Offset	dB	1, 2, 3	-4.5	
CP length		1, 2, 3	Normal	
Hysteresis	dB	1, 2, 3	0	
Time To Trigger	S	1, 2, 3	0	
Filter coefficient		1, 2, 3	0	L3 filtering is not used
DRX		1, 2, 3	N/A	OFF
Time offset between PCell and PSCell		1, 2, 3	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		2	3 μs	Synchronous cells
		3	3 μs	Synchronous cells
T1	S	1, 2, 3	5	
T2	S	1, 2, 3	5	

4.6.1.3.4.2 Test procedure

Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR cells according to T1 in Table 4.6.1.3.5-1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message with event A3 configured.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.1.3.5-1. T2 starts.

- 6. UE shall transmit a MeasurementReport message embedded in E-UTRA RRC message *ULInformationTransferMRDC* triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.If either of the reconfiguration in step 7 or step 9 fails, the SS switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.6.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.6.1.3.4.3-1: Common Exception messages

	Default Message Contents				
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents	Table H.3.1-1				
exceptions	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED				
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for Configuration 4.6.1.3-1				
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and Synchronous cells for Configuration 4.6.1.3-2				
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and Synchronous cells for Configuration 4.6.1.3-3				
	Table H.3.1-4 with A3-offset = -4.5dB				
	Table H.3.1-5 with Condition INTRA-FREQ				
	Table H.3.1-6 with Condition Pattern #0				
	Table H.3.1-7 with Condition INTRA-FREQ				
	Table H.3.4-1				
	Table H.3.4-2				

4.6.1.3.5 Test requirement

Tables 4.6.1.3.4.1-3 and 4.6.1.3.5-1 define the primary level settings including test tolerances for EN-DC intrafrequency event triggered reporting with per-UE gaps for PSCell in FR1.

Table 4.6.1.3.5-1: NR Cell specific test parameters for EN-DC intra-frequency event triggered reporting with per-UE gaps for PSCell in FR1

Parameter	Unit	Test	Ce	Cell 2		II 3	
		configuration	T1	T1 T2		T2	
TDD configuration		1		N/A		N/A	
		2	TDDC	TDDConf.1.1		TDDConf.1.1	
		3	TDDC	onf.2.1	TDDConf.2.1		
PDSCH RMC		1	SR.1.	1 FDD	N.	/A	
configuration		2	SR.1.	1 TDD]		
		3	SR.2.	1 TDD	1		
RMSI CORESET		1	CR.1.	1 FDD	CR.1.	1 FDD	
RMC		2	CR.1.	1 TDD	CR.1.	1 TDD	
configuration		3		1 TDD		1 TDD	
Dedicated		1	+	.1 FDD		.1 FDD	
CORESET RMC		2	+	.1 TDD		.1 TDD	
configuration		3		.1 TDD		.1 TDD	
OCNG Patterns		1, 2, 3		P.1		P.1	
TRS configuration		1		.1 FDD		/A	
1110 comigaration		2	+	.1 TDD		/A	
		3	_	.2 TDD		/A	
Initial BWP		1, 2, 3		VP.0.1		VP.0.1	
configuration		1, 2, 3		VP.0.1	1	VP.0.1	
Active DL BWP		1, 2, 3		VP.1.2		VP.1.1	
configuration		1, 2, 0	DEBWI .I.I		VI .1.1		
Active UL BWP		1, 2, 3	ULBWP.1.2 ULBWP.1.1		VP.1.1		
configuration		, , -					
RLM-RS		1, 2, 3	CSI	l-RS	SS	SB	
$N_{oc}^{ m Note~2}$	dBm/SCS	1			-98		
¹ V oc		2		-	-98		
		3			-95		
N_{oc} Note 2	dBm/15 KHz	1			-98		
¹Voc		2	7				
		3	7				
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1	4	-1.46	-Infinity	-1.46	
$\mathbf{L}_{s}/1_{ot}$		2	7				
		3					
\hat{E}_{s}/N_{oc}	dB	1	4	4	-Infinity	4	
L_s/V_{oc}		2					
		3					
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
		2	-94	-94	-Infinity	-94	
		3	-91	-91	-Infinity	-91	
lo	dBm/9.36 MHz	1	-64.60	-62.25	-64.60	-62.25	
	dBm/9.36 MHz	2	-64.60	-62.25	-64.60	-62.25	
	dBm/38.16 MHz	3	-58.50	-56.16	-58.50	-56.16	
Propagation Condition		1, 2, 3	AWGN				

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 1.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify intra with index}$

where,

 $T_{identify_intra_with_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}\right) \ ms$

 T_{PSS/SSS_sync_ntra} = max (600ms, ceil (5 x K_p) x SMTC period)^{Note 1} x CSSF_{intra} = max (600ms, ceil (5 x 1) x 20ms) x 1 = 600ms

 $T_{SSB_measurement_period_intra} = max$ (200ms, ceil (5 x K_p) x SMTC period)^{Note 1} x CSSF_{intra} = max (200ms, ceil (5 x 1) x 20ms) x 1 = 200ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.6.1.4 EN-DC FR1 event-triggered reporting with gap in DRX

4.6.1.4.1 Test purpose

To verify that the UE makes correct reporting of an event in DRX within EN-DC intra-frequency NR cell search requirements in TS 38.133 [6] clause 9.2. This test will partly verify the intra-frequency cell search requirements.

4.6.1.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.6.1.4.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.1.4.

4.6.1.4.4 Test description

4.6.1.4.4.1 Initial conditions

Test 4.6.1.4 can be run in one of the configurations defined in Table 4.6.1.4.4.1-1.

Table 4.6.1.4.4.1-1: Supported test configurations for NR FR1 Cell

Configuration	Description
4.6.1.4-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
4.6.1.4-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
4.6.1.4-3	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
Note: The UE configur	is only required to be tested in one of the supported test ations.

Configure the test equipment and the DUT according to the parameters in Table 4.6.1.4.4.1-2.

Table 4.6.1.4.4.1-2: Initial conditions for EN-DC event-triggered reporting in FR1

Parameter	Value	Comment

Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] sclause 4.4.2 and 4.3.1.				
Channel bandwidth	As specified	As specified by the test configuration selected from Table 4.6.1.4.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to connection diagram	N/A					

- 1. Message contents are defined in clause 4.6.1.4.4.3.
- 2. The general test parameter settings are set up according to Table 4.6.1.4.4.1-3.
- 3. Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2. Cell 3 is powered OFF.

Table 4.6.1.4.4.1-3: General test parameters for EN-DC intra-frequency event triggered reporting with per-UE gaps for PSCell in FR1 with DRX

Parameter	Unit	configur		lue	Comment
		ation	Test 1	Test 2	
Active cell		1, 2, 3	E-UTRAN Ce Cell 2	ll 1 and NR	
Neighbour cell		1, 2, 3	NR Cell 3		Cell to be identified.
RF Channel Number		1, 2, 3	1: Cell 1 2: Cell 2 and	Cell 3	
Measurement gap type		1, 2, 3	Per-UE gaps		
Measurement gap repitition periodicity	ms	1, 2, 3	40		
Measurement gap length	ms	1, 2, 3	6		
Measurement gap offset	ms	1, 2, 3	39		
SSB configuration		1	SSB.1 FR1		
		2	SSB.1 FR1		
		3	SSB.2 FR1		
SMTC configuration		1	SMTC.2		
		2	SMTC.1		
		3	SMTC.1		
CSI-RS parameters		1	CSI-RS.1.2 F		
		2	CSI-RS.1.2 T	DD	
		3	CSI-RS.2.2 T	DD	
A3-Offset	dB	1, 2, 3	-4.5		
CP length		1, 2, 3	Normal		
Hysteresis	dB	1, 2, 3	0		
Time To Trigger	S	1, 2, 3	0		
Filter coefficient		1, 2, 3	0		L3 filtering is not used
DRX		1, 2, 3	DRX.1	DRX.2	
Time offset between PCell and PSCell		1, 2, 3	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms		Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		2	3 μs		Synchronous cells
		3	3 μs		Synchronous cells
T1	S	1, 2, 3	5		
T2	S	1, 2, 3	5	10	

4.6.1.4.4.2 Test procedure

Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

There are two BWPs configured in Cell 2, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 2. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR cells according to T1 in Table 4.6.1.4.5-1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message with event A3 configured.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.1.4.5-1. T2 starts.
- 6. UE shall transmit a MeasurementReport message embedded in E-UTRA RRC message *ULInformationTransferMRDC* triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms for Test 1 or less than 6402 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.If either of the reconfiguration in step 7 or step 9 fails, the SS switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 4.6.1.4.4.1-3 as appropriate.

4.6.1.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.6.1.4.4.3-1: Common Exception messages

	Default Message Contents
Common contents of system	
information blocks exceptions	
Default RRC messages and	Table H.3.1-1
information elements contents	
exceptions	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 4.6.1.4-1
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and synchronous cells for configuration 4.6.1.4-2
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and
	synchronous cells for configuration 4.6.1.4-3
	Table H.3.1-4 with A3-offset = -4.5dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-6 with Condition Pattern #0
	Table H.3.1-7 with Condition INTRA-FREQ
	Table H.3.4-1
	Table H.3.4-2
	Table H.3.7-1 with Condition DRX.1 for test 1
	Table H.3.7-1 with Condition DRX.2 for test 2

4.6.1.4.5 Test requirement

Tables 4.6.1.4.4.1-3 and 4.6.1.4.5-1 define the primary level settings including test tolerances for EN-DC intrafrequency event triggered reporting with per-UE gaps for PSCell in FR1.

Table 4.6.1.4.5-1: NR Cell specific test parameters for EN-DC intra-frequency event triggered reporting with per-UE gaps for PSCell in FR1 with DRX

Parameter	Unit	Test	Cell 2		Cell 3		
		configuration	T1 T2		T1	T2	
TDD configuration		1	N/A		N/A		
		2		onf.1.1	TDDConf.1.1		
		3		onf.2.1	TDDC	TDDConf.2.1	
PDSCH RMC		1	SR.1.	1 FDD	N.	/A	
configuration		2	SR.1.	1 TDD			
		3	SR.2.	1 TDD			
RMSI CORESET		1	CR.1.	1 FDD	CR.1.	1 FDD	
RMC		2	CR.1.	1 TDD	CR.1.:	1 TDD	
configuration		3	CR.2.	1 TDD	CR.2.:	1 TDD	
Dedicated		1	CCR.1	.1 FDD	CCR.1	.1 FDD	
CORESET RMC		2	CCR.1	.1 TDD	CCR.1	.1 TDD	
configuration		3		.1 TDD	CCR.2		
OCNG Patterns		1, 2, 3		P.1		P.1	
TRS configuration		1		.1 FDD		/A	
· · · · · · · · · · · · · · · · · · ·		2		.1 TDD		/A	
		3		.2 TDD	N		
Initial BWP		1, 2, 3		VP.0.1	DLBW	/P.0.1	
configuration			ULBV	VP.0.1	ULBW	/P.0.1	
Active DL BWP		1, 2, 3	+	VP.1.2	DLBV	/P.1.1	
configuration							
Active UL BWP		1, 2, 3	ULBWP.1.2 ULBWP.1.1		/P.1.1		
configuration							
RLM-RS		1, 2, 3	CSI-RS SSB		SB		
$N_{oc}^{ m Note~2}$	dBm/SCS	1			98		
oc oc		2			98		
		3	-95				
$N_{oc}^{$	dBm/15 KHz	1	-98				
- · oc		2					
		3					
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1	4	-1.46	-Infinity	-1.46	
s / Tot		2					
		3					
\hat{E}_s/N_{oc}	dB	1	4	4	-Infinity	4	
_s/ - · oc		2					
		3					
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
		2	-94	-94	-Infinity	-94	
		3	-91	-91	-Infinity	-91	
lo	dBm/9.36 MHz	1	-64.60	-62.25	-64.60	-62.25	
	dBm/9.36 MHz	2	-64.60	-62.25	-64.60	-62.25	
	dBm/38.16 MHz	3	-58.50	-56.16	-58.50	-56.16	
Propagation		1, 2, 3		A۷	VGN		
Condition							

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 1.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify intra with index}$

where,

For Test 1:

```
T<sub>identify</sub> intra with index = (T<sub>PSS/SSS</sub> sync ntra + T<sub>SSB</sub> measurement period intra) ms
```

 $T_{PSS/SSS_sync_ntra} = max$ (600ms, ceil(1.5x 5 x K_p) x max (SMTC period,DRX cycle)) x CSSF_{intra} = max (600ms, ceil(1.5 x 5 x 1) x max (20ms, 40ms)) x 1 = 600ms

 $T_{SSB_measurement_period_intra} = max (200ms, ceil(1.5x 5 x K_p) x max (SMTC period,DRX cycle)) x CSSF_intra} = max (200ms, ceil(1.5 x 5 x 1) x max (20ms, 40ms)) x1 = 320ms$

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms in this test case (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For Test 2:

$$T_{identify_intra_with_index} = \left(T_{PSS/SSS_sync_ntra} + T_{SSB_measurement_period_intra}\right) ms$$

 T_{PSS/SSS_sync_ntra} = ceil (5 x K_p) x DRX cycle x CSSF_{intra} = ceil (5 x1) x 640ms x 1 = 3200ms

 $T_{SSB_measurement_period_intra} = ceil (5 x K_p) x DRX cycle x CSSF_intra = ceil (5 x 1) x 640ms x 1 = 3200ms$

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 6402 ms in this test case (note: this gives a total of 6400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.6.1.5 EN-DC FR1 event-triggered reporting without gap in non-DRX with SSB time index detection

4.6.1.5.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within EN-DC intra-frequency NR cell search requirements in TS 38.133 [6] clause 9.5. This test will partly verify the FDD intra-frequency cell search requirements. UE is required to report SSB time index.

4.6.1.5.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.6.1.5.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.1.5.

4.6.1.5.4 Test description

4.6.1.5.4.1 Initial conditions

Test 4.6.1.5 can be run in one of the configurations defined in Table 4.6.1.5.4.1-1.

Table 4.6.1.5.4.1-1: Supported test configurations for FR1 PSCell

Configu	uration	Description		
4.6.1.5-1 15 kHz SSB SCS, 10MHz bandwidth, FDD dup		15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
Note:	te: The UE is only required to be tested in one of the supported test			
configurations.				

Configure the test equipment and the DUT according to the parameters in Table 4.6.1.5.4.1-2.

Table 4.6.1.5.4.1-2: Initial conditions for EN-DC event-triggered reporting in FR1

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] sclause 4.4.2 and 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 4.6.1.5.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. Message contents are defined in clause 4.6.1.5.4.3.
- 2. The general test parameter settings are set up according to Table 4.6.1.5.4.1-3.
- 3. Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2. Cell 3 is powered OFF.

Table 4.6.1.5.4.1-3: General test parameters for EN-DC intra-frequency event triggered reporting without gap for FDD PSCell in FR1 with SSB index reading

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1	E-UTRAN Cell 1 and NR Cell 2	
Neighbour cell		1	NR Cell 3	Cell to be identified.
RF Channel Number		1	1: Cell 1 2: Cell 2 and Cell 3	
SSB configuration		1	SSB.1 FR1	
SMTC configuration		1	SMTC.2	
A3-Offset	dB	1	-4.5	
CP length		1	Normal	
Hysteresis	dB	1	0	
Time To Trigger	S	1	0	
Filter coefficient		1	0	L3 filtering is not used
DRX		1	N/A	OFF
Time offset between PCell and PSCell		1	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
T1	S	1	5	
T2	S	1	5	

4.6.1.5.4.2 Test procedure

Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR cells according to T1 in Table 4.6.1.5.5-1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message with event A3 configured.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.1.5.5-1. T2 starts.
- 6. UE shall transmit a MeasurementReport message embedded in E-UTRA RRC message *ULInformationTransferMRDC* triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.If either of the reconfiguration in step 7 or step 9 fails, the SS switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.6.1.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.6.1.5.4.3-1: Common Exception messages

	Default Message Contents				
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-1				
	Table H.3.1-2 with Condition INTRA-FREQ				
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 4.6.1.5-1				
	Table H.3.1-4 with Condition SSB Index and A3-offset = -4.5dB				
	Table H.3.1-5 with Condition INTRA-FREQ				
	Table H.3.1-7 with Condition INTRA-FREQ and SSB Index				
	Table H.3.4-1				
	Table H.3.4-2				

4.6.1.5.5 Test requirement

Tables 4.6.1.5.4.1-3 and 4.6.1.5.5-1 define the primary level settings including test tolerances for EN-DC FR1 event-triggered reporting without gap in non-DRX with SSB time index detection.

Table 4.6.1.5.5-1: NR Cell specific test parameters for EN-DC intra-frequency event triggered reporting without gap for FDD PSCell in FR1 with SSB index reading

Parameter	Unit	Test	Ce	Cell 2 Cell 3		II 3	
		configuration	T1	T2	T1	T2	
TDD configuration		1	N	N/A N/A		/A	
PDSCH RMC		1	SR.1.	SR.1.1 FDD		N/A	
configuration							
RMSI CORESET		1	CR.1.	1 FDD	CR.1.	1 FDD	
RMC							
configuration							
Dedicated		1	CCR.1	.1 FDD	CCR.1	.1 FDD	
CORESET RMC							
configuration							
OCNG Patterns		1		P.1		P.1	
TRS configuration		1		.1 FDD		/A	
Initial BWP		1		VP.0.1		VP.0.1	
configuration			-	ULBWP.0.1		ULBWP.0.1	
Active DL BWP		1	DLBWP.1.1		DLBV	DLBWP.1.1	
configuration							
Active UL BWP		1	ULBWP.1.1 ULBWP.1.1		VP.1.1		
configuration							
RLM-RS		1	SSB SSB		SB		
$N_{oc}^{ m Note 2}$	dBm/SCS	1	-98				
N_{oc} Note 2	dBm/15 KHz	1	-98				
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1	4	-1.46	-Infinity	-1.46	
\hat{E}_s/N_{oc}	dB	1	4	4	-Infinity	4	
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
lo	dBm/9.36 MHz	1	-64.60	-62.25	-64.60	-62.25	
Propagation		1	AWGN				
Condition							

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\rm ac}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 1.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify intra with index}$

where,

 $T_{identify_intra_with_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} + T_{SSB_time_index_intra}\right) ms$

- T_{PSS/SSS_sync_intra} = max (600ms, ceil (5 x K_p) x SMTC period)^{Note 1} x CSSF_{intra} = max (600ms, Ceil(5 x 1) x 20ms) x 1 = 600ms
- $T_{SSB_measurement_period_intra}$ = max (200ms, ceil (5 x K_p) x SMTC period) $^{Note 1}$ x CSSF $_{intra}$ = max (200ms, ceil(5 x 1) x 20ms) x 1 = 200ms

- $T_{SSB_time_index_intra}$ = max (120ms, ceil (3 x K_p) x SMTC period)^{Note 1} x CSSF_{intra} = max (120ms, ceil (3 x 1) x 20ms) x 1 = 120ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms in this test case (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.6.1.6 EN-DC FR1 event-triggered reporting with gap in non-DRX with SSB time index detection

4.6.1.6.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within EN-DC intra-frequency NR cell search requirements in TS 38.133 [6] clause 9.2. This test will partly verify the FDD intra-frequency cell search requirements. UE is required to report SSB time index.

4.6.1.6.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

4.6.1.6.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 4.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.1.6.

4.6.1.6.4 Test description

4.6.1.6.4.1 Initial conditions

Test 4.6.1.6 can be run in one of the configurations defined in Table 4.6.1.6.4.1-1.

Table 4.6.1.6.4.1-1: Supported test configurations for NR FR1 Cell

Configuratio	n	Description
4.6.1.6-1		15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
Note: The	UE	is only required to be tested in one of the supported test configurations.

Configure the test equipment and the DUT according to the parameters in Table 4.6.1.6.4.1-2.

Table 4.6.1.6.4.1-2: Initial conditions for EN-DC event-triggered reporting in FR1

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.4.2 and 4.3.1.		
Channel bandwidth	As specified	As specified by the test configuration selected from Table 4.6.1.6.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram	N/A			

1. Message contents are defined in clause 4.6.1.6.4.3.

- 2. The general test parameter settings are set up according to Table 4.6.1.6.4.1-3.
- 3. Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2. Cell 3 is powered OFF.

Table 4.6.1.6.4.1-2: General test parameters for EN-DC intra-frequency event triggered reporting with gap for PSCell in FR1 with SSB index reading

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1	E-UTRAN Cell 1 and NR Cell 2	
Neighbour cell		1	NR Cell 3	Cell to be identified.
RF Channel Number		1	1: Cell 1 2: Cell 2 and Cell 3	
Measurement gap type		1	Per-UE gaps	
Measurement gap repitition periodicity	ms	1	40	
Measurement gap length	ms	1	6	
Measurement gap offset	ms	1	39	
SSB configuration		1	SSB.1 FR1	
SMTC configuration		1	SMTC.2	
CSI-RS parameters		1	CSI-RS.1.2 FDD	
A3-Offset	dB	1	-4.5	
CP length		1	Normal	
Hysteresis	dB	1	0	
Time To Trigger	S	1	0	
Filter coefficient		1	0	L3 filtering is not used
DRX		1	N/A	OFF
Time offset between PCell and PSCell		1	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
T1	S	1	5	
T2	S	1	5	

4.6.1.6.4.2 Test procedure

Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR cells according to T1 in Table 4.6.1.6.5-1. T1 starts.
- 3. SS shall transmit an RRCConnectionReconfiguration message with event A3 configured.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.1.6.5-1. T2 starts.
- 6. UE shall transmit a MeasurementReport message embedded in E-UTRA RRC message *ULInformationTransferMRDC* triggered by Event A3. If the overall delays measured from the beginning of time

- period T2 is less than 922 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.If either of the reconfiguration in step 7 or step 9 fails, the SS switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.6.1.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.6.1.6.4.3-1: Common Exception messages

	Default Message Contents
Common contents of system information	
blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for Configuration 4.6.1.6-1
	Table H.3.1-4 with Condition SSB Index and A3-offset = -4.5dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-6 with Condition Pattern #0
	Table H.3.1-7 with Condition INTRA-FREQ and SSB Index
	Table H.3.4-1
	Table H.3.4-2

4.6.1.6.5 Test requirement

Tables 4.6.1.6.4.1-3 and 4.6.1.6.5-1 define the primary level settings including test tolerances for EN-DC intrafrequency event triggered reporting with gap for PSCell in FR1 with SSB index reading.

Table 4.6.1.6.5-1: NR Cell specific test parameters for EN-DC intra-frequency event triggered reporting with gap for PSCell in FR1 with SSB index reading

Parameter	Unit	Test	Cell 2 Cell 3		II 3		
		configuration	T1	T2	T1	T2	
TDD configuration		1	N/A N/A		/A		
PDSCH RMC		1	SR.1.	1 FDD	N	N/A	
configuration							
RMSI CORESET		1	CR.1.	1 FDD	CR.1.	1 FDD	
RMC							
configuration							
Dedicated		1	CCR.1	.1 FDD	CCR.1	.1 FDD	
CORESET RMC							
configuration							
OCNG Patterns		1		2.1		P.1	
TRS configuration		1	TRS.1	.1 FDD	N	/A	
Initial BWP		1	DLBWP.0.1 DLBWP.0.:		VP.0.1		
configuration			ULBV	ULBWP.0.1		ULBWP.0.1	
Active DL BWP		1	DLBWP.1.2		DLBV	DLBWP.1.1	
configuration							
Active UL BWP		1	ULBWP.1.1 ULBWP.1.1		VP.1.1		
configuration							
RLM-RS		1	CSI-RS SSB		SB		
$N_{oc}^{ m Note~2}$	dBm/SCS	1	-98				
$N_{_{OC}}^{}$ Note 2	dBm/15 KHz	1	-98				
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	1	4	-1.46	-Infinity	-1.46	
\hat{E}_s/N_{oc}	dB	1	4	4	-Infinity	4	
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
lo	dBm/9.36 MHz	1	-64.60	-62.25	-64.60	-62.25	
Propagation		1	AWGN				
Condition							

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\rm ac}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to Cell 1.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify intra with index}$

where,

 $T_{identify_intra_with_index} = \left(T_{PSS/SSS_sync_ntra} + T_{SSB_measurement_period_intra} + T_{SSB_time_index_intra}\right) \ ms$

 $T_{PSS/SSS_sync_ntra} = max$ (600ms, ceil (5 x K_p) x SMTC period)^{Note 1} x CSSF_{intra} = max (600ms, Ceil(5 x 1) x 20ms) x 1 = 600ms

 $T_{SSB_measurement_period_intra}$ = max (200ms, ceil (5 x K_p) x SMTC period) $^{Note \, 1}$ x CSSF $_{intra}$ = max (200ms, ceil (5 x 1) x 20ms) x 1 = 200ms

 $T_{SSB_time_index_intra} = max (120ms, ceil (3 x K_p) x SMTC period)^{Note 1} x CSSF_{intra} = max (120ms, ceil (3 x 1) x 20ms) x 1 = 120ms$

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms in this test case (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

4.6.2 Inter-frequency measurements

4.6.2.0 Minimum conformance requirements for Inter-frequency measurements

The requirements in Section 9.3 apply, provided:

- The cell being identified or measured is detectable.

An inter-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Sections 10.1.4 and 10.1.5 for FR1 and FR2, respectively, for a corresponding Band,
- SS-RSRQ related side conditions given in Sections 10.1.9 and 10.1.10 for FR1 and FR2, respectively, for a corresponding Band,
- SS-SINR related side conditions given in Sections 10.1.14 and 10.1.15 for FR1 and FR2, respectively, for a corresponding Band,
- SSB_RP and SSB Ês/Iot according to Annex B.2.3 for a corresponding Band.

When measurement gaps are provided, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable inter frequency cell within $T_{identify_inter_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (reportQuantityRsIndexes or maxNrofRSIndexesToReport is not configured). Otherwise UE shall be able to identify a new detectable inter frequency cell within $T_{identify_inter_with_index}$. The UE shall be able to identify a new detectable inter frequency SS block of an already detected cell within $T_{identify_inter_without_index}$.

$$T_{identify_inter_with\ out_index} = (T_{PSS/SSS_sync_inter} + T_{SSB_measurement_period_inter})\ ms$$

$$T_{identify_inter_with\ index} = (T_{PSS/SSS_sync_inter} + T_{SSB_measurement_period_inter} + T_{SSB_time_index_inter})\ ms$$

Where:

T_{PSS/SSS} sync inter: it is the time period used in PSS/SSS detection given in table 9.3.4-1 and table 9.3.4-2.

 $T_{SSB_time_index_inter}$: it is the time period used to acquire the index of the SSB being measured given in table 9.3.4-3 and table 9.3.4-4.

 $T_{SSB_measurement_period_inter}$: equal to a measurement period of SSB based measurement given in table 9.3.5-1 and table 9.3.5-2.

 $CSSF_{inter}$: it is a carrier specific scaling factor and is determined according to $CSSF_{within_gap,i}$ in section 9.1.5.2 for measurement conducted within measurement gaps.

Table 9.3.4-1: Time period for PSS/SSS detection, (Frequency range FR1)

Condition NOTE1,2	T _{PSS/SSS_sync_inter}		
No DRX	$Max(600ms, 8 \times Max(MGRP, SMTC period)) \times CSSF_{inter}$		
DRX cycle ≤ 320ms	$Max(600ms, Ceil(8*1.5) \times Max(MGRP, SMTC period, DRX cycle)) \times CSSF_{inter}$		
DRX cycle > 320ms	8 × DRX cycle × CSSF _{inter}		
NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1 NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.			

Table 9.3.4-3: Time period for time index detection (Frequency range FR1)

Condition NOTE1,2	T _{SSB_time_index_inter}		
No DRX	$Max(120ms, 3 \times Max(MGRP, SMTC period)) \times CSSF_{inter}$		
DRX cycle ≤ 320ms Max(120ms, Ceil(3 × 1.5) × Max(MGRP, SMTC period, DRX cycle)) × CSSF _{inter}			
DRX cycle > 320ms	3 × DRX cycle × CSSF _{inter}		
NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1			
NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for			
the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.			

[TS 38.133-f50, clause 9.3.5]

When measurement gaps are provided for inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting SS-RSRP, SS-RSRQ and SS-SINR measurements to higher layers with measurement accuracy as specified in subclauses 10.1.4, 10.1.5, 10.1.9, 10.1.10, 10.1.14 and 10.1.15, respectively, as shown in table 9.3.5-1 and 9.3.5-2:

Table 9.3.5-1: Measurement period for inter-frequency measurements with gaps (Frequency FR1)

Condition NOTE1,2	T _{SSB_measurement_period_inter}		
No DRX	$Max(200ms, 8 \times Max(MGRP, SMTC period)) \times CSSF_{inter}$		
DRX cycle ≤ 320ms	$Max(200ms, Ceil(8 \times 1.5) \times Max(MGRP, SMTC period, DRX cycle)) \times CSSF_{inter}$		
DRX cycle > 320ms	$8 \times DRX \ cycle \times CSSF_{inter}$		
NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1			
NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for			
the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.			

[TS 38.133, clause 9.3.6.3]

Reported SS-RSRP, SS-RSRQ, and SS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 10.1.4.1, 10.1.5.1, 10.1.9.1, 10.1.10.1, 10.1.14.1 and 10.1.15.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be within $T_{identify_inter_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index. Otherwise UE shall be able to identify a new detectable inter frequency cell within $T_{identify_inter_with_index}$. Both $T_{identify_inter_with_index}$ and $T_{identify_inter_with_index}$ are defined in clause 9.3.4. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify_inter_without_index}$ or $T_{identify_inter_with_index}$ defined in clause 9.3.4 and then triggers the measurement report as per TS 38.331 [2], the event triggered measurement reporting delay shall be less than $T_{SSB_measurement_period_inter}$ defined in clause 9.3.5 provided the timing to that cell has not changed more than \pm 3200 Tc while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clause 9.3.2, 9.3.4, 9.3.5, 9.3.6.3.

4.6.2.1 EN-DC FR1-FR1 event-triggered reporting in non-DRX

4.6.2.1.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within EN-DC inter-frequency NR cell search requirements without SSB time index detection in TS 38.133 [6] clause 9.3.4.

4.6.2.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.2.1.

4.6.2.1.4 Test description

4.6.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.2.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.2.1.4.1-2. Test environment parameters are given in Table 4.6.2.1.4.1-3.

Table 4.6.2.1.4.1-1: EN-DC FR1-FR1 event triggered reporting tests in non-DRX supported test configurations

Test Case ID	Description		
4.6.2.1-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.2.1-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.2.1-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.6.2.1-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.2.1-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.2.1-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note 1: The UE is only required to be tested in one of the supported test configurations			
Note 2: The targ	et NR cell3 has the same SCS, BW and duplex mode as NR serving cell2		

Table 4.6.2.1.4.1-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Unit	Test	Value		Comment
		configurati	Test 1	Test 2	
E-UTRA RF Channel		on Config		1	One E-UTRAN TDD carrier
Number		1,2,3,4,5,6			frequencies is used.
NR RF Channel		Config	1, 2		Two FR1 NR carrier frequencies is
Number		1,2,3,4,5,6		, –	used.
Active cell		Config 1,2,3,4,5,6	LTE Cell 1 (PCell) and NR cell 2 (PScell)		LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config 1,2,3,4,5,6	NR cell 3		NR cell 3 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3,4,5,6	0	4	As specified in TS 38.133 clause 9.1.2-1.
Measurement gap offset		Config 1,2,3,4,5,6	39	19	
SMTC-SSB parameters		Config 1,4	SSB.1 FR1		As specified in clause A.3
		Config 2,5	SSB.1 FR1		As specified in clause A.3.
		Config 3,6	SSB.2 FR1		As specified in clause A.3
A3-Offset	dB	Config 1,2,3,4,5,6	-6		
Hysteresis	dB	Config 1,2,3,4,5,6	0		
CP length		Config 1,2,3,4,5,6	Normal		
TimeToTrigger	S	Config 1,2,3,4,5,6	0		
Filter coefficient		Config 1,2,3,4,5,6	0		L3 filtering is not used
DRX		Config 1,2,3,4,5,6	OFF		DRX is not used
Time offset between PCell and PSCell		Config 1,2,3,4,5,6	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells		Config 1,4	3ms		Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		Config 2,3,5,6	3μs		Synchronous cells.
T1	S	Config 1,2,3,4,5,6	5		
T2	S	Config 1,2,3,4,5,6	1	1	

Table 4.6.2.1.4.1-3: Test Environment test parameters for EN-DC inter-frequency event triggered
reporting without SSB time index detection in non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.
Channel	As specified	by the test configuration selected fr	rom Table 4.6.2.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	For 4Rx cap	able UEs without any 2Rx RF	
connection	bands use A	.3.2.5.2 for DUT Part. and	
diagram	A.3.1.8.4 for	TE Part	

- 1. Message contents are defined in clause 4.6.2.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 are set according to Annex C.1.2 and Annex C.1.3. Cell 3 is switched off during the initial connection setup.

4.6.2.1.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 4.6.2.1.4.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table 4.6.2.1.4.1-2 is provided for UE that support per-FR gap. In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.6.2.1.4.1-2. T1 starts.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- ${\bf 4.\ The\ UE\ shall\ transmit\ RRCConnection} Reconfiguration Complete\ message.$
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.2.1.4.1-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 920 ms for Test 1 and 760 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message. If either of the reconfiguration in step 7 or step 9 fails, SS switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure

parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 4.6.2.1.4.1-2 as appropriate.

4.6.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 4.6.2.1.4.3-1: Common Exception messages for Additional EN-DC FR1-FR1 event triggered reporting tests in non-DRX test requirement

Default Message Contents				
Common contents of system information blocks				
exceptions				
Default RRC messages and information	Table H.3.1-1			
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ			
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,			
	SMTC.2 and Asynchronous cells for configuration 4.6.2.1-1 and			
	4.6.2.1-4			
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,			
	SMTC.1 and Synchronous cells for configuration 4.6.2.1-2 and 4.6.2.1-			
	5			
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1,			
	SMTC.1 and Synchronous cells for configuration 4.6.2.1-3 and 4.6.2.1-			
	6			
	Table H.3.1-4 with A3-offset = -6dB			
	Table H.3.1-5 with Condition INTER-FREQ			
	Table H.3.4-4 with Condition gapUE for Test 1			
	Table H.3.4-4 with Condition gapFR1 for Test 2			
	Table H.3.4-5 with Condition Pattern #0 for Test 1			
	Table H.3.4-5 with Condition Pattern #4 for Test 2			
	Table H.3.1-7 with Condition INTER-FREQ			
	Table H.3.4-1			
	Table H.3.4-2			
	Table H.3.4-3			

4.6.2.1.5 Test requirement

Table 4.6.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.2.1.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Unit	Test	Cell 2		Cell 3			
		configuratio n		2	T1	T2		
NR RF Channel Number		Config 1,2,3,4,5,6	1		2			
Duplex mode		Config 1,4	FDD		DD			
•		Config		TE	DD			
		2,3,5,6						
BW _{channel}	MHz	Config 1,4			_{B,c} = 52			
		Config 2,5		10: N _{RB,c} =				
DIA/D DIA/	N 41 1-	Config 3,6	4	40: N _{RB,c} = 106 10: N _{RB,c} = 52				
BWP BW	MHz	Config 1,4 Config 2,5			$_{B,c} = 52$ $_{B,c} = 52$			
		Config 3,6	40: N _{RB} ,		<u>s,c = 32</u> _ = 106			
TDD configuration		Config 2,5	TDDConf.1.1	TO. TURB	TDDConf	.1.1		
		Config 3,6	TDDConf.2.1		TDDConf			
Initial DL BWP		Config	DLBWP.0.1		NA			
		1,2,3,4,5,6						
Initial UL BWP		Config	ULBWP.0.1		NA			
		1,2,3,4,5,6	DI DI (D. 4.4					
Dedicated DL BWP		Config	DLBWP.1.1		NA			
Dedicated UL BWP		1,2,3,4,5,6 Config	ULBWP.1.1		NA			
Dedicated OL BWP		1,2,3,4,5,6	ULBWP.1.1		INA			
OCNG Patterns defined in		Config	OP.1			OP.1		
A.3.2.1.1 (OP.1)		1,2,3,4,5,6	01.1			01.1		
TRS configuration		Config 1,4	TRS.1.1 FDD		NA			
ű		Config 2,5	TRS.1.1 TDD		NA			
		Config 3,6	TRS.1.2 TDD					
PDSCH Reference					NA	_		
measurement channel		Config 1,4 Config 2,5	SR.1.1 FDD SR.1.1 TDD			_		
		Config 2,5	SR2.1 TDD					
CORESET Reference		Config 1,4	CR.1.1 FDD					
Channel		Config 2,5	CR.1.1 TDD)				
		Config 3,6	CR2.1 TDD					
SMTC configuration defined					-0.0			
in A.3.2.11.1 and A.3.2.11.2		Config 1,4	SMTC.2					
		Config	SMTC.1					
DDCCLI/DDCCLI aubaarriar	kHz	2,3,5,6						
PDSCH/PDCCH subcarrier spacing	KHZ	Config 1,2,4,5	15 30					
Spacing		Config 3,6)			
EPRE ratio of PSS to SSS				Ĭ	-			
EPRE ratio of PBCH DMRS		•						
to SSS EPRE ratio of PBCH to PBCH								
DMRS EPRE ratio of PDCCH DMRS								
to SSS								
EPRE ratio of PDCCH to		Config						
PDCCH DMRS		1,2,3,4,5,6	0			0		
EPRE ratio of PDSCH DMRS to SSS		1,2,0,1,0,0						
EPRE ratio of PDSCH to PDSCH								
EPRE ratio of OCNG DMRS to SSS(Note 1)								
EPRE ratio of OCNG to		1						
OCNG DMRS (Note 1)								
$N_{_{OC}}$ Note2	dBm/15		-98		-	-98		

$N_{oc}^{ m Note2}$	dBm/S CS	Config 1,2,4,5	-98		-98	
		Config 3,6	-9	95		-95
SS-RSRP Note 3	dBm/S CS	Config 1,2,4,5	-94	-94	-Infinity	-91
		Config 3,6	-91	-91	-Infinity	-88
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7
\hat{E}_{s}/N_{oc}	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7
IO ^{Note3}	dBm/9.3 6MHz	Config 1,2,4,5	-64.59	-64.59	-70.05	-62.26
	dBm/38. 16MHz	Config 3,6	-58.49	-58.49	-63.94	-56.15
Propagation Condition		Config 1,2,3,4,5,6	AW	/GN	А	WGN

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 920 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 760 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1 and 2 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.2.2 EN-DC FR1-FR1 event-triggered reporting in DRX

4.6.2.2.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX within EN-DC interfrequency NR cell search requirements without SSB time index detection in TS 38.133 [6] clause 9.3.4.

4.6.2.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.2.2.

4.6.2.2.4 Test description

4.6.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.2.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.2.2.4.1-2. Test environment parameters are given in Table 4.6.2.2.4.1-3.

Table 4.6.2.2.4.1-1: EN-DC FR1-FR1 event triggered reporting tests in DRX supported test configurations

Test Case ID	Description			
4.6.2.2-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
4.6.2.2-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
4.6.2.2-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
4.6.2.2-4	LTE TDD, NR 15 kHz SSB SCS, 40MHz bandwidth, FDD duplex mode			
4.6.2.2-4				
4.6.2.2-6	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
	Note 1: The UE is only required to be tested in one of the supported test configurations Note 2: The target NR cell3 has the same SCS, BW and duplex mode as NR serving cell2			

Table 4.6.2.2.4-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in DRX

Parameter	Unit	Test	Value			Comment	
		configurati	Test	Test	Test	Test	
		on	1	2	3	4	
E-UTRA RF Channel		Config	1			One E-UTRAN TDD carrier	
Number		1,2,3,4,5,6				frequencies is used.	
NR RF Channel		Config	1, 2			Two FR1 NR carrier frequencies is	
Number		1,2,3,4,5,6					used.
Active cell		Config			Cell) and	l NR	LTE Cell 1 is on E-UTRA RF
		1,2,3,4,5,6	cell 2 ((PScell)			channel number 1.
							NR Cell 2 is on NR RF channel
							number 1.
Neighbour cell		Config	NR ce	II 3			NR cell 3 is on NR RF channel
		1,2,3,4,5,6					number 2.
Gap Pattern Id		Config	0		4		As specified in TS 38.133
		1,2,3,4,5,6					clause 9.1.2-1.
Measurement gap		Config	39		19		
offset		1,2,3,4,5,6					
SMTC-SSB parameters		Config 1,4	SSB.1	FR1			As specified in clause A.3
		Config 2,5	SSB.1	FR1			As specified in clause A.3
		Config 3,6	SSB.2 FR1			As specified in clause A.3	
A3-Offset	dB	Config	-6				
		1,2,3,4,5,6					
Hysteresis	dB	Config	0				
		1,2,3,4,5,6	Normal				
CP length		Config	Normal				
		1,2,3,4,5,6					
TimeToTrigger	S	Config	0				
=:1.		1,2,3,4,5,6	1.200		10.50		
Filter coefficient		Config	0				L3 filtering is not used
		1,2,3,4,5,6					
DRX	ms	Config	DRX	DRX	DRX	DRX	As specified in A.5
		1,2,3,4,5,6	.1	.2	.1	.2	
Time offset between		Config	3 µs				Synchronous EN-DC
PCell and PSCell		1,2,3,4,5,6					A section of the sect
Time offset between		Config 1,4	3ms				Asynchronous cells.
serving and neighbour							The timing of Cell 3 is 3ms later
cells		Config					than the timing of Cell 2.
		Config	3µs				Synchronous cells.
		2,3,5,6					
T1	S	Config	5				
' -	3	1,2,3,4,5,6	3				
T2	S	1,2,3,4,5,0 Config	1.1	1.1	1.1	1.1	
12	٦	1,2,3,4,5,6	1.1	1.1	1.1	1.1	
	L	1,2,3,4,3,0				I	

Table 4.6.2.2.4-3: Test Environment parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in DRX

Parameter	Value	Comment

Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.				
Channel bandwidth	As specified by the test configuration selected from Table 4.6.2.1.4.1-1.					
Propagation conditions	AWGN		As specified in Annex C.2.2.			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to connection diagram		able UEs without any 2Rx RF 3.2.5.1 for DUT Part. and r TE Part				

- 1. Message contents are defined in clause 4.6.2.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and are set according to Annex C.1.2 and Annex C.1.3. Cell 3 is switched off during the initial connection setup.

4.6.2.2.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 4.6.2.2.4-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table 4.6.2.2.4-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.6.2.2.4-2. T1 starts.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.2.2.4-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delays measured from the beginning of time period T2 is less than 1080 ms for Test 1, 10240 ms for Test 2, 1080 ms for Test 3 and 10240 ms for Test 4 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message. If either of the reconfiguration in step 7 or step 9 fails, SS

switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 4.6.2.2.4-2 as appropriate.

4.6.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 4.6.2.2.4.3-1: Common Exception messages for Additional EN-DC FR1-FR1 event triggered reporting with SSB test requirement

Default Message Contents				
Common contents of system information blocks				
exceptions				
Default RRC messages and information	Table H.3.1-1			
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ			
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,			
	SMTC.2 and Asynchronous cells for configuration 6.6.2.1-1			
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,			
	SMTC.1 and Synchronous cells for configuration 6.6.2.1-2			
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1,			
	SMTC.1 and Synchronous cells for configuration 6.6.2.1-3			
	Table H.3.1-4 with A3-offset = -6dB			
	Table H.3.1-5 with Condition INTER-FREQ			
	Table H.3.4-4 with Condition gapUE for Test 1 and Test 2			
	Table H.3.4-4 with Condition gapFR1 for Test 3 and Test 4			
	Table H.3.4-5 with Condition Pattern #0 for Test 1 and Test 2			
	Table H.3.4-5 with Condition Pattern #4 for Test 3 and Test 4			
	Table H.3.1-7 with Condition INTER-FREQ			
	Table H.3.7-1 with Condition DRX.1 for Test 1 and Test 3			
	Table H.3.7-1 with Condition DRX.2 for Test 2 and Test 4			
	Table H.3.4-1			
	Table H.3.4-2			
	Table H.3.4-3			

4.6.2.2.5 Test requirement

Table 4.6.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.2.2.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

Parameter	Unit	Test	Cell 2	Cell 3		
		configuratio n	T1 T2	T1 T2		
NR RF Channel Number		Config 1,2,3,4,5,6	1	1 2		
Duplex mode		Config 1,4	FDD			
		Config		TDD		
DVA	N 41 1-	2,3,5,6	10.	N - F2		
BW _{channel}	MHz	Config 1,4 Config 2,5		$N_{RB,c} = 52$ $N_{RB,c} = 52$		
		Config 3,6	40: N	N _{RB,c} = 52 N _{RB,c} = 106		
BWP BW	MHz	Config 1,4	10:	$N_{RB,c} = 52$		
		Config 2,5		N _{RB,c} = 52		
		Config 3,6		I _{RB,c} = 106		
TDD configuration		Config 2,5	TDDConf.1.1	TDDConf.1.1		
		Config 3,6	TDDConf.2.1	TDDConf.2.1		
Initial DL BWP		Config 1,2,3,4,5,6	DLBWP.0.1 NA			
Initial UL BWP		Config 1,2,3,4,5,6	ULBWP.0.1 NA			
Dedicated DL BWP		Config 1,2,3,4,5,6	DLBWP.1.1	NA		
Dedicated UL BWP		Config 1,2,3,4,5,6	ULBWP.1.1	NA		
TRS configuration		Config 1,4	TRS.1.1 FDD	NA		
		Config 2,5	TRS.1.1 TDD	NA		
		Config 3,6	TRS.1.2 TDD	NA		
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2,3,4,5,6	OP.1	OP.1		
PDSCH Reference		Config 1,4	SR.1.1 FDD	-		
measurement channel		Config 2,5	SR.1.1 TDD			
		Config 3,6	SR2.1 TDD			
CORESET Reference		Config 1,4	CR.1.1 FDD	-		
Channel		Config 2,5 Config 3,6	CR.1.1 TDD CR2.1 TDD	_		
SMTC configuration defined						
in A.3.11.1 and A.3.11.2		Config 1,4	SMTC.2			
		Config 2,3,5,6	S	MTC.1		
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2,4,5	15			
EPRE ratio of PSS to SSS		Config 3,6 Config	0	30		
EPRE ratio of PBCH DMRS		1,2,3,4,5,6	Č			
to SSS EPRE ratio of PBCH to PBCH		-				
DMRS						
EPRE ratio of PDCCH DMRS to SSS						
EPRE ratio of PDCCH to PDCCH DMRS						
EPRE ratio of PDSCH DMRS to SSS						
EPRE ratio of PDSCH to PDSCH						
EPRE ratio of OCNG DMRS to SSS(Note 1)						

EPRE ratio of OCNG to OCNG DMRS (Note 1)						
$N_{_{OC}}$ Note2	dBm/15 kHz		-98 -98		-98	
$N_{\scriptscriptstyle OC}$ Note2	dBm/S CS	Config 1,2,4,5	-98 -98		-98	
		Config 3,6	-6	95		-95
SS-RSRP Note 3	dBm/S CS	Config 1,2,4,5	-94	-94	-Infinity	-91
		Config 3,6	-91	-91	-Infinity	-88
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7
\hat{E}_s/N_{oc}	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7
IO ^{Note3}	dBm/9. 36MHz	Config 1,2,4,5	-64.59	-64.59	-70.05	-62.26
	dBm/38 .16MHz	Config 3,6	-58.49	-58.49	-63.94	-56.15
Propagation Condition		Config 1,2,3,4,5,6	AWGN AWGN		WGN	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled
- Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1080 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 10240 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1080 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 10240 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.2.3 Void

4.6.2.4 Void

4.6.2.5 EN-DC FR1-FR1 event-triggered reporting in non-DRX with SSB time index detection

4.6.2.5.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event in non-DRX within EN-DC interfrequency NR cell search requirements with SSB time index detection in TS 38.133 [6] clause 9.3.4.

4.6.2.5.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.2.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.2.3.

4.6.2.5.4 Test description

4.6.2.5.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.2.5.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.2.5.4.1-2. Test environment parameters are given in Table 4.6.2.5.4.1-3.

Table 4.6.2.5.1-1: EN-DC FR1-FR1 event triggered reporting tests in non-DRX with SSB time index detection supported test configurations

Test Case ID	Description		
4.6.2.5 -1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.2.5 -2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.2.5 -3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.6.2.5 -4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.2.5 -5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.2.5 -6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note 1: The UE is only required to be tested in one of the supported test configurations			
Note 2: The target NR cell3 has the same SCS, BW and duplex mode as NR serving cell2			

Table 4.6.2.5-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in non-DRX

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
E-UTRA RF Channel Number		Config 1,2,3,4,5,6	1		One E-UTRAN TDD carrier frequencies is used.
NR RF Channel Number		Config 1,2,3,4,5,6	1, 2		Two FR1 NR carrier frequencies is used.
Active cell		Config 1,2,3,4,5,6	LTE Cell 1 (PCell) and NR cell 2 (PScell)		LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config 1,2,3,4,5,6	NR cell 3		NR cell 3 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3,4,5,6	0	4	As specified in TS 38.133 clause 9.1.2-1.
Measurement gap offset		Config 1,2,3,4,5,6	39	19	
SMTC-SSB parameters		Config 1,4	SSB.1 FR1		As specified in clause A.3
		Config 2,5	SSB.1 FR1		As specified in clause A.3
		Config 3,6	SSB.2 FR1		As specified in clause A.3
A3-Offset	dB	Config 1,2,3,4,5,6	-6		
Hysteresis	dB	Config 1,2,3,4,5,6	0		
CP length		Config 1,2,3,4,5,6	Normal		
TimeToTrigger	s	Config 1,2,3,4,5,6	0		
Filter coefficient		Config 1,2,3,4,5,6	0		L3 filtering is not used
DRX		Config 1,2,3,4,5,6	OFF		DRX is not used
Time offset between PCell and PSCell		Config 1,2,3,4,5,6	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells		Config 1,4	3ms		Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		Config 2,3,5,6	3μs		Synchronous cells.
T1	S	Config 1,2,3,4,5,6	5		
T2	S	Config 1,2,3,4,5,6	1	1	

Diagram

Exceptions to

connection

diagram

With GOD time mack detection in non-biox					
Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.				
Channel	As specified by the test configuration selected from Table 4.6.2.1.4.1-1.				
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.		

Table 4.6.2.5.4-3: Test Environment parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in non-DRX

1. Message contents are defined in clause 4.6.2.5.4.3.

A.3.1.8.4 for TE Part

DUT Part

A.3.2.3.4

bands use A.3.2.5.1 for DUT Part. and

- For 4Rx capable UEs without any 2Rx RF

2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and are set according to Annex C.1.2 and Annex C.1.3. Cell 3 is switched off during the initial connection setup.

4.6.2.5.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCel in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 4.6.2.5.4-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table 4.6.2.5.4-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.6.2.5.4-2. T1 starts.
- 3. The SS shall transmit an RRCConnection Reconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.2.5.4-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delays measured from the beginning of time period T2 is less than 1040 ms for Test 1 and 880 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
 - 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message. If either of the reconfiguration in step 7 or step 9 fails,

switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.)

- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 4.6.2.5.4-2 as appropriate.

4.6.2.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 4.6.2.5.4.3-1: Common Exception messages for Additional EN-DC FR1-FR1 event triggered reporting tests in non-DRX with SSB test requirement

De	fault Message Contents
Common contents of system information blocks	
exceptions	
Default RRC messages and information	Table H.3.1-1
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.2 and Asynchronous cells for configuration 4.6.2.1-1 and
	4.6.2.1-4
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.1 and Synchronous cells for configuration 4.6.2.1-2 and 4.6.2.1-
	5
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1,
	SMTC.1 and Synchronous cells for configuration 4.6.2.1-3 and
	4.6.2.1-6
	Table H.3.1-4 with A3-offset = -6dB and with Condition SSB Index
	Table H.3.1-5 with Condition INTER-FREQ
	Table H.3.4-4 with Condition gapUE for Test 1
	Table H.3.4-4 with Condition gapFR1 for Test 2
	Table H.3.4-5 with Condition Pattern #0 for Test 1
	Table H.3.4-5 with Condition Pattern #4 for Test 2
	Table H.3.1-7 with Conditions INTER-FREQ and SSB Index
	Table H.3.4-1
	Table H.3.4-2
	Table H.3.4-3

4.6.2.5.5 Test requirement

Table 4.6.2.5.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.2.5.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

Parameter	Unit	Test	Cel			Cell 3
		configuratio n	T1	T2	T1	T2
NR RF Channel Number		Config 1,2,3,4,5,6	1 2			2
Duplex mode		Config 1,4		FDD		
·		Config		TDD		
		2,3,5,6				
BW _{channel}	MHz	Config 1,4			$N_{RB,c} = 52$	
		Config 2,5		10:	N _{RB,c} = 52	
DIA/D DIA/	N 41 1-	Config 3,6		40: N	I _{RB,c} = 106	
BWP BW	MHz	Config 1,4 Config 2,5		10:	$N_{RB,c} = 52$ $N_{RB,c} = 52$	
		Config 3,6			$I_{RB,c} = 52$ $I_{RB,c} = 106$	
TDD configuration		Config 2,5	TDDCo			Conf.1.1
		Config 3,6	TDDCo	nf.2.1	TDD	Conf.2.1
Initial DL BWP		Config	DLBW	P.0.1		NA
Initial UL BWP		1,2,3,4,5,6	ULBW	D 0 1		NA
ITIILIAI OL BWP		Config 1,2,3,4,5,6	ULBW	P.U.1		IVA
Dedicated DL BWP		Config	DLBW	P.1.1		NA
D. Franciski BWB		1,2,3,4,5,6		D4.4		N. A
Dedicated UL BWP		Config 1,2,3,4,5,6	ULBWP.1.1 NA		NA	
TRS configuration		Config 1,4	TRS.1.	1 FDD		NA
		Config 2,5	TRS.1.	1 TDD		NA
		Config 3,6	TRS.1.2	2 TDD		NA
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2,3,4,5,6	OP	.1	OP.1	
PDSCH Reference		Config 1,4	SR.1.1	FDD	-	
measurement channel		Config 2,5	SR.1.1	TDD		
		Config 3,6	SR2.1	TDD		
CORESET Reference		Config 1,4	CR.1.1			-
Channel		Config 2,5	CR.1.1			
		Config 3,6	CR2.1	TDD		
SMTC configuration defined in A.3.2.11.1 and A.3.2.11.2		Config 1,4	SMTC.2			
		Config 2,3,5,6		S	MTC.1	
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2,4,5			15	
EDDE votio -f DOC / COO		Config 3,6			30	
EPRE ratio of PSS to SSS		Config 1,2,3,4,5,6	0			0
EPRE ratio of PBCH DMRS to SSS		_,_,_,				
EPRE ratio of PBCH to PBCH DMRS						
EPRE ratio of PDCCH DMRS to SSS						
EPRE ratio of PDCCH to PDCCH DMRS						
EPRE ratio of PDSCH DMRS to SSS						
EPRE ratio of PDSCH to PDSCH						
EPRE ratio of OCNG DMRS to SSS(Note 1)						

EPRE ratio of OCNG to OCNG DMRS (Note 1)							
N_{oc} Note2	dBm/15 kHz		-6	-98 -		-98	
$N_{\scriptscriptstyle OC}$ Note2	dBm/S CS	Config 1,2,4,5	-(98	-98		
		Config 3,6	-(95		-95	
SS-RSRP Note 3	dBm/S CS	Config 1,2,4,5	-94	-94	-Infinity	-91	
		Config 3,6	-91	-91	-Infinity	-88	
$\mathbf{\hat{E}}_{ ext{s}}/\mathbf{I}_{ ext{ot}}$	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7	
\hat{E}_{s}/N_{oc}	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7	
IO ^{Note3}	dBm/9. 36MHz	Config 1,2,4,5	-64.59	-64.59	-70.05	-62.26	
	dBm/38 .16MHz	Config 3,6	-58.49	-58.49	-63.94	-56.15	
Propagation Condition		Config 1,2,3,4,5,6	AW	'GN	A'	WGN	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1040 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 880 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1 and 2 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.2.6 EN-DC FR1-FR1 event-triggered reporting in DRX with SSB time index detection

4.6.2.6.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX within EN-DC interfrequency NR cell search requirements with SSB time index detection in TS 38.133 [6] clause 9.3.4.

4.6.2.6.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.2.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A. 4.6.2.6.

4.6.2.6.4 Test description

4.6.2.6.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.2.6.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.2.6.4.1-2. Test environment parameters are given in Table 4.6.2.6.4.1-3.

Table 4.6.2.6.4.1-1: EN-DC FR1-FR1 event triggered reporting tests in DRX with SSB time index detection supported test configurations

Test Case ID	Description		
4.6.2.6-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.2.6-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.2.6-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.6.2.6-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.2.6-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.2.6-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note 1: The UE is only required to be tested in one of the supported test configurations			
Note 2: The targ	et NR cell3 has the same SCS, BW and duplex mode as NR serving cell2		

Table 4.6.2.6.4-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test		Va	lue		Comment
		configurati	Test	Test	Test	Test	
E LITOA DE Obarral		on	1	2	3	4	One E LITRAN TRR comics
E-UTRA RF Channel Number		Config 1,2,3,4,5,6	1				One E-UTRAN TDD carrier frequencies is used.
NR RF Channel		Config	1, 2				Two FR1 NR carrier frequencies is
Number		1,2,3,4,5,6	1, 2				used.
Active cell		Config		ell 1 (PC	Cell) and	INR	LTE Cell 1 is on E-UTRA RF
		1,2,3,4,5,6	cell 2 ((PScell)			channel number 1.
							NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config	NR ce	II 3			NR cell 3 is on NR RF channel
rveignbour cen		1,2,3,4,5,6	141100	0			number 2.
Gap Pattern Id		Config	0		4		As specified in TS 38.133
		1,2,3,4,5,6					clause 9.1.2-1.
Measurement gap		Config	39		19		
offset		1,2,3,4,5,6	CCD 4	ED4			As an afficient in places A O
SMTC-SSB parameters		Config 1,4	SSB.1	FKI			As specified in clause A.3
		Config 2,5	SSB.1	FR1			As specified in clause A.3
			002.2				The openings in diadee 7 in
		Config 3,6	SSB.2	FR1			As specified in clause A.3
A3-Offset	dB	Config	-6				
		1,2,3,4,5,6					
Hysteresis	dB	Config	0				
		1,2,3,4,5,6					
CP length		Config	Norma	al			
TimeToTrigger	S	1,2,3,4,5,6 Config	0				
Tillie to migger	3	1,2,3,4,5,6	0				
Filter coefficient		Config	0				L3 filtering is not used
		1,2,3,4,5,6					
DRX	ms	Config	DRX	DRX	DRX	DRX	As specified in clause A.5
Time - # + - +		1,2,3,4,5,6	.1	.2	.1	.2	Complete to the DO
Time offset between PCell and PSCell		Config 1,2,3,4,5,6	3 μs				Synchronous EN-DC
Time offset between		Config 1,4	3ms				Asynchronous cells.
serving and neighbour		Joining 1,7	0.710				The timing of Cell 3 is 3ms later
cells							than the timing of Cell 2.
		Config	3µs				Synchronous cells.
		2,3,5,6					
T1	S	Config	5				
· -		1,2,3,4,5,6					
T2	S	Config	1.5	13.5	1.3	13.5	
		1,2,3,4,5,6					

Table 4.6.2.6.4-3: Test Environment parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Value	Comment

Test environment	NC As specified in TS 38.508-1 [14] clause 4.1						
Test frequencies	As specified	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.					
Channel	As specified	by the test configuration selected fr	rom Table 4.6.2.1.4.1-1.				
bandwidth							
Propagation	AWGN		As specified in Annex C.2.2.				
conditions							
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.2.3.4					
Exceptions to		able UEs without any 2Rx RF					
connection	bands use A	.3.2.5.1 for DUT Part. and					
diagram	A.3.1.8.4 fo	r TE Part					

- 1. Message contents are defined in clause 4.6.2.6.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and are set according to Annex C.1.2 and Annex C.1.3. Cell 3 is switched off during the initial connection setup.

4.6.2.6.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 4.6.2.6.4-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table 4.6.2.6.4-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.6.2.6.4-2. T1 starts.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 4.6.2.6.4-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delays measured from the beginning of time period T2 is less than 1280 ms for Test 1, 13440 ms for Test 2, 1280 ms for Test 3 and 13440 ms for Test 4 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. The SS shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message. If either of the reconfiguration in step 7 or step 9 fails, SS

switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 4.6.2.6.4-2 as appropriate.

4.6.2.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 4.6.2.6.4.3-1: Common Exception messages for Additional EN-DC FR1-FR1 event triggered reporting in DRX with SSB test requirement

De	fault Message Contents
Common contents of system information blocks	
exceptions	
Default RRC messages and information	Table H.3.1-1
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.2 and Asynchronous cells for configuration 6.6.2.1-1
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.1 and Synchronous cells for configuration 6.6.2.1-2
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1,
	SMTC.1 and Synchronous cells for configuration 6.6.2.1-3
	Table H.3.1-4 with A3-offset = -6dB and Condition SSB Index
	Table H.3.1-5 with Condition INTER-FREQ
	Table H.3.4-4 with Condition gapUE for Test 1 and Test 2
	Table H.3.4-4 with Condition gapFR1 for Test 3 and Test 4
	Table H.3.4-5 with Condition Pattern #0 for Test 1 and Test 2
	Table H.3.4-5 with Condition Pattern #4 for Test 3 and Test 4
	Table H.3.1-7 with Conditions INTER-FREQ and SSB Index
	Table H.3.7-1 with Condition DRX.1 for Test 1 and Test 3
	Table H.3.7-1 with Condition DRX.2 for Test 2 and Test 4
	Table H.3.4-1
	Table H.3.4-2
	Table H.3.4-3

4.6.2.6.5 Test requirement

Table 4.6.2.5.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.2.6.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

Parameter	Unit	Test	Cell 2		Cell	3
		configuratio n	T1 T2	!	T1	T2
NR RF Channel Number		Config 1,2,3,4,5,6	1		2	
Duplex mode		Config 1,4	FDD			
.,		Config		TDD		
BW _{channel}	NAL I-	2,3,5,6		10: N -	- 50	
BVV _{channel}	MHz	Config 1,4 Config 2,5		10: N _{RB,c} = 10: N _{RB,c} =		
		Config 3,6		$O: N_{RB,c} =$		
BWP BW	MHz	Config 1,4		10: N _{RB,c} =		
		Config 2,5		10: N _{RB,c} =	= 52	
		Config 3,6		0: N _{RB,c} =		
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2,3,4,5,6	OP.1		OP.	1
PDSCH Reference		Config 1,4	SR.1.1 FDD			
measurement channel		Config 2,5	SR.1.1 TDD			
		Config 3,6	SR2.1 TDD			
CORESET Reference		Config 1,4	CR.1.1 FDD		-	
Channel		Config 2,5	CR.1.1 TDD			
		Config 3,6	CR2.1 TDD			
TDD configuration		Config 2,5	•	TDDConf	.1.1	
		Config 3,6	TDDConf.2.1			
Initial DL BWP		Config 1,2,3,4,5,6	DLBWP.0.1			
Initial UL BWP		Config 1,2,3,4,5,6	ULBWP.0.1			
Dedicated DL BWP		Config 1,2,3,4,5,6	DLBWP.1.1			
Dedicated UL BWP		Config 1,2,3,4,5,6	ULBWP.1.1			
TRS configuration		Config 1,4	TRS.1.1 FDD			
		Config 2,5	TRS.1.1 TDD			
		Config 3,6	TRS.1.2 TDD			
SMTC configuration defined in A.3.11.1 and A.3.11.2		Config 1,4	SMTC.2			
		Config 2,3,5,6	SMTC.1			
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2,4,5	15			
EPRE ratio of PSS to SSS		Config 3,6 Config	30			
		1,2,3,4,5,6				
EPRE ratio of PBCH DMRS to SSS						
EPRE ratio of PBCH to PBCH DMRS						
EPRE ratio of PDCCH DMRS to SSS						
EPRE ratio of PDCCH to PDCCH DMRS						
to SSS						
EPRE ratio of PDSCH to PDSCH						

EPRE ratio of OCNG DMRS						
to SSS(Note 1)						
EPRE ratio of OCNG to						
OCNG DMRS (Note 1)						
$oldsymbol{N}_{oc}$ Note2	dBm/15 kHz		_Ç	98	-	·98
$N_{_{oc}}$ Note2	dBm/S CS	Config 1,2,4,5	-9	98	-	.98
		Config 3,6	-6	95	-	.95
SS-RSRP Note 3	dBm/S CS	Config 1,2,4,5	-94	-94	-Infinity	-91
		Config 3,6	-91	-91	-Infinity	-88
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7
\hat{E}_s/N_{oc}	dB	Config 1,2,3,4,5,6	4	4	-Infinity	7
IO ^{Note3}	dBm/9. 36MHz	Config 1,2,4,5	-64.59	-64.59	-70.05	-62.26
	dBm/38 .16MHz	Config 3,6	-58.49	-58.49	-63.94	-56.15
Propagation Condition		Config 1,2,3,4,5,6	AWGN AWGN			

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1280 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 13440 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%. with a confidence level of 95%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1280 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 13440 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

- 4.6.2.7 Void
- 4.6.2.8 Void

4.6.3 L1-RSRP measurement for beam reporting

4.6.3.0 Minimum conformance requirements

4.6.3.0.1 Minimum conformance requirements for SSB-based L1-RSRP measurement for beam reporting

The UE shall be capable of performing L1-RSRP measurements based on the configured SSB resource for L1-RSRP computation, and the UE physical layer shall be capable of reporting L1-RSRP measured over the measurement period of $T_{L1-RSRP\ Measurement\ Period\ SSB}$.

The value of T_{L1-RSRP_Measurement_Period_SSB} is defined in Table 9.5.4.1-1 for FR1,

where

- M=1 if higher layer parameter timeRestrictionForChannelMeasurement is configured, and M=3 otherwise
- N=8.

For FR1,

- P=1/(1 T_{SSB}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the SSB; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB.

Where:

 $T_{SSB} = ssb$ -periodicityServingCell

 $T_{SMTCperiod}$ = the configured SMTC1 period or SMTC2 period if configured

If the high layer in TS 38.331 [13] signalling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

Longer evaluation period would be expected if the combination of SSB, SMTC occasion and measurement gap configurations does not meet pervious conditions.

Editor's Note: FFS what evaluation period would be expected if SSB are in the same OFDM symbols with RLM/BFD/CBD-RS, or other SSB.

Table 9.5.4.1-1: Measurement period $T_{L1\text{-RSRP_Measurement_Period_SSB}}$ for FR1

Configuration T _{L1-RSRP_M}		T _{L1-RSRP_Measurement_Period_SSB} (ms)		
n	on-DRX	$max(T_{Report}, ceil(M*P)*T_{SSB})$		
DRX cycle ≤ 320ms		$max(T_{Report}, ceil(1.5*M*P)*max(T_{DRX},T_{SSB}))$		
DRX c	ycle > 320ms	ceil(M*P)*T _{DRX}		
Note:	Note: T _{SSB} = ssb-periodicityServingCell is the periodicity of the SSB-Index			
configured for L1-RSRP measurement. T _{DRX} is the DRX cycle length.				
	T _{Report} is config	gured periodicity for reporting.		

The UE shall send L1-RSRP reports only for report configurations configured for the active BWP.

The UE shall report the L1-RSRP value as a 7-bit value in the range [-140, -44] dBm with 1dB step size according to clause 10.1.19 for FR1 and 10.1.20 for FR2 if *nrofReportedRS* is configured to one. If *nrofReportedRS* is configured to be larger than one, or if *groupBasedBeamReporting* is enabled, the UE shall use differential L1-RSRP based reporting

as defined in clause 10.1.19 for FR1 and 10.1.20 for FR2. The differential L1-RSRP is quantized to a 4-bit value with 2dB step size. The mapping between the reported L1-RSRP value and the measured quantity is described in 10.1.6.

Reported L1-RSRP measurements contained in periodic L1-RSRP measurement reports shall meet the requirements in clauses 10.1.19 for FR1 and 10.1.20 for FR2, respectively.

The UE shall only send periodic L1-RSRP measurement reports for an active BWP.

The UE shall transmit the periodic L1-RSRP reporting on PUCCH over the air interface according to the periodicity defined in clause 5.2.1.4 in TS 36.300 [24].

The UE is required to be capable of measuring SSB and CSI-RS for L1-RSRP without measurement gaps. The UE is required to perform the SSB and CSI-RS measurements with measurement restrictions as described in the following clauses.

For FR1, when the SSB for L1-RSRP measurement is in the same OFDM symbol as CSI-RS for RLM/BFD/CBD/L1-RSRP measurement.

- If SSB and CSI-RS have same SCS, UE shall be able to measure the SSB for L1-RSRP measurement without any restriction;
- If SSB and CSI-RS have different SCS,
 - If UE supports simultaneousRxDataSSB-DiffNumerology, UE shall be able to measure the SSB for L1-RSRP measurement without any restriction;
 - If UE does not support simultaneousRxDataSSB-DiffNumerology, UE is required to measure one of but not both SSB for L1-RSRP measurement and CSI-RS. Longer measurement period for SSB based L1-RSRP measurement is expected, and no requirements are defined.

The normative reference for this requirement is TS 38.133 [6] clause 9.5.3.1, 9.5.4.1 and 9.5.5.1.

4.6.3.0.2 Minimum conformance requirements for CSI-RS-based L1-RSRP measurement for beam reporting

The UE shall be capable of performing L1-RSRP measurements based on the configured CSI-RS resource for L1-RSRP computation, and the UE physical layer shall be capable of reporting L1-RSRP measured over the measurement period of $T_{L1-RSRP_Measurement_Period_CSI-RS}$.

The value of $T_{L1\text{-RSRP_Measurement_Period_CSI-RS}}$ is defined in Table 9.5.4.2-1 for FR1, where

- For periodic and semi-persistent CSI-RS resources, M=1 if higher layer parameter *timeRestrictionForChannelMeasurement* is configured, and M=3 otherwise
- For aperiodic CSI-RS resources M=1
- For periodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply if *qcl-InfoPeriodicCSI-RS* is configured for all the resources in the resource set and for each resource one RS has QCL-TypeD with
 - SSB for L1-RSRP measurement, or
 - another CSI-RS in resource set configured with repetition ON.
- For periodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / N_{res_per_set}), where N_{res_per_set} is number of resources in the resource set. The requirements apply provided *qcl-InfoPeriodicCSI-RS* is configured for all resources in the resource set.
- For semi-persistent CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set and for each resource one RS has QCL-TypeD with
 - SSB for L1-RSRP measurement, or
 - another CSI-RS in resource set configured with repetition ON.

- For semi-persistent CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / N_{res_per_set}), where N_{res_per_set} is number of resources in the resource set. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set.
- For aperiodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided *qcl-info* is configured for all resources in the resource set and for each resource one RS has QCL-TypeD with
 - SSB for L1-RSRP measurement, or
 - another CSI-RS in resource set configured with repetition ON.
- For aperiodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to ON, N=1. UE is not required to meet the accuracy requirements in clause 10.1.19.2 and 10.1.20.2 if number of resources in the resource set is smaller than *maxNumberRxBeam*. The requirements apply provided *qcl-info* is configured for all resources in the resource set.

For FR1,

- $P=1/(1-T_{CSI-RS}/MGRP)$, when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

Where:

 $T_{SMTCperiod}$ = the configured SMTC1 period or SMTC2 period if configured.

 T_{CSI-RS} = the periodicity of CSI-RS configured for L1-RSRP measurement

If the high layer in TS 38.331 [2] signaling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

Note: The overlap between CSI-RS for L1-RSRP measurement and SMTC means that CSI-RS for L1-RSRP measurement is within the SMTC window duration.

Longer evaluation period would be expected if the combination of CSI-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

Editor's Note: FFS what evaluation period would be expected if CSI-RS are in the same OFDM symbols with RLM/BFD/CBD-RS, or other CSI-RS.

Table 9.5.4.2-1: Measurement period TL1-RSRP_Measurement_Period_CSI-RS for FR1

Conf	Configuration T _{L1-RSRP_Measurement_Period_CSI-RS} (ms)		
non-DRX $\max(T_{Report}, ceil(M*P)*T_{CSI-RS})$		$max(T_{Report}, ceil(M*P)*T_{CSI-RS})$	
DRX cy	cle ≤ 320ms	$max(T_{Report}, ceil(1.5*M*P)*max(T_{DRX},T_{CSI-RS}))$	
DRX cy	cle > 320ms	ceil(M*P)*T _{DRX}	
Note 1:	T _{CSI-RS} is the periodicity of CSI-RS configured for L1-RSRP		
	measurement. T_{DRX} is the DRX cycle length. T_{Report} is configured		
	periodicity for reporting.		
Note 2:	the requirements are applicable provided that the CSI-RS resource		
	configured for	r L1-RSRP measurement is transmitted with Density = 3.	

The UE shall send L1-RSRP reports only for report configurations configured for the active BWP.

The UE shall report the L1-RSRP value as a 7-bit value in the range [-140, -44] dBm with 1dB step size according to clause 10.1.19 for FR1 and 10.1.20 for FR2 if *nrofReportedRS* is configured to one. If *nrofReportedRS* is configured to be larger than one, or if *groupBasedBeamReporting* is enabled, the UE shall use differential L1-RSRP based reporting as defined in clause 10.1.19 for FR1 and 10.1.20 for FR2. The differential L1-RSRP is quantized to a 4-bit value with 2dB step size. The mapping between the reported L1-RSRP value and the measured quantity is described in 10.1.6.

Reported L1-RSRP measurements contained in aperiodic triggered, aperiodic triggered periodic and aperiodic triggered semi-persistent L1-RSRP reports shall meet the requirements in clauses 10.1.19 for FR1 and 10.1.20 for FR2, respectively.

The UE shall only send aperiodic L1-RSRP measurement reports, if a DCI trigger has been received.

After the UE receives CSI request in DCI, the UE shall transmit the aperiodic L1-RSRP reporting on PUSCH over the air interface at the time specified according to clause 6.2.1.2 in TS 36.300 [24].

For both FR1 and FR2, when the CSI-RS for L1-RSRP measurement is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for L1-RSRP measurement in the PRBs that overlap with an SSB.

For FR1, when the SSB for RLM/BFD/CBD/L1-RSRP measurement is within the active BWP and has same SCS than CSI-RS for L1-RSRP measurement, the UE shall be able to perform CSI-RS measurement without restrictions.

For FR1, when the SSB for RLM/BFD/CBD/L1-RSRP measurement is within the active BWP and has different SCS than CSI-RS for L1-RSRP measurement, the UE shall be able to perform CSI-RS measurement with restrictions according to its capabilities:

- If the UE supports <code>simultaneousRxDataSSB-DiffNumerology</code> the UE shall be able to perform CSI-RS measurement without restrictions.
- If the UE does not support *simultaneousRxDataSSB-DiffNumerology*, UE is required to measure one of but not both CSI-RS for L1-RSRP measurement and SSB. Longer measurement period for CSI-RS based L1-RSRP measurement is expected, and no requirements are defined.

For FR1, when the CSI-RS for L1-RSRP measurement is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement, UE shall be able to measure the CSI-RS for L1-RSRP measurement without any restriction.

The normative reference for this requirement is TS 38.133 [6] clauses 9.5.3.1, 9.5.4.2 and 9.5.5.2.

4.6.3.1 EN-DC FR1 SSB-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.

4.6.3.1.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

4.6.3.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.3.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.3.1.

4.6.3.1.4 Test description

4.6.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.3.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.3.1.4.1-2. Test environment parameters are given in Table 4.6.3.1.4.1-3.

Table 4.6.3.1.4.1-1: EN-DC SSB based L1-RSRP measurement supported test configurations

Test Case ID	Description
4.6.3.1-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
4.6.3.1-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
4.6.3.1-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
4.6.3.1-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
4.6.3.1-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
4.6.3.1-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
Note: The UE is	only required to be tested in one of the supported test configurations

Table 4.6.3.1.4.1-2: General test parameters for EN-DC SSB based L1-RSRP measurement

Parameter	Config	Unit	Value
SSB GSCN	1~6		freq1
	1,4		FDD
Duplex mode	2,5	•	TDD
·	3,6		TDD
	1,4		N/A
TDD Configuration	2,5		TDDConf.1.1
	3,6		TDDConf.2.1
	1,4		10: N _{RB,c} = 52
BW _{channel}	2,5	MHz	10: N _{RB,c} = 52
	3,6		40: N _{RB,c} = 106
PDSCH Reference measurement	1,4		SR.1.1 FDD
channel	2,5		SR.1.1 TDD
Charlie	3,6		SR.2.1 TDD
RMSI CORESET Reference	1,4		CR.1.1 FDD
Channel	2,5		CR.1.1 TDD
Chamer	3,6		CR.2.1 TDD
Dedicated CORESET Reference	1,4		CCR.1.1 FDD
Channel	2,5		CCR.1.1 TDD
Chamer	3,6		CCR.2.1 TDD
	1,4		SSB.3 FR1
SSB configuration	2,5		SSB.3 FR1
_	3,6		SSB.4 FR1
OCNG Patterns	1~6		OP.1
Initial DIMP Configuration	1~6		DLBWP.0.1
Initial BWP Configuration	1~0		ULBWP.0.1
Dedicated BWP configuration	1~6		DLBWP.1.1 ULBWP.1.1
SMTC configuration	1~6		SMTC.1
DRX configuration	1~6		Off
reportConfigType	1~6		periodic
reportQuantity	1~6		ssb-Index-RSRP
Number of reported RS	1~6		2
L1-RSRP reporting period	1~6	slot	80
T1	1~6	S	5
T2	1~6	S	1
EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS to SSS	+		
EPRE ratio of PBCH to PBCH DMRS			
EPRE ratio of PDCCH DMRS to SSS	1		
EPRE ratio of PDCCH to PDCCH	1		
DMRS	1~6	dB	0
EPRE ratio of PDSCH DMRS to SSS	1 -0	ub.	5
EPRE ratio of PDSCH to PDSCH DMRS			
EPRE ratio of OCNG DMRS to SSSNote 1	1		
EPRE ratio of OCNG to OCNG DMRS Note 1	-		
	1.0		AVACAL
Propagation condition	1~6		AWGN

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.	
Channel	As specified	by the test configuration selected fr	om Table 4.6.3.1.4.1-1.	
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2.	
conditions				
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to	For 4Rx capable UEs without any 2 Rx RF			
connection	bands use A	3.2.5.2 for DUT part and		
diagram	A.3.1.8.4 for	A.3.1.8.4 for TE Part		

Table 4.6.3.1.4.1-3: Test Environment parameters for EN-DC SSB based L1-RSRP measurement

- 1. Message contents are defined in clause 4.6.3.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is NR FR1 cell (PSCell). Cell 2 is the target for SSB based L1-RSRP measurements. UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

4.6.3.1.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 4.6.3.1.4.1-2. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity ENDC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On*, according to TS 38.508-1 [14] clause 4.5.

- 2. Set the parameters according to T1 in Table 4.6.3.1.5-1. T1 starts.
- 5. The UE shall be transmitting CSI on PUCCH with a periodicity of 80 slots.
- 6. When T1 expires, the SS shall set the parameters according to T2 in 4.6.3.1.5-1. T2 starts.
- 7. The UE shall start sending L1-RSRP report including results of both SSB0 and SSB1 every 80 slots, no later than 640ms plus 80 slots. If the UE is sending L1-RSRP reports every 80 slots no later than 720 ms for configuration 1, 2, 4 and 5 and no later than 680 ms for configuration 3 and 6 from the beginning of time period T2 until the end of time period T2, the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.
- 8. The SS waits until T2 expires.
- 9. The SS shall transmit *RRCConnectionReconfiguration* message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 10. The SS then shall transmit *RRCConnectionReconfiguration* message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 11. If any the reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release On and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 12. Repeat steps 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.6.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 4.6.3.1.4.3-1: Common Exception messages EN-DC SSB based L1-RSRP measurement

Default Message Contents			
Common contents of system information blocks			
exceptions			
Default RRC messages and information Table H.3.6-1			
elements contents exceptions	Table H.3.6-2 with conditions PERIODIC and SS-RSRP		
	Table H.3.6-3 with conditions SSB and PERIODIC		
	Table H.3.6-4		
	Table H.3.4-1		

Table 4.6.3.1.4.3-2: RadioLinkMonitoringConfig

Derivation Path: TS 38.508-1 [14], Table 4.6.3-133			
Information Element	Value/remark	Comment	Condition
RadioLinkMonitoringConfig ::= SEQUENCE {			
failureDetectionResourcesToAddModList	1 entry		
SEQUENCE			
(SIZE(1maxNrofFailureDetectionResources)) OF			
SEQUENCE {			
purpose	both	UE is configured	
		to perform RLM	
		and BFD based	
		on the SSBs.	
detectionResource CHOICE {			
ssb-Index	0		
}			
}			
}			

4.6.3.1.5 Test requirement

Table 4.6.3.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.3.1.5-1: SSB specific test parameters for EN-DC SSB based L1-RSRP measurement

Parameter	Config	Unit	SS	B#0	SS	B#1
Parameter	Config	Unit	T1	T2	T1	T2
$N_{\it oc}$ Note2	1~6	dBm/15kHz		-94.6	5+TT	
$N_{\it oc}^{}$ Note2	1,2,4,5	dBm/SSB SCS		-94.6	5+TT	
T oc	3,6	dbiii/33b 3c3		-91.6	5+TT	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	1~6	dB	0+TT	0+TT	-Infinity	3+TT
CCR DCDD Note3	1,2,4,5	dBm/SSB SCS	- 94.65+ TT	- 94.65+ TT	-Infinity	- 91.65+T T
SSB RSRP Note3	3,6		- 91.65+ TT	- 91.65+ TT	-Infinity	- 88.65+T T
Io Note3	1,2,4,5	dBm/9.36 MHz	- 63.69+ TT	- 63.69+ TT	- 66.70+ TT	- 61.93+T T
	3,6	dBm/38.16 MHz	- 57.59+ TT	- 57.59+ TT	- 60.61+ TT	- 55.84+T T
\hat{E}_s/N_{oc}	1~6	dB	0+TT	0+TT	-Infinity	3+TT

The UE shall send L1-RSRP report every 80 slots. After 480 ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including the results for both SSB#0 and SSB#1 while meeting the accuracy requirements defined in TS 38.133 [6] clause 10.1.19.1.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.3.2 EN-DC FR1 SSB-based L1-RSRP measurement in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Message content is TBD
- Test procedure is TBD
- Initial conditions contain FFS (RAN4 pending)

4.6.3.2.1 Test purpose

To verify that the UE makes correct reporting of SSB-based L1-RSRP measurement in DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

4.6.3.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.3.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.3.2.

4.6.3.2.4 Test description

4.6.3.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.3.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.3.2.4.1-2. Test environment parameters are given in Table 4.6.3.2.4.1-3.

Table 4.6.3.2.4.1-1: EN-DC SSB based L1-RSRP measurement in DRX supported test configurations

	Config	Description
	1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
	2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
	3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
	4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
	5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
	6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
Note:	The UE is only re	guired to be tested in one of the supported test configurations

Table 4.6.3.2.4.1-2: General test parameters for EN-DC SSB based L1-RSRP measurement in DRX

Parameter	Config	Unit	Value
SSB GSCN	1~6		freq1
	1,4		FDD
Duplex mode	2,5		TDD
•	3.6		TDD

	1.4		N/A
TDD Configuration	1,4 2,5		TDDConf.1.1
TDD Comiguration	3,6		TDDConf.2.1
	1,4		10: N _{RB,c} = 52
BW _{channel}	2,5	MHz	10: N _{RB,c} = 52
	3,6		40: N _{RB,c} = 106
PDSCH Reference measurement	1,4		SR.1.1 FDD
channel	2,5		SR.1.1 TDD
oneo	3,6		SR.2.1 TDD
RMSI CORESET Reference	1,4		CR.1.1 FDD
Channel	2,5		CR.1.1 TDD
	3,6		CR.2.1 TDD
Dedicated CORESET Reference	1,4		CCR.1.1 FDD
Channel	2,5		CCR.1.1 TDD
	3,6		CCR.2.1 TDD
000 " "	1,4		SSB.3 FR1
SSB configuration	2,5		SSB.3 FR1
CONO Della con	3,6		SSB.4 FR1
OCNG Patterns	1~6		OP.1
Initial BWP Configuration	1~6		DLBWP.0.1
	-		ULBWP.0.1
Dedicated BWP configuration	1~6		DLBWP.1.1
	1.0		ULBWP.1.1
SMTC configuration	1~6		SMTC.1
TDC Configuration	1,4		TRS.1.1 FDD
TRS Configuration	2,5		TRS.1.1 TDD
DDV configuration	3,6 1~6		TRS.1.2 TDD DRX.3
DRX configuration reportConfigType	1~6		periodic
	1~6		ssb-Index-RSRP
reportQuantity Number of reported RS	1~6		2
L1-RSRP reporting period	1~6	slot	80
T1	1~6	S	5
T2	1~6	S	1
EPRE ratio of PSS to SSS	1 0	3	<u> </u>
EPRE ratio of PBCH DMRS to SSS	1		
EPRE ratio of PBCH to PBCH	+		
DMRS			
EPRE ratio of PDCCH DMRS to	+		
SSS			
EPRE ratio of PDCCH to PDCCH	†		
DMRS			
EPRE ratio of PDSCH DMRS to	1~6	dB	0
SSS			
EPRE ratio of PDSCH to PDSCH			
DMRS	-		
EPRE ratio of OCNG DMRS to SSSNote 1			
	-		
EPRE ratio of OCNG to OCNG DMRS Note 1			
Propagation condition	1~6		AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 4.6.3.2.4.1-3: Test Environment parameters for EN-DC SSB based L1-RSRP measurement in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.
Channel	As specified	by the test configuration selected fr	om Table 4.6.3.2.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	For 4Rx cap	able UEs without any 2 Rx RF	
connection	bands use A.3.2.5.2 for DUT part and		
diagram	A.3.1.8.4 for	TE Part	

- 1. Message contents are defined in clause 4.6.3.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is NR FR1 cell (PSCell). Cell 2 is the target for SSB based L1-RSRP measurements. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

4.6.3.2.4.2 Test procedure

TBD

4.6.3.2.4.3 Message contents

TBD

4.6.3.2.5 Test requirement

Table 4.6.3.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.3.2.5-1: SSB specific test parameters for EN-DC SSB based L1-RSRP measurement in DRX

Parameter	Config	Unit	SS	B#0	SS	B#1
Parameter	Config	Offit	T1	T2	T1	T2
$N_{_{OC}}^{}$ Note2	1~6	dBm/15kHz		-94.6	5+TT	
$N_{oc}^{$	1,2,4,5	dBm/SSB SCS		-94.6	5+TT	
1 v oc	3,6	UDIII/33B 3C3		-91.6	5+TT	
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	1~6	dB	0+TT	0+TT	-Infinity	3+TT
CCD DCDD Note3	1,2,4,5	dBm/SSB SCS	- 94.65+ TT	- 94.65+ TT	-Infinity	- 91.65+T T
SSB RSRP Note3	3,6		- 91.65+ TT	- 91.65+ TT	-Infinity	- 88.65+T T
Io Note3	1,2,4,5	dBm/9.36 MHz	- 63.69+ TT	- 63.69+ TT	-66.70	- 61.93+T T
	3,6	dBm/38.16 MHz	- 57.59+ TT	- 57.59+ TT	-60.61	- 55.84+T T

Ê	\hat{z}_s/N_{oc}		1~6 dB 0+TT 0+TT -Infinity 3+TT						
No	Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period					ne period			
		T2.							
No	ote 2:	2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for							
		N_{oc}	to be fulfilled.						
No	ote 3:			nave been derived from ot rameters themselves.	her parame	eters for inf	ormation p	ırposes.	

The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the accuracy requirements as defined in Section 10.1.19.1. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.3.3 EN-DC FR1 CSI-RS-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD

4.6.3.3.1 Test purpose

To verify that the UE makes correct reporting of CSI-RS-based L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.2.

4.6.3.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.3.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.3.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.3.3.

4.6.3.3.4 Test description

4.6.3.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.3.3.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.3.3.4.1-2. Test environment parameters are given in Table 4.6.3.3.4.1-3.

Table 4.6.3.3.4.1-1: EN-DC CSI-RS based L1-RSRP measurement supported test configurations

Test Case ID	Description		
4.6.3.3-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.3.3-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.3.3-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
4.6.3.3-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
4.6.3.3-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode		
4.6.3.3-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode		
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations		

Table 4.6.3.3.4.1-2: General test parameters for EN-DC CSI-RS based L1-RSRP measurement

	Parameter	Config	Unit	Value
Duplex mode	SSB GSCN	1~6		
TDD Configuration]	FDD
TDD Configuration	Duplex mode]	
TDD Configuration		3,6		
BW_{channel}				
BW _{channel}	TDD Configuration	2,5		
BW_channel		3,6	1	TDDConf.2.1
PDSCH Reference measurement channel		1,4		10: N _{RB,c} = 52
PDSCH Reference measurement channel	BW _{channel}	2,5	MHz	10: N _{RB,c} = 52
Content Cont		3,6		40: N _{RB,c} = 106
Content Cont	DD0011D (1.4		SR.1.1 FDD
SR.2.1 TDD			1	
1,4 CR.1.1 FDD CR.1.1 TDD CR.1.1 TDD CR.1.1 TDD CR.2.1 TDD	channel		1	
RMSI CORESET Reference Channel				
Dedicated CORESET Reference Channel	RMSI CORESET Reference Channel		1	
Dedicated CORESET Reference Channel	TAMOI CONECET Reference Chamiles		1	
Commons				
SSB configuration	Dedicated CORESET Reference		1	
1,4 SSB.3 FR1	Channel		-	
SSB configuration				
3,6	000			
1,4 CSI-RS 1.3 FDD	SSB configuration			
CSI-RS configuration				
3,6]	CSI-RS 1.3 FDD
1-6	CSI-RS configuration	2,5		CSI-RS 1.3 TDD
1,4		3,6		CSI-RS 2.3 TDD
1,4	OCNG Patterns	1~6		OP.1
TRS Configuration		1.4		
3,6	TRS Configuration			
Initial BWP Configuration	Trib Cormiguration			
Dedicated BWP configuration Dedicated BWP configuration T=6 DLBWP.1.1 ULBWP.1.1 SMTC configuration DRX configuration 1=6 SMTC.1 DRX configuration 1=6 Off reportConfigType 1=6 reportQuantity 1=6 Cri-RSRP Number of reported RS 1=6 Qcl-Info T=6 SSB#0 for resource SSB#1 for resour		0,0		
SMTC configuration 1~6 SMTC.1 DRX configuration 1~6 Off reportConfigType 1~6 aperiodic reportQuantity 1~6 Cri-RSRP Number of reported RS 1~6 2 qcl-Info 1~6 SIots 26 T1 1~6 Slots 26 T1 1~6 SIOTS 2 EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of OCNG DMRS to SSS	Initial BWP Configuration	1~6		ULBWP.0.1
SMTC configuration DRX configuration DRX configuration 1-6 Off reportConfigType 1-6 aperiodic reportQuantity 1-6 Cri-RSRP Number of reported RS 1-6 Qcl-Info reportSlotOffsetList 1-6 SSB#0 for resource SSB#1 for resource SSB#0 for resource SSB#1 fo	Dedicated BWP configuration	1~6		
DRX configuration reportConfigType reportQuantity 1-6 reportSloft reported RS qcl-Info reportSlotOffsetList 1-6	SMTC configuration	1~6		
reportConfigType reportQuantity 1-6 reportQuantity 1-6 reportQuantity 1-6 reportQuantity 1-6 reportConfigType qcl-Info qcl-Info 1-6 qcl-Info qcl-Info qcl-Info 1-6 qcl-Info qcl-Inf				
reportQuantity Number of reported RS qcl-Info qcl-Info 1~6 qcl-Info 1~6 qcl-Info 1~6 qcl-Info 1~6 SSB#0 for resource SSB#1 for resource				
Number of reported RS				
reportSlotOffsetList reportSlotOffsetList 1-6 slots 26 T1 1-6 s EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSSNote 1 EPRE ratio of OCNG DMRS to SSNote 1				
reportSlotOffsetList reportSlotOffsetList 1-6 slots 26 T1 1-6 s EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of OCNG DMRS to SSS	Number of reported R5	1~6		
reportSlotOffsetList 1~6 slots 26 T1 1~6 s 5 EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of OCNG DMRS to SSS	gcl-Info	1~6		
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of OCNG DMRS to SSS		1.0		
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS	•		slots	
EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS Note 1		1~6	S	5
EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS Note 1				
EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DDSCH DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1	EPRE ratio of PBCH DMRS to SSS			
EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1	EPRE ratio of PBCH to PBCH DMRS			
DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1	EPRE ratio of PDCCH DMRS to SSS			
EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1	EPRE ratio of PDCCH to PDCCH	1		
EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1	DMRS			
EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1		1~6	dB	0
DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1		1		
EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1				
EPRE ratio of OCNG to OCNG DMRS Note 1	EPRE ratio of OCNG DMRS to	1		
Note 1	SSS ^{Note 1}]		
Propagation condition 1~6 AWGN				
	Propagation condition	1~6		AWGN
Note 1: OCNG shall be used such that both cells are fully allocated and a constant		-		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 4.6.3.3.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to connection diagram			

Table 4.6.3.3.4.1-3: Test Environment parameters for EN-DC CSI-RS L1-RSRP measurement

- 1. Message contents are defined in clause 4.6.3.3.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is NR FR1 cell (PSCell). Cell 2 is the target for CSI-RS based L1-RSRP measurements. Before the test, UE is configured to perform RLM and BFD measurement based on the SSBs.

4.6.3.3.4.2 Test procedure

The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-RSRP on aperiodic CSI-RS resources. Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. UE is also configured to measure L1-RSRP based on SSB. Upon receiving the DCI trigger, UE provides the report back based on the reporting configuration as defined in table 4.6.3.3.4.1-2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On*, according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.6.3.3.5-1. T1 starts.
- 3. After 80ms from the start of the test the SS transmits the DCI trigger in slot 1 for configuration 1,2,4,5 and slot 8 for configuration 3,6. The corresponding CSI-RS set is transmitted with the offset of 24 slots after the DCI trigger.
- 4. The UE shall send L1-RSRP report at slot 26 from the reception of DCI trigger. The report shall contain L1-RSRP of both resource#0 and resource#1.
- 5. If after T1 expiry no report is received or received report did not contain L1-RSRP of both resource#0 and resource#1 or UE sent the L1-RSRP report at different slot than 26 from the reception of DCI trigger, the number of 'failed' iterations is increased by one, otherwise, the number of 'passed' iterations is increased by one.
- 6. The SS shall transmit *RRCConnectionReconfiguration* message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 7. The SS then shall transmit *RRCConnectionReconfiguration* message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 8. If any the reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release On and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 9. Repeat steps 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

4.6.3.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 4.6.3.3.4.3-1: Common Exception messages EN-DC SSB based L1-RSRP measurement

De	Default Message Contents					
Common contents of system information blocks exceptions	TBD					
Default RRC messages and information	Table H.3.6-1					
elements contents exceptions	Table H.3.6-2 with conditions APERIODIC and CSI-RSRP					
	Table H.3.6-3 with conditions CSI-RS and APERIODIC					
	Table H.3.6-5					
	Table H.3.6-6					
	Table H.3.6-7					
	Table H.3.6-8					
	Table H.3.6-9					
	Table H.3.4-1					

Table 4.6.3.3.4.3-2: RadioLinkMonitoringConfig

Derivation Path: TS 38.508-1 [14], Table 4.6.3-133			
Information Element	Value/remark	Comment	Condition
RadioLinkMonitoringConfig ::= SEQUENCE {			
failureDetectionResourcesToAddModList SEQUENCE (SIZE(1maxNrofFailureDetectionResources)) OF	1 entry		
SEQUENCE {			
purpose	both	UE is configured to perform RLM and BFD based on the SSBs.	
}			
}			

4.6.3.3.5 Test requirement

Table 4.6.3.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.3.3.5-1: CSI-RS specific test parameters for EN-DC CSI-RS L1-RSRP measurement

1~6 1,2,4,5	dBm/15kHz		5+TT	
	dDm/CCD CCC	-94 6		
2.6		J-7.0	5+TT	
3,0	dBm/SSB SCS	-91.65+TT		
1~6	dB	0+TT	3+TT	
1,2,4,5	dDm/CCD CCC	-94.65+TT	-91.65+TT	
3,6	UBIII/33B 3C3	-91.65+TT	-88.65+TT	
1,2,4,5	dBm/9.36 MHz	-63.69+TT	-61.93+TT	
3,6	dBm/38.16 MHz	-57.59+TT	-55.84+TT	
1~6	dB	0+TT	3+TT	
	1,2,4,5 3,6 1,2,4,5 3,6	1~6 dB 1,2,4,5 3,6 dBm/SSB SCS 1,2,4,5 dBm/9.36 MHz 3,6 dBm/38.16 MHz	1~6 dB 0+TT 1,2,4,5 dBm/SSB SCS -94.65+TT 3,6 -91.65+TT -91.65+TT 1,2,4,5 dBm/9.36 MHz -63.69+TT 3,6 dBm/38.16 MHz -57.59+TT	

Note 1:

Interference from other cells and noise sources not specified in the test is assumed to be Note 2: constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\it oc}$ to be fulfilled.

CSI-RS RSRP and lo levels have been derived from other parameters for information Note 3: purposes. They are not settable parameters themselves.

After 80ms from the beginning of the test, the UE shall send L1-RSRP report at slot [TBD] from the beginning of T2. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in 10.1.20.1.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.6.3.4 EN-DC FR1 CSI-RS-based L1-RSRP measurement in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD
- Message content is TBD
- Test procedure is TBD
- Initial conditions contain FFS (RAN4 pending)

4.6.3.4.1 Test purpose

To verify that the UE makes correct reporting of CSI-RS-based L1-RSRP measurement in DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.2.

4.6.3.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

4.6.3.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.3.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.6.3.4.

4.6.3.4.4 Test description

4.6.3.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.6.3.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 4.6.3.2.4.1-2. Test environment parameters are given in Table 4.6.3.2.4.1-3.

Table 4.6.3.4.4.1-1: EN-DC CSI-RS based L1-RSRP measurement in DRX supported test configurations

Config	Description
1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
Note: The UE is only re	equired to be tested in one of the supported test configurations

Table 4.6.3.4.4.1-2: General test parameters for EN-DC CSI-RS based L1-RSRP measurement in DRX

Parameter	Config	Unit	Value
SSB GSCN	1~6		freq1
	1,4		FDD
Duplex mode	2,5		TDD
	3,6		TDD
TDD Configuration	1,4	-	N/A
	2,5		TDDConf.1.1

		1	
	3,6		TDDConf.2.1
	1,4		10: N _{RB,c} = 52
BW _{channel}	2,5	MHz	10: N _{RB,c} = 52
	3,6		40: N _{RB,c} = 106
DDCCII Deference maccurement	1,4		SR.1.1 FDD
PDSCH Reference measurement	2,5		SR.1.1 TDD
channel	3,6		SR.2.1 TDD
	1,4		CR.1.1 FDD
RMSI CORESET Reference Channel	2,5		CR.1.1 TDD
	3,6		CR.2.1 TDD
	1,4		CCR.1.1 FDD
Dedicated CORESET Reference	2,5		CCR.1.1 TDD
Channel	3,6		CCR.2.1 TDD
	1,4		SSB.3 FR1
SSB configuration	2,5		SSB.3 FR1
COD configuration	3,6		SSB.4 FR1
	1,4		CSI-RS 1.3 FDD
CCL DC configuration	2,5		CSI-RS 1.3 TDD
CSI-RS configuration			
OCNC Pottorno	3,6		CSI-RS 2.3 TDD
OCNG Patterns	1~6		OP.1
c	1,4		TRS.1.1 FDD
TRS Configuration	2,5		TRS.1.1 TDD
	3,6		TRS.1.2 TDD
Initial BWP Configuration	1~6		DLBWP.0.1
garanea			ULBWP.0.1
Dedicated BWP configuration	1~6		DLBWP.1.1
	ļ		ULBWP.1.1
SMTC configuration	1~6		SMTC.1
DRX configuration	1~6		DRX.3
reportConfigType	1~6		aperiodic
reportQuantity	1~6		cri-RSRP
Number of reported RS	1~6		2
qcl-Info	1~6		SSB#0 for resource#0
qci-iiiio	1~0		SSB#1 for resource#1
reportSlotOffsetList	1~6	slots	26
T1	1~6	S	5
EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS to SSS	1		
EPRE ratio of PBCH to PBCH DMRS	1		
EPRE ratio of PDCCH DMRS to SSS	1		
EPRE ratio of PDCCH to PDCCH	1		
DMRS			
EPRE ratio of PDSCH DMRS to SSS	1~6	dB	0
EPRE ratio of PDSCH to PDSCH	1		
DMRS			
EPRE ratio of OCNG DMRS to	1		
SSS ^{Note 1}			
EPRE ratio of OCNG to OCNG DMRS Note 1	-		
Propagation condition	1~6		AWGN
<u></u>	1	I	l .

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 4.6.3.4.4.1-3: Test Environment parameters for EN-DC CSI-RS based L1-RSRP measurement in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.
Channel	As specified	by the test configuration selected fr	om Table 4.6.3.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to			
connection			
diagram			

- 1. Message contents are defined in clause 4.6.3.4.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is NR FR1 cell (PSCell). Cell 2 is the target for CSI-RS based L1-RSRP measurements. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

4.6.3.4.4.2 Test procedure

TBD

4.6.3.4.4.3 Message contents

TBD

4.6.3.4.5 Test requirement

Table 4.6.3.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 4.6.3.4.5-1: CSI-RS specific test parameters for EN-DC SSB based L1-RSRP measurement in DRX

Parameter	Config	Unit	CSI-RS#0	CSI-RS#1	
N_{oc} Note1	1~6	dBm/15kHz	-94.65+TT		
N Note1	1,2,4,5	dBm/SSB SCS	-94.6	5+TT	
N_{oc} Note1	3,6	UBIII/33B 3C3	-91.65+TT		
$\mathbf{\hat{E}}_{s}/\mathrm{I}_{ot}$	1~6	dB	0+TT	3+TT	
CSI-RS RSRP	1,2,4,5	dBm/SSB SCS	-94.65+TT	-91.65+TT	
Note2	3,6		-91.65+TT	-88.65+TT	
lo Note2	1,2,4,5	dBm/9.36 MHz	-63.69+TT	-61.93+TT	
10	3,6	dBm/38.16 MHz	-57.59+TT	-55.84+TT	
\hat{E}_s/N_{oc}	1~6	dB	0+TT	3+TT	

Note 1: Void

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: CSI-RS RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

After 80ms from the beginning of the test, the UE shall send L1-RSRP report at slot 26 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in 10.1.20.1.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

4.7 Measurement performance requirements

4.7.1 SS-RSRP

4.7.1.0 Minimum conformance requirements

4.7.1.0.1 Intra-frequency absolute SS-RSRP measurement accuracy requirements

The intra-frequency SS-RSRP absolute accuracy requirements are defined for the SS-RSRP measured from a cell on the same frequency as that of the PCell or PSCell in FR1.

The accuracy requirements in Table 4.7.1.0.1-1 are valid under the following conditions:

- Conditions defined in 38.101-1 [2] Clause 7.3 for reference sensitivity are fulfilled.
- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each relevant SSB.

Table 4.7.1.0.1-1: SS-RSRP intra frequency absolute accuracy in FR1

Accı	ıracy		Conditions				
Normal	Extreme	SSB		lo ^{Note}	¹ range		
condition	condition	Ês/lot	NR operating band groups		Minimur	n lo	Maximum Io
				dBm / SCS _{SSB}			
dB	dB	dB		SCS _{SSB} = 15 kHz	SCS _{SSB} = 30 kHz	dBm/BW _{Channel}	dBm/BW _{Channel}
			NR_FDD_FR1_A, NR_TDD_FR1_A, NR_SDL_FR1_A	-121	-118	N/A	-70
			NR_FDD_FR1_B	-120.5	-117.5	N/A	-70
			NR_TDD_FR1_C	-120	-117	N/A	-70
±4.5	±4.5 ±9 ≥	±9 ≥-6	NR_FDD_FR1_D, NR_TDD_FR1_D	-119.5	-116.5	N/A	-70
			NR_FDD_FR1_E, NR_TDD_FR1_E	-119	-116	N/A	-70
			NR_FDD_FR1_G	-118	-115	N/A	-70
			NR_FDD_FR1_H	-117.5	-114.5	N/A	-70
±8	±11	≥-6	NR_FDD_FR1_A, NR_TDD_FR1_A, NR_SDL_FR1_A, NR_FDD_FR1_B, NR_TDD_FR1_D, NR_TDD_FR1_D, NR_TDD_FR1_E, NR_TDD_FR1_E, NR_TDD_FR1_G, NR_FDD_FR1_G, NR_FDD_FR1_H,	N/A	N/A	-70	-50

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: NR operating band groups in FR1 are as defined in Section 3A.4.1

The reporting range for SS-RSRP is defined from -156dBm to -31dBm with 1dB resolution. The mapping of the measured quantity to the reported value is defined by Table 4.7.1.0.1-2.

Table 4.7.1.0.1-2: SS-RSRP and CSI-RSRP measurement report mapping

Reported value	Measured quantity value(L3 SS-RSRP)	Measured quantity value(L1 SS-RSRP and CSI-RSRP)	Unit
RSRP_0	SS-RSRP<-156	Not valid	dBm
RSRP_1	-156≤ SS-RSRP<-155	Not valid	dBm
RSRP_2	-155≤ SS-RSRP<-154	Not valid	dBm
RSRP_3	-154≤ SS-RSRP<-153	Not valid	dBm
RSRP_4	-153≤ SS-RSRP<-152	Not valid	dBm
RSRP_5	-152≤ SS-RSRP<-151	Not valid	dBm
RSRP_6	-151≤ SS-RSRP<-150	Not valid	dBm
RSRP_7	-150≤ SS-RSRP<-149	Not valid	dBm
RSRP_8	-149≤ SS-RSRP<-148	Not valid	dBm
RSRP_9	-148≤ SS-RSRP<-147	Not valid	dBm
RSRP_10	-147≤ SS-RSRP<-146	Not valid	dBm
RSRP_11	-146≤ SS-RSRP<-145	Not valid	dBm
RSRP_12	-145≤ SS-RSRP<-144	Not valid	dBm
RSRP_13	-144≤ SS-RSRP<-143	Not valid	dBm
RSRP_14	-143≤ SS-RSRP<-142	Not valid	dBm
RSRP_15	-142≤ SS-RSRP<-141	Not valid	dBm
RSRP_16	-141≤ SS-RSRP<-140	RSRP<-140	dBm
RSRP_17	-140≤ SS-RSRP<-139	-140≤ RSRP<-139	dBm
RSRP_18	-139≤ SS-RSRP<-138	-139≤ RSRP<-138	dBm
RSRP_111	-46≤ SS-RSRP<-45	-46≤ RSRP<-45	dBm
RSRP_112	-45≤ SS-RSRP<-44	-45≤ RSRP<-44	dBm
RSRP_113	-44≤ SS-RSRP<-43	-44≤ RSRP	dBm
RSRP_114	-43≤ SS-RSRP<-42	Not valid	dBm
RSRP_115	-42≤ SS-RSRP<-41	Not valid	dBm
RSRP_116	-41≤ SS-RSRP<-40	Not valid	dBm
RSRP_117	-40≤ SS-RSRP<-39	Not valid	dBm
RSRP_118	-39≤ SS-RSRP<-38	Not valid	dBm
RSRP_119	-38≤ SS-RSRP<-37	Not valid	dBm
RSRP_120	-37≤ SS-RSRP<-36	Not valid	dBm
RSRP_121	-36≤ SS-RSRP<-35	Not valid	dBm
RSRP_122	-35≤ SS-RSRP<-34	Not valid	dBm
RSRP_123	-34≤ SS-RSRP<-33	Not valid	dBm

RSRP_124	-33≤ SS-RSRP<-32	Not valid	dBm
RSRP_125	-32≤ SS-RSRP<-31	Not valid	dBm
RSRP_126	-31≤ SS-RSRP	Not valid	dBm
RSRP_127 ¹	Infinity	Infinity	dBm

Note 1: The value of RSRP_127 is applicable for RSRP threshold configured by the network as defined in TS 38.331 [13], but not for the purpose of measurement reporting.

The normative reference for this requirement is TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.6.

4.7.1.0.2 Intra-frequency relative SS-RSRP measurement accuracy requirements

The intra-frequency relative accuracy of SS-RSRP is defined as the SS-RSRP measured from one cell compared to the SS-RSRP measured from another cell on the same frequency in FR1.

The accuracy requirements in Table 4.7.1.0.2-1 are valid under the following conditions:

- Conditions defined in 38.101-1 [2] Clause 7.3 for reference sensitivity are fulfilled.
- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each relevant SSB.

Table 4.7.1.0.2-1: SS-RSRP Intra frequency relative accuracy in FR1

Accuracy		Conditions SSB Io Note 1 range							
Normal	Evtromo	SSB							
condition	Extreme condition	Ês/lot Note 2	NR operating band groups Note 4	Minimum Io Maxii			Maximum Io		
				dBm /	SCS _{SSB}				
dB	dB	dB		SCS _{SSB} = SCS _{SSB} = 15 kHz 30 kHz		dBm/BW _{Channel}	dBm/BW _{Channel}		
			NR_FDD_FR1_A, NR_TDD_FR1_A, NR_SDL_FR1_A	-121	-118	N/A	-50		
			NR_FDD_FR1_B	-120.5	-117.5	N/A	-50		
			NR_TDD_FR1_C	-120	-117	N/A	-50		
±2	±3	≥-3	NR_FDD_FR1_D, NR_TDD_FR1_D	-119.5	-116.5	N/A	-50		
			NR_FDD_FR1_E, NR_TDD_FR1_E	-119	-116	N/A	-50		
			NR_FDD_FR1_G	-118	-115	N/A	-50		
			NR_FDD_FR1_H	-117.5	-114.5	N/A	-50		
±3	±3	≥-6	Note 3	Note 3	Note 3	N/A	Note 3		

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter SSB Ês/lot is the minimum SSB Ês/lot of the pair of cells to which the requirement applies.

NOTE 3: The same bands and the same lo conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.

NOTE 4: NR operating band groups in FR1 are as defined in TS 38.133 [6] Section 3.5.2.

The reporting range for SS-RSRP is defined from -156dBm to -31dBm with 1dB resolution. The mapping of the measured quantity to the reported value is defined by Table 4.7.1.0.1-2.

The normative reference for this requirement is TS 38.133 [6] clauses 10.1.2.1.2 and 10.1.6.

4.7.1.0.3 Inter-frequency absolute SS-RSRP measurement accuracy requirements

The inter-frequency SS-RSRP absolute accuracy requirements in this clause are defined for the SS-RSRP measured from a cell on a different frequency as that of the PCell or PSCell in FR1.

The accuracy requirements in Table 4.7.1.0.3-1 are valid under the following conditions:

- Conditions defined in 38.101-1 [2] Clause 7.3 for reference sensitivity are fulfilled.
- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB.

Table 4.7.1.0.3-1: SS-RSRP inter frequency absolute accuracy in FR1

Accı	ıracy			Conditions				
Normal	Extreme	SSB		lo ^{Note}	¹ range			
condition	condition	Ês/lot Note 2	NR operating band groups Note 3	Minimum Io		n lo	Maximum Io	
				dBm / S	CS _{SSB}			
dB	dB	dB		SCS _{SSB} = 15 kHz	SCS _{SSB} = 30 kHz	dBm/BW _{Channel}	dBm/BW _{Channel}	
			NR_FDD_FR1_A, NR_TDD_FR1_A, NR_SDL_FR1_A	-121	-118	N/A	-70	
			NR_FDD_FR1_B	-120.5	-117.5	N/A	-70	
			NR_TDD_FR1_C	-120	-117	N/A	-70	
±4.5	±9	≥6	NR_FDD_FR1_D, NR_TDD_FR1_D	-119.5	-116.5	N/A	-70	
			NR_FDD_FR1_E, NR_TDD_FR1_E	-119	-116	N/A	-70	
			NR_FDD_FR1_G	-118	-115	N/A	-70	
			NR_FDD_FR1_H	-117.5	-114.5	N/A	-70	
±8	±11	≥6	NR_FDD_FR1_A, NR_TDD_FR1_A, NR_SDL_FR1_A, NR_FDD_FR1_B, NR_TDD_FR1_D, NR_TDD_FR1_D, NR_TDD_FR1_E, NR_TDD_FR1_E, NR_TDD_FR1_E, NR_FDD_FR1_G, NR_FDD_FR1_H,	N/A	N/A	-70	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: Void.

NOTE 3: NR operating band groups in FR1 are as defined in Section 3A.4.1

The reporting range for SS-RSRP is defined from -156dBm to -31dBm with 1dB resolution. The mapping of the measured quantity to the reported value is defined by Table 4.7.1.0.1-2.

The normative reference for this requirement is TS 38.133 [6] clauses 10.1.4.1.1 and 10.1.6.

4.7.1.0.4 Inter-frequency relative SS-RSRP measurement accuracy requirements

The inter-frequency SS-RSRP relative accuracy requirements in this clause are defined for the SS-RSRP measured from a cell on a different frequency as that of the PCell or PSCell in FR1.

The accuracy requirements in Table 4.7.1.0.4-1 are valid under the following conditions:

- Conditions defined in 38.101-1 [2] Clause 7.3 for reference sensitivity are fulfilled.
- Conditions for inter-frequency measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB,

$$\left| RSRP1 \right|_{dBm} - \left| RSRP2 \right|_{dBm} \le 27dB$$

- | Channel 1_Io -Channel 2_Io | ≤ 20 dB
- Other conditions are [TBD].

Table 4.7.1.0.4-1: SS-RSRP inter frequency relative accuracy in FR1

Accı	ıracy		Conditions					
Normal	Extreme	SSB Io Note 1 range						
condition	condition	Ês/lot Note 2	NR operating band groups	Minimum Io		n Io	Maximum Io	
				dBm / S	SCS _{SSB}			
dB	dB	dB		SCS _{SSB} = 15 kHz	SCS _{SSB} = 30 kHz	dBm/BW _{Channel}	dBm/BW _{Channel}	
			NR_FDD_FR1_A, NR_TDD_FR1_A, NR_SDL_FR1_A	-121	-118	N/A	-50	
			NR_FDD_FR1_B	-120.5	-117.5	N/A	-50	
			NR_TDD_FR1_C	-120	-117	N/A	-50	
±4.5	±6	≥6	NR_FDD_FR1_D, NR_TDD_FR1_D	-119.5	-116.5	N/A	-50	
			NR_FDD_FR1_E, NR_TDD_FR1_E	-119	-116	N/A	-50	
			NR_FDD_FR1_G	-118	-115	N/A	-50	
			NR_FDD_FR1_H	-117.5	-114.5	N/A	-50	

NOTE 1: Io is assumed to have constant EPRE across the bandwidth.

NOTE 2: The parameter SSB Ês/lot is the minimum SSB Ês/lot of the pair of cells to which the requirement applies.

NOTE 3: NR operating band groups in FR1 are as defined in Section 3A.4.1

The reporting range for SS-RSRP is defined from -156dBm to -31dBm with 1dB resolution. The mapping of the measured quantity to the reported value is defined by Table 4.7.1.0.1-2.

The normative reference for this requirement is TS 38.133 [6] clauses 10.1.4.1.2 and 10.1.6.

4.7.1.1 Intra-frequency measurements

4.7.1.1.1 EN-DC FR1 SS-RSRP absolute measurement accuracy

4.7.1.1.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

4.7.1.1.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.1.1.

4.7.1.1.4 Test description

4.7.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.1.1.4.1-1.

Table 4.7.1.1.4.1-1: EN-DC FR1 SS-RSRP measurement accuracy supported test configurations

Test Case ID	Description
4.7.1.1.1-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD
4.7.1.1.1-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD
4.7.1.1.1-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD
4.7.1.1.1-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD
4.7.1.1.1-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD
4.7.1.1.1-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD
Note	The UE is only required to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 4.7.1.1.1.4.1-2.

Table 4.7.1.1.4.1-2: Initial conditions for SS-RSRP intra frequency absolute accuracy in FR1

Parameter		\	√alue	Comment
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH			As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies		As speci	fied in Annex E, Table E.1-3	1 and TS 38.508-1 [14] clause 4.3.1.
Channel	P	s specif	ied by the test configuration	n selected from Table 4.7.1.1.1.4.1-1.
bandwidth				
Propagation		Д	WGN	As specified in Annex C.2.2.
conditions				
Connection	TE Part	2Rx	A.3.1.8.2 with $n = 2$ and	As specified in TS 38.508-1 [14] Annex A.
Diagram			$\varphi_1 = 5 \text{ Hz}$	
		4Rx	A.3.1.8.5 with $n = 2$ and	
			$\varphi_{1,1} = 5 \text{ Hz}, \ \varphi_{1,2} = 10$	
			Hz, $\phi_{1,3} = 15 \text{ Hz}$	
	DUT Part		A.3.2.3.4	
Exceptions to			N/A	
connection				
diagram				

- 1. Message contents are defined in clause 4.7.1.1.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in the same frequency. Cell 2 is the PSCell and Cell 3 is the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.1.1.4.2 Test procedure

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On*, according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to Table 4.7.1.1.5-1 as appropriate.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.
- 5. The UE shall transmit periodically MeasurementReport messages.
- 6. After 10s wait from Step 3, the SS shall check the SS-RSRP reported values in the periodic MeasurementReport. The SS-RSRP value of Cell 3 reported by the UE is compared to the expected SS-RSRP. If the value is outside the limits in Table 4.7.1.1.1.5-2 or the UE fails to report the measurement value for Cell 3, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.
- 7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.
- 8. Repeat steps 1-7 for each sub-test in Table 4.7.1.1.5-1 as appropriate.

4.7.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.7.1.1.4.3-1: Common Exception messages for EN-DC FR1 SS-RSRP absolute measurement accuracy

efault Message Contents
Table H.3.1-1 Table H.3.1-2 Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 2 and Asynchronous cells for configuration 4.7.1.1.1-1 and 4.7.1.1.1-4 Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 1 and synchronous cells for configuration 4.7.1.1.1-2 and 4.7.1.1.1-5 Table H.3.1-3 with Condition SSB.2 FR1, SMTC pattern 1 and synchronous cells for configuration 4.7.1.1.1-3 and 4.7.1.1.1-6 Table H.3.1-7 Table H.3.4-1 Table H.3.4-2

Table 4.7.1.1.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for EN-DC FR1 SS-RSRP Accuracy

Information Element	Value/remark	Comment	Condition
ReportConfigNR::= SEQUENCE {			
reportType CHOICE {			
periodical SEQUENCE {			PERIODICAL
reportQuantityCell SEQUENCE {			
rsrq	false		
}			
maxReportCells	2		
}			
}			
}			

4.7.1.1.5 Test requirement

Table 4.7.1.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 4.7.1.1.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 4.7.1.1.1.5-2 for test configurations 1, 2, 4 and 5, and the corresponding absolute accuracy requirements in Table 4.7.1.1.1.5-3 for test configurations 3 and 6.

Table 4.7.1.1.5-1: EN-DC FR1 SS-RSRP measurement accuracy test parameters

Dawa		l linit	Tes	st 1	Tes	st 2	Tes	st 3
	meter	Unit	Cell 2	Cell 3	Cell 2	Cell 3	Cell 2	Cell 3
Physical cell ID			489	0	489	0	489	0
SSB ARFCN	Config 1,4		fre	q1	fre		fre	q1
Duplex mode	Config 2,3,5,6	+	FDD TDD					
	Config 1,4					plicable		
TDD configuration	Config 2,5	+				onf.1.1		
122 comigaration	Config 3,6	-				onf.2.1		
	Config 1,4					_{B,c} = 52		
BW _{channel}	Config 2,5	– MHz				_{B,c} = 52		
Situation.	Config 3,6	1			40: N _{RB}			
	Config 1,4					_{B,c} = 52		
BWP BW	Config 2,5	†				_{B,c} = 52		
J J	Config 3,6	+			40: N _{RB}			
Downlink initial BWP c	<u> </u>					wp.0		
Downlink dedicated B\						WP.1		
						WP.1 WP.1		
Uplink dedicated BWP DRx Cycle	Configuration	ms				vvP.1 plicable		
DRX Cycle		1115	TDC 1.1			Pilcable	TDC 4	
	Config 1,4		TRS.1.1 FDD		TRS.1. 1 FDD		TRS.1. 1 FDD	
TRS Configuration	Config 2,5		TRS.1.1 TDD	-	TRS.1. 1 TDD	-	TRS.1. 1 TDD	-
	Config 3,6		TRS.2.1 TDD		TRS.2. 1 TDD		TRS.2. 1 TDD	
	Config 1,4		SR.1.1 FDD		SR.1.1 FDD		SR.1.1 FDD	
PDSCH Reference measurement channel	Config 2,5		SR.1.1 TDD	-	SR.1.1 TDD	-	SR.1.1 TDD	-
- Criainioi	Config 3,6		SR.2.1 TDD		SR.2.1 TDD		SR.2.1 TDD	
	Config 1,4		CR.1.1 FDD		CR.1.1 FDD		CR.1.1 FDD	
RMSI CORESET Reference Channel	Config 2,5		CR.1.1 TDD	-	CR.1.1 TDD	-	CR.1.1 TDD	-
	Config 3,6		CR2.1 TDD		CR2.1 TDD		CR2.1 TDD	
	Config 1,4		CCR.1. 1 FDD		CCR.1. 1 FDD		CCR.1. 1 FDD	
Control Channel RMC	Config 2,5		CCR.1. 1 TDD	-	CCR.1. 1 TDD	-	CCR.1. 1 TDD	-
	Config 3,6		CR2.1 TDD		CCR2. 1 TDD		CCR2.1 TDD	
	Config 1,4		SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1
SSB configuration	Config 2,5		SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1
	Config 3,6		SSB 2.FR1	SSB.2 FR1	SSB 2.FR1	SSB.2 FR1	SSB 2.FR1	SSB.2 FR1
Time offset with Cell	Config 1,4	ms	-	3	-	3	-	3
2	Config 2,3,5,6	μs	-	3	_	3	-	3
CMTC Configuration	Config 1,4				SM	ΓC.2		
SMTC Configuration	Config 2,3,5,6				SM	ΓC.1		

OCNG Pat	terns					OF	P.1				
PDSCH/PD	ОССН	Config 1,2,4,5	kHz	15 kHz							
subcarrier	ocarrier spacing Config 3,6		KHZ	30kHz							
	of PSS to SSS										
	of PBCH DMF										
	of PBCH to PE										
	of PDCCH DN					•					
		PDCCH DMRS	dB	0	0	0	0	0	0		
	of PDSCH DM										
	of PDSCH to I										
		RS to SSS(Note 1)									
EPRE fallo		CNG DMRS (Note 1)									
$N_{\scriptscriptstyle oc}$ Note	Config 1,2,4,5	Depending on band group	dBm/15Kh	-10	7.5	-8	38	-116 +	∆ _{BG_offset}		
2	Config Depending on band 3,6 group		Z	-11	3.8	-94		-116 + Δ _{BG_offset}			
$N_{_{oc}}$ Note	Config 1,2,	4,5	dBm/SCS	-107.4		-88		Same as Noc/15kHz			
2	Config 3,6	Depending on band group	UBIII/SCS	-110.8		-91		-113 + ∆ _{BG_offset}			
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$			dB	1.88	-4.97	1.88	-4.97	0.09	-4.96		
\hat{E}_{s}/N_{oc}			dB	6	2	6	2	3	-0.2		
SS-	Config 1,2,4,5	Depending on band group	dDm/CCC	-101.5	-105.5	-82	-86	$\begin{array}{c} \textbf{-113} + \\ \Delta_{\text{BG_offse}} \\ t \end{array}$	-116.2 + Δ _{BG_offse}		
RSRP ^{Note}	Config 3,6	Depending on band group	dBm/SCS	-104.8	-108.8	-85	-89	$\begin{array}{c} \text{-}110\text{+} \\ \Delta_{\text{BG_offse}} \\ \text{t} \end{array}$	- 113.6+ Δ _{BG_offse} t		
Io ^{Note3}	Config 1,2,4,5	Depending on band group	dBm/ 9.36MHz	-71	.55	-52	2.05	-82.25+	Δ_{BG_offset}		
10	Config 3,6	Depending on band group	dBm/ 38.16MHz	-71	.57	-51	77	-75.98 +	- Δ _{BG_offset}		
Propagatio	n condition	•	-			AW	GN				
	onfiguration					1\	<2				

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 5: Δ_{BG_offset} is defined in clause 3A.4, Table 3A.4.1-2.

Table 4.7.1.1.1.5-2: SS-RSRP Intra frequency absolute accuracy requirements for the reported values for test configurations 1, 2, 4 and 5

Normal Conditions	Test 1 All bands	Test 2 All bands	Test 3	
			Bands NR_FDD_FR1_A, NR_TDD_FR1_A	34
			Bands NR FDD FR1 B	35
			Bands NR_TDD_FR1_C	35
Lowest reported value (Call 2)	45	61	Bands NR_FDD_FR1_D,	36
Lowest reported value (Cell 3)	45	01	NR_TDD_FR1_D	
			Bands NR_FDD_FR1_E,	36
			NR_TDD_FR1_E	
			Bands NR_FDD_FR1_G	37
			Bands NR_FDD_FR1_H	38
			Bands NR_FDD_FR1_A,	47
			NR_TDD_FR1_A	
			Bands NR_FDD_FR1_B	47
			Bands NR_TDD_FR1_C	48
Highest reported value (Cell 3)	57	80	Bands NR_FDD_FR1_D,	48
I lightest reported value (Gell G)	01	00	NR_TDD_FR1_D	
			Bands NR_FDD_FR1_E,	49
			NR_TDD_FR1_E	
			Bands NR_FDD_FR1_G	50
			Bands NR_FDD_FR1_H	50
Extreme Conditions	Test 1 All bands	Test 2 All bands	Test 3	
Extreme Conditions			Test 3 Bands NR_FDD_FR1_A,	30
Extreme Conditions				30
Extreme Conditions			Bands NR_FDD_FR1_A,	30
Extreme Conditions			Bands NR_FDD_FR1_A, NR_TDD_FR1_A	
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B	30
Extreme Conditions Lowest reported value (Cell 3)			Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	30 31
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	30 31
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E	30 31 31 32
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G	30 31 31
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H	30 31 31 32
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A,	30 31 31 32 33
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A	30 31 31 32 33 33 52
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B	30 31 31 32 33 33
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C	30 31 31 32 33 33 52 52 52 53
Lowest reported value (Cell 3)	41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C	30 31 31 32 33 33 52
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	30 31 31 32 33 33 52 52 52 53 53
Lowest reported value (Cell 3)	41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	30 31 31 32 33 33 52 52 52 53
Lowest reported value (Cell 3)	41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_B Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E	30 31 31 32 33 33 52 52 52 53 53
Lowest reported value (Cell 3)	41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G	30 31 31 32 33 33 52 52 52 53 53 54
Lowest reported value (Cell 3)	41 62	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C	30 31 31 32 33 33 52 52 52 53 53

Table 4.7.1.1.5-3: SS-RSRP Intra frequency absolute accuracy requirements for the reported values for test configurations 3 and 6

Normal Conditions	Test 1	Test 2	Test 3				
Normal Conditions	All bands	All bands	lest 3				
			Bands NR_FDD_FR1_A,	37			
			NR_TDD_FR1_A				
			Bands NR_FDD_FR1_B	38			
			Bands NR_TDD_FR1_C	38			
Lowest reported value (Cell 3)	42	58		39			
Lowest reported value (Cell 3)	42	30					
				39			
			R_TDD_FR1_A ands NR_FDD_FR1_B				
				50			
			Bands NR_FDD_FR1_A, 50 NR_TDD_FR1_A Bands NR_FDD_FR1_B 50 Bands NR_TDD_FR1_C 51 Bands NR_FDD_FR1_D, 51 NR_TDD_FR1_D Bands NR_FDD_FR1_E, 52 NR_TDD_FR1_E				
			Bands NR FDD FR1 H 41 Bands NR_FDD_FR1_A, 50 NR_TDD_FR1_A Bands NR_FDD_FR1_B 50 Bands NR_TDD_FR1_C 51 Bands NR_FDD_FR1_D, 51 NR_TDD_FR1_D Bands NR_FDD_FR1_E, 52 NR_TDD_FR1_E Bands NR_FDD_FR1_G 53 Bands NR_FDD_FR1_H 53				
			Bands NR_FDD_FR1_B 50 Bands NR_TDD_FR1_C 51 Bands NR_FDD_FR1_D, 51 NR_TDD_FR1_D Bands NR_FDD_FR1_E, 52				
Highest reported value (Cell 3)	54	77	Bands NR_FDD_FR1_D, 51				
l lightest reported value (con e)	"	''	ands NR_FDD_FR1_D, 51 IR_TDD_FR1_D ands NR_FDD_FR1_E, 52				
				52			
			NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H 53				
			Bands NR_FDD_FR1_H	53			
I .		Tack 3					
Extreme Conditions	Test 1	Test 2	Test 3				
Extreme Conditions	Test 1 All bands	Test 2 All bands		22			
Extreme Conditions			Fands NR FDD FR1 H 41 Fands NR FDD FR1 A, 50 FR TDD FR1 A Fands NR FDD FR1 B 50 FR1 SA FAND FR1 C 51 FR TDD FR1 D, 51 FR TDD FR1 D FR1 D FR1 B 52 FR TDD FR1 E FR TDD FR1 E FR TDD FR1 E FR TDD FR1 B 53 FEST 3 FR TDD FR1 A 53 FR TDD FR1 A 33 FR TDD FR1 A 33 FR TDD FR1 A 33 FR TDD FR1 A 50 FR TDD FR1 A 53 FR TDD FR1 A 33				
Extreme Conditions			### Sands NR FDD FR1 B				
Extreme Conditions			Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B	33			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C	33 34			
Extreme Conditions Lowest reported value (Cell 3)			Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D,	33 34			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	33 34 34			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	33 34 34			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E	33 34 34			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G	33 34 34 35			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H	33 34 34 35 36			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G	33 34 34 35 36 36			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A	33 34 34 35 36 36			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A,	33 34 34 35 36 36 54			
Lowest reported value (Cell 3)	37	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C	33 34 34 35 36 36 54			
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B	33 34 34 35 36 36 54 55 55			
Lowest reported value (Cell 3)	37	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C	33 34 34 35 36 36 54 55 55			
Lowest reported value (Cell 3)	37	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	33 34 34 35 36 36 54 55 55 55			
Lowest reported value (Cell 3)	37	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	33 34 34 35 36 36 54 55 55 55			
Lowest reported value (Cell 3)	37	53	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C	33 34 34 35 36 36 54 55 55 56			

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

4.7.1.1.2 EN-DC FR1 SS-RSRP relative measurement accuracy

4.7.1.1.2.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRP relative measurement accuracy is within the specified limits for all bands.

4.7.1.1.2.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.1.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.1.1.

4.7.1.1.2.4 Test description

4.7.1.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.1.1.2.4.1-1.

Table 4.7.1.1.2.4.1-1: EN-DC FR1 SS-RSRP measurement accuracy supported test configurations

Test Case ID	Description	
4.7.1.1.2-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.1.1.2-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.1.1.2-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
4.7.1.1.2-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.1.1.2-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.1.1.2-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.7.1.1.2.4.1-2.

Table 4.7.1.1.2.4.1-2: Initial conditions for SS-RSRP intra frequency relative accuracy in FR1

Parameter	Value			Comment		
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH			As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies		As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] clause 4.3.1.				
Channel	P	s specif	ied by the test configuration	n selected from Table 4.7.1.1.2.4.1-1.		
bandwidth						
Propagation		Α	WGN	As specified in Annex C.2.2.		
conditions						
Connection	TE Part	2Rx	A.3.1.8.2 with $n = 2$ and	As specified in TS 38.508-1 [14] Annex A.		
Diagram			$\varphi_1 = 5 \text{ Hz}$			
		4Rx	A.3.1.8.5 with $n = 2$ and			
			$\varphi_{1,1} = 5 \text{ Hz}, \ \varphi_{1,2} = 10$			
			Hz, $\phi_{1,3} = 15 \text{ Hz}$			
	DUT Part		A.3.2.3.4			
Exceptions to	N/A					
connection						
diagram						

- 1. Message contents are defined in clause 4.7.1.1.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in the same frequency. Cell 2 is the PSCell and Cell 3 is the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.1.1.2.4.2 Test procedure

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5
- 2. Set the parameters according to Table 4.7.1.1.2.5-1 as appropriate.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.

- 5. The UE shall transmit periodically MeasurementReport messages.
- 6. After 10s wait from Step 3, the SS shall check the SS-RSRP reported values of Cell 2 and Cell 3 in the periodic MeasurementReport. The SS-RSRP value of Cell 3 reported by the UE is compared to the reported SS-RSRP of Cell 2. If the resulting value is outside the limits in Table 4.7.1.1.2.5-2 or the UE fails to report the measurement value for Cell 2 or Cell 3, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.
- 7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.
- 8. Repeat steps 1-7 for each sub-test in Table 4.7.1.1.2.5-1 as appropriate.

4.7.1.1.2.4.3 Message contents

Message contents are same as in clause 4.7.1.1.1.4.3.

4.7.1.1.2.5 Test requirement

Table 4.7.1.1.2.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 4.7.1.1.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 4.7.1.1.2.5-2.

Table 4.7.1.1.2.5-1: Same as Table 4.7.1.1.1.5-1 with the following exceptions:

Parameter		Unit	Tes	st 1	Test 2		Test 3		
			Onit	Cell 2	Cell 3	Cell 2	Cell 3	Cell 2	Cell 3
$N_{_{oC}}$ Note	Config Depending on band 1,2,4,5 group		dBm/15Kh	-106		-88		-116 + Δ _{BG_offset}	
2	Config 3,6	Depending on band group	Z	-113		-94		-116 + Δ _{BG_offset}	
N_{oc} Note Config 1,2,4,5		dBm/SCS	Sam Noc/1		Same as Noc/15kHz		Same as Noc/15kHz		
2	Config Depending on band 3,6 group		ubili/3C3	-110		-91		-113 + ∆ _{BG_offset}	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	1.88	-4.97	1.88	-4.97	-0.01	-4.76
\hat{E}_{s}/N_{oc}			dB	6	2	6	2	3	0
SS- RSRP ^{Note}	Config 1,2,4,5	Depending on band group	dDm/CCC	-100	-104	-82	-86	-113 + Δ _{BG_offse}	-116 + Δ _{BG_offse} t
3	Config 3,6	Depending on band group	dBm/SCS	-104	-108	-85	-89	-110 + Δ _{BG_offse}	-113 + Δ _{BG_offse}
Io ^{Note3}	Config 1,2,4,5	5		.05	-82.20+	Δ_{BG_offset}			
10	Config 3,6	Depending on band group	dBm/ 38.16MHz	-70.77 -51.77		77	-75.93 + Δ _{BG_offset}		

Table 4.7.1.1.2.5-2: SS-RSRP Intra frequency relative accuracy requirements for the reported values

	Test 1	Test 2	Test 3	
	All bands	All bands	All bands	
Normal Conditions				
Lowest reported value (Cell 3)	RSRP_x - 9	RSRP_x - 9	RSRP_x - 8	
Highest reported value (Cell 3)	RSRP_x + 1	RSRP_x + 1	RSRP_x + 2	
Extreme Conditions				
Lowest reported value (Cell 3)	RSRP_x - 9	RSRP_x - 9	RSRP_x - 8	
Highest reported value (Cell 3)	RSRP_x + 1	RSRP_x + 1	RSRP_x + 2	
RSRP x is the reported value of Cell 2				

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

4.7.1.2 Inter-frequency measurements

4.7.1.2.1 EN-DC FR1-FR1 SS-RSRP absolute measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.1.2.1.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

4.7.1.2.1.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.1.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.1.2.

4.7.1.2.1.4 Test description

4.7.1.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.1.2.1.4.1-1.

Table 4.7.1.2.1.4.1-1: EN-DC FR1-FR1 SS-RSRP measurement accuracy supported test configurations

Test Case ID	Description			
4.7.1.2.1-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD			
4.7.1.2.1-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD			
4.7.1.2.1-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD			
4.7.1.2.1-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD			
4.7.1.2.1-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD			
4.7.1.2.1-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD			
Note	Note: The UE is only required to be tested in one of the supported test configurations			

Configure the test equipment and the DUT according to the parameters in Table 4.7.1.2.1.4.1-2.

diagram

Parameter		Value	Comment	
Test environment	NC, T	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	l A	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 4.7.1.2.1.4.1-1			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection Diagram	TE Part	A.3.1.8.2 with n = 2 and ϕ_1 = 5 Hz	As specified in TS 38.508-1 [14] Annex A.	
	DUT Part	A.3.2.3.4		
Exceptions to connection		N/A		

Table 4.7.1.1.4.1-2: Initial conditions for SS-RSRP inter frequency absolute accuracy in FR1

- 1. Message contents are defined in clause 4.7.1.2.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in two different FR1 frequencies. Cell 2 is the PSCell and Cell 3 is the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.1.2.1.4.2 Test procedure

Same as in clause 4.7.1.1.1.4.2 but replacing Table 4.7.1.1.1.5-1 and 4.7.1.1.1.5-2 with 4.7.1.2.1.5-1 and 4.7.1.2.1.5-2, respectively.

4.7.1.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.1.2.1.5 Test requirement

TBD

4.7.1.2.2 EN-DC FR1-FR1 SS-RSRP relative measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.1.2.2.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

4.7.1.2.2.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.1.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.1.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.1.2.

4.7.1.2.2.4 Test description

4.7.1.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.1.2.2.4.1-1.

Table 4.7.1.2.2.4.1-1: EN-DC FR1-FR1 SS-RSRP measurement accuracy supported test configurations

Test Case ID	Description
4.7.1.2.2-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD
4.7.1.2.2-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD
4.7.1.2.2-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD
4.7.1.2.2-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD
4.7.1.2.2-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD
4.7.1.2.2-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD
Note	: The UE is only required to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 4.7.1.2.2.4.1-2.

Table 4.7.1.2.2.4.1-2: Initial conditions for SS-RSRP inter frequency relative accuracy in FR1

Parameter		Value	Comment
Test environment	NC, TI	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	A	As specified in Annex E, Table E.1-1	. and TS 38.508-1 [14] sclause 4.3.1.
Channel bandwidth	A	As specified by the test configuration	n selected from Table 4.7.1.2.2.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	A.3.1.8.2 with n = 2 and ϕ_1 = 5 Hz	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 4.7.1.2.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in two different FR1 frequencies. Cell 2 is the PSCell and Cell 3 is the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.1.2.2.4.2 Test procedure

Same as in clause 4.7.1.1.2.4.2 but replacing Table 4.7.1.1.2.5-1 and 4.7.1.1.2.5-2 with 4.7.1.2.2.5-1 and 4.7.1.2.2.5-2, respectively.

4.7.1.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.1.2.2.5 Test requirement

TBD

4.7.2 SS-RSRQ

4.7.2.0 Minimum conformance requirements

4.7.2.0.1 Intra-frequency SS-RSRQ measurement accuracy requirements

TBD

4.7.2.0.2 Inter-frequency SS-RSRQ measurement accuracy requirements

TBD

4.7.2.1 EN-DC FR1 SS-RSRQ measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.2.1.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRQ measurement accuracy is within the specified limits for all bands.

4.7.2.1.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.2.1.

4.7.2.1.4 Test description

4.7.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.2.1.4.1-1.

Table 4.7.2.1.4.1-1: EN-DC FR1 SS-RSRQ measurement accuracy supported test configurations

Test Case ID	Description	
4.7.2.1-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.2.1-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.2.1-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
4.7.2.1-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.2.1-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.2.1-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.7.2.1.4.1-2.

connection diagram

Parameter		Value	Comment
Test environment	NC, TI	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	l A	As specified in Annex E, Table E.1-1	L and TS 38.508-1 [14] sclause 4.3.1.
Channel bandwidth		As specified by the test configuration	on selected from Table 4.7.2.1.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	A.3.1.8.2 with n = 2 and ϕ_1 = 5 Hz	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	A.3.2.3.4	
Exceptions to		N/A	

Table 4.7.2.1.4.1-2: Initial conditions for SS-RSRQ intra frequency accuracy in FR1

- 1. Message contents are defined in clause 4.7.2.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in the same frequency. Cell 2 is the PSCell and Cell 3 is the target cell for SS-RSRQ measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.2.1.4.2 Test procedure

TBD.

4.7.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.2.1.5 Test requirement

TBD

4.7.2.2 EN-DC FR1-FR1 SS-RSRQ measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.2.2.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRQ measurement accuracy is within the specified limits for all bands.

4.7.2.2.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.2.2.

4.7.2.2.4 Test description

4.7.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.2.2.4.1-1.

Table 4.7.2.2.4.1-1: EN-DC FR1-FR1 SS-RSRQ measurement accuracy supported test configurations

Test Case ID	Description
4.7.2.2-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD
4.7.2.2-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD
4.7.2.2-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD
4.7.2.2-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD
4.7.2.2-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD
4.7.2.2-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD
Note	: The UE is only required to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 4.7.2.2.4.1-2.

Table 4.7.2.2.4.1-2: Initial conditions for SS-RSRQ inter frequency accuracy in FR1

Parameter	Value		Comment	
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	A	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.	
Channel bandwidth	As specified by the test configuratio		on selected from Table 4.7.2.1.4.1-1.	
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection Diagram	TE Part	A.3.1.8.2 with n = 2 and ϕ_1 = 5	As specified in TS 38.508-1 [14] Annex A.	
	DUT Part	A.3.2.3.4		
Exceptions to connection diagram	N/A			

- 1. Message contents are defined in clause 4.7.2.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in two different FR1 frequencies. Cell 2 is the PSCell and Cell 3 is the target cell for SS-RSRQ measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.2.2.4.2 Test procedure

TBD

4.7.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.2.2.5 Test requirement

TBD

4.7.3 SS-SINR

4.7.3.1 EN-DC FR1 SS-SINR measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

4.7.3.1.1 Test purpose

FFS

4.7.3.1.2 Test applicability

FFS

4.7.3.1.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.3.1.

4.7.3.1.4 Test description

4.7.3.1.4.1 Initial conditions

FFS

4.7.3.1.4.2 Test procedure

FFS

4.7.3.1.4.3 Message contents

FFS

4.7.3.1.5 Test requirements

FFS

4.7.3.2 EN-DC FR1-FR1 SS-SINR measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

4.7.3.2.1	Test purpose
FFS	
4.7.3.2.2	Test applicability
FFS	

110

4.7.3.2.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.3.2.

4.7.3.2.4 Test description4.7.3.2.4.1 Initial conditions

4.7.3.2.4.2 Test procedure

FFS

4.7.3.2.4.3 Message contents

FFS

4.7.3.2.5 Test requirements

FFS

4.7.4 L1-RSRP

4.7.4.0	Minimum conformance requirements
4.7.4.0.1 TBD	SSB based absolute L1-RSRP measurement accuracy requirements
4.7.4.0.2 TBD	SSB based relative L1-RSRP measurement accuracy requirements
4.7.4.0.3	CSI-RS based absolute L1-RSRP measurement accuracy requiremen

TBD

4.7.4.0.4 CSI-RS based relative L1-RSRP measurement accuracy requirements

TBD

4.7.4.1 SSB based L1-RSRP measurements

4.7.4.1.1 EN-DC FR1 SSB based L1-RSRP absolute measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

⁻ The core requirements in TS 38.133 are between [.] or TBD.

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.4.1.1.1 Test purpose

The purpose of this test is to verify that the SSB based L1-RSRP absolute measurement accuracy is within the specified limits for all bands.

4.7.4.1.1.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.4.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.4.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.4.1.

4.7.4.1.1.4 Test description

4.7.4.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.4.1.1.4.1-1.

Table 4.7.4.1.1.4.1-1: EN-DC FR1 SSB based L1-RSRP absolute measurement accuracy supported test configurations

Test Case ID	Description	
4.7.4.1.1-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.1.1-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.1.1-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
4.7.4.1.1-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.1.1-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.1.1-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.7.4.1.1.4.1-2.

Table 4.7.4.1.1.4.1-2: Initial conditions for SSB based L1-RSRP absolute accuracy in FR1

Parameter	Value		Comment	
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	A	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 4.7.4.1.1.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram		N/A		

- 1. Message contents are defined in clause 4.7.4.1.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the NR FR1 cell. Cell 2 is the PSCell and the target for SSB base L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.4.1.1.4.2 Test procedure

TBD

4.7.4.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.4.1.1.5 Test requirement

TBD

4.7.4.1.2 EN-DC FR1 SSB based L1-RSRP relative measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.4.1.2.1 Test purpose

The purpose of this test is to verify that the SSB based L1-RSRP relative measurement accuracy is within the specified limits for all bands.

4.7.4.1.2.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.4.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.4.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.4.1.

4.7.4.1.2.4 Test description

4.7.4.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.4.1.2.4.1-1.

Table 4.7.4.1.2.4.1-1: EN-DC FR1 SSB based L1-RSRP relative measurement accuracy supported test configurations

Test Case ID	Description	
4.7.4.1.2-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.1.2-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.1.2-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
4.7.4.1.2-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.1.2-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.1.2-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.7.4.1.2.4.1-2.

Table 4.7.4.1.2.4.1-2: Initial conditions for SSB based L1-RSRP relative accuracy in FR1

Parameter	Value		Comment
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] sclause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 4.7.4.1.2.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

- 1. Message contents are defined in clause 4.7.4.1.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the NR FR1 cell. Cell 2 is the PSCell and the target for SSB base L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.4.1.2.4.2 Test procedure

TBD

4.7.4.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.4.1.2.5 Test requirement

TBD

4.7.4.2 CSI-RS based L1-RSRP measurements

4.7.4.2.1 EN-DC FR1 CSI-RS based L1-RSRP absolute measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.4.2.1.1 Test purpose

The purpose of this test is to verify that the CSI-RS based L1-RSRP absolute measurement accuracy is within the specified limits for all bands.

4.7.4.2.1.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.4.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.4.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.4.2.

4.7.4.2.1.4 Test description

4.7.4.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.4.2.1.4.1-1.

Table 4.7.4.2.1.4.1-1: EN-DC FR1 CSI-RS based L1-RSRP absolute measurement accuracy supported test configurations

Test Case ID	Description	
4.7.4.2.1-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.2.1-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.2.1-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
4.7.4.2.1-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.2.1-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.2.1-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.7.4.2.1.4.1-2.

Table 4.7.4.2.1.4.1-2: Initial conditions for CSI-RS based L1-RSRP absolute accuracy in FR1

Parameter	Value		Comment
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	ļ ,	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 4.7.4.2.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

1. Message contents are defined in clause 4.7.4.2.1.4.3.

2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the NR FR1 cell. Cell 2 is the PSCell and the target for SSB base L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.4.2.1.4.2 Test procedure

TBD

4.7.4.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.4.2.1.5 Test requirement

TBD

4.7.4.2.2 EN-DC FR1 CSI-RS based L1-RSRP relative measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

4.7.4.2.2.1 Test purpose

The purpose of this test is to verify that the CSI-RS based L1-RSRP relative measurement accuracy is within the specified limits for all bands.

4.7.4.2.2.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

4.7.4.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.4.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.4.2.

4.7.4.2.2.4 Test description

4.7.4.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 4.7.4.2.2.4.1-1.

Table 4.7.4.2.2.4.1-1: EN-DC FR1 CSI-RS based L1-RSRP relative measurement accuracy supported test configurations

Test Case ID	Description	
4.7.4.2.2-1	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.2.2-2	LTE FDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.2.2-3	LTE FDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
4.7.4.2.2-4	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
4.7.4.2.2-5	LTE TDD, NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
4.7.4.2.2-6	LTE TDD, NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 4.7.4.2.2.4.1-2.

Table 4.7.4.2.2.4.1-2: Initial conditions for CSI-RS based L1-RSRP relative accuracy in FR1

Parameter	Value		Comment	
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	P	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 4.7.4.2.2.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram	N/A			

1. Message contents are defined in clause 4.7.4.2.2.4.3.

2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the NR FR1 cell. Cell 2 is the PSCell and the target for SSB base L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

4.7.4.2.2.4.2 Test procedure

TBD

4.7.4.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

4.7.4.2.2.5 Test requirement

TBD

5 EN-DC with at least one NR cell in FR2

This section contains test scenarios for E-UTRA and NR dual connectivity with E-UTRA as PCell and NR as PSCell. This configuration is also known as NSA Option 3 and 3a. At least one NR cell is in Frequency Range 2.

For conformance testing involving FR2 test cases in this specification, the UE under test shall disable UL Tx diversity schemes.

- 5.1 Void
- 5.2 Void
- 5.3 RRC CONNECTED state mobility
- 5.3.1 Void
- 5.3.2 RRC connection mobility control
- 5.3.2.1 Void
- 5.3.2.2 Random access
- 5.3.2.3 Void
- 5.4 Timing
- 5.4.1 UE transmit timing
- 5.4.1.0 Minimum Conformance Requirements 5.4.1.0.1 Minimum conformance requirements for UE transmit timing accuracy

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is specified in Table 5.4.1.0.1-1. This requirement applies:

- when it is the first transmission in a DRX cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission.

The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{c}}$. The downlink timing is defined as the time when the first detected path (in time) of the corresponding downlink frame is received from the reference cell. N_{TA} for PRACH is defined as 0.

 $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{c}}$ (in T_{c} units) for other channels is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance in TS 38.133 [6] clause 7.3 was applied. N_{TA} for other channels is not changed until next timing advance is received. The value of $N_{\text{TA offset}}$ depends on the duplex mode of the cell in which the uplink transmission takes place and the frequency range (FR). $N_{\text{TA offset}}$ is defined in Table 5.4.1.0.1-2.

Frequency Range	SCS of SSB signals (KHz)	SCS of uplink signals s(KHz)	T _e	
		15	12*64*T _c	
	15	30	10*64*T _c	
1		60	10*64*T _c	
	30	15	8*64*T _c	
		30	8*64*T _c	
		60	7*64*T _c	
	120	60	3.5*64*T _c	
2	120	120	3.5*64*T _c	
	240	60	3*64*T _c	
	240	120	3*64*T _c	
Note 1: T _c i	Note 1: T _c is the basic timing unit defined in TS 38.211 [6]			

Table 5.4.1.0.1-1: Te Timing Error Limit

Table 5.4.1.0.1-2: The Value of $N_{\mathrm{TA~offset}}$

Freque	ency range and band of cell used for uplink transmission	N _{TA offset} (Unit: T _c)		
FR1 FD	band without LTE-NR coexistence case or FR1	25600 (Note 1)		
TDD ban	d without LTE-NR coexistence case			
FR1 FD	band with LTE-NR coexistence case	0 (Note 1)		
FR1 TDD	band with LTE-NR coexistence case	39936 (Note 1)		
FR2		13792		
Note 1:	Note 1: The UE identifies $N_{ m TA~offset}$ based on the information n-TimingAdvanceOffset			
	according to [2]. If UE is not provided with the information n-			
	TimingAdvanceOffset, the default value of $N_{ m TA~offset}$ is set as 25600 for FR1			
band. In case of multiple UL carriers in the same TAG, UE expects that the same value of n-TimingAdvanceOffset is provided for all the UL carriers				
according to section 4.2 in [3] and the value 39936 of $N_{ m TA~offset}$ can also be				
	provided for a FDD serving cell.Note 2: Void			

When it is not the first transmission in a DRX cycle or there is no DRX cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame of the reference cell except when the timing advance in TS 38.133 [6] clause 7.3 is applied.

When the transmission timing error between the UE and the reference timing exceeds $\pm T_e$, the UE is required to adjust its timing to within $\pm T_e$. The reference timing shall be $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_c$ before the downlink timing of the reference cell. All adjustments made to the UE uplink timing shall follow these rules:

- 1) The maximum amount of the magnitude of the timing change in one adjustment shall be T_a.
- 2) The minimum aggregate adjustment rate shall be T_p per second.
- 3) The maximum aggregate adjustment rate shall be T_{q} per 200ms.

where the maximum autonomous time adjustment step T_q and the aggregate adjustment rate T_p are specified in Table 5.4.1.0.1-3.

Table 5.4.1.0.1-3: T_q Maximum Autonomous Time Adjustment Step and T_p Minimum Aggregate Adjustment rate

Frequency Range	SCS of uplink signals (KHz)	Tq	Tp		
	15	5.5*64*T _c	5.5*64*T _c		
1	30	5.5*64*T _c	5.5*64*T _c		
	60	5.5*64*T _c	5.5*64*T _c		
2	60	2.5*64*T _c	2.5*64*T _c		
Δ	120	2.5*64*T _c	2.5*64*T _c		
NOTE 1: T _c is the basic timing unit defined in TS 38.211 [6]					

The normative reference for this requirement is TS.38.133 [6] clause 7.1.2.

5.4.1.1 EN-DC FR2 UE transmit timing accuracy

Editor's Notes

Minimum conformance requirements need to be updated in Clause [5.4.1.0]

- Test procedure needs further updates specific to the OTA aspect
- MU/TT is FFS

5.4.1.1.1 Test purpose

The purpose of this test is to verify that the UE can follow frame timing change of the connected gNodeb and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1.2

5.4.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC FR2.

5.4.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause TBD.

The normative reference for this requirement is TS.38.133 [6] clause A.5.4.1.1

5.4.1.1.4 Test Description

5.4.1.1.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table 5.3.5-1 of 38.521-1 [17].

This test can be run in one of the configurations defined in Table 5.4.1.1.4.1-1.

Table 5.4.1.1.4.1-1: Supported test configurations for FR2 PSCell

Configuration	Description
1	LTE FDD, NR TDD, SSB SCS 240 kHz, data SCS 120 kHz, BW 100 MHz
2	LTE TDD, NR TDD, SSB SCS 240 kHz, data SCS 120 kHz, BW 100 MHz
Note: The UE is only required to be tested in one of the supported test configurations	
depend	ing on UE capability.

Configure the test equipment and the DUT according to the parameters in Table 5.4.1.1.4.1-2

Table 5.4.1.1.4.1-2: Initial conditions for EN-DC FR2 transmit timing accuracy

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E.1.1, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1.		2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth		As specified by the test configuration selected from Table 5.5.1.4.4.1-1	
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 5 4.1.1.4.3.
- 2. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR2 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2. The general test parameters are given in Table 5.4.1.4.5-4 below.
- 3. Void
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.2 and C.1.3.

5.4.1.1.4.2 Test procedure

Editor's Note: Some aspects of EN-DC FR2 testing in OTA environment needs to be updated

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR FR2 cell (PSCell). The downlink timing of the PSCell is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS used as a measurement reference facilitating the SS timing estimation.

The test sequence shall be carried out in RRC_CONNECTED for every test case.

Following will be the test sequence for this test

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set up E-UTRA PCell according to parameters given in Table A.6.1.1-1 and setup NR PSCell according to parameters given in Table 4.4.1.1.4.1-1.
- 3. The SS shall transmit an RRCConnectionReconfiguration message configuring the UE with the message content defined in clause 4.4.1.1.4.3.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. After connection set up with the cell, the test equipment will verify that the timing of the NR cell is within ($N_{TA} + N_{TA_offset}$) \pm T_e of the first detected path of DL SSB.
 - a. The N_{TA} offset value (in T_c units) is 25600 for FR1

- b. The T_e values depend on the DL and UL SCS for which the test is being run and are given in Table 4.4.1.1.5-4.
- 6. The test system shall adjust the timing of the DL path by values given in Table 4.4.1.1.4.2-1

Table 4.4.1.1.4.2-1: Adjustment Value for DL Timing

SCS of SSB signals (KHz) Adjustment Value		ent Value
	Test1	Test2
15	+64*64Tc	+32*64Tc
30	+32*64Tc	+16*64Tc

- 7. The test system shall verify that the adjustment step size and the adjustment rate shall be according to requirements specified in Table 4.4.1.1.5-5. This will only be done for Test1. The test system samples the UE Transmit Timing once per SRS transmission (as per configured SRS periodicity). To check Rule 1, the SS shall check that the maximum time adjustment step size T_q between one SRS transmission (slot n) to next (slot n+p, where p is the periodicity of SRS) is within Rule 1 as specified in clause 4.4.1.0.1 and Table 4.4.1.0.1-3. To check that the minimum adjustment rate is within Rule 2 as specified in clause 4.4.1.0.1 and Table 4.4.1.0.1-3, the SS shall measure the change in SRS transmission timing over a 1.002s sliding window, with step size 2ms. To check that the maximum adjustment rate is within Rule 3 as specified in clause 4.4.1.0.1 and Table 4.4.1.0.1-3, the SS shall measure the change in SRS transmission timing over a 198ms sliding window, with step size 2ms. The three rules apply until the UE transmit timing offset is within the limits specified in 4.4.1.0.1 and Table 4.4.1.0.1-3 with respect to the first detected path (in time) of the corresponding downlink frame of Cell 1.
- 8. The test system shall verify that the UE transmit timing offset stays within $(N_{TA} + N_{TA_offset}) \pm T_e$ of the first detected path of DL SSB. For Test 2 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment

5.4.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions:

Table 5.4.1.1.4.3-1: SRS-Config: Additional test requirement for UE transmit timing accuracy for ENDC FR2 UE

Derivation Path: TS 38.331 [6], clause 6.3.2 Information Element SRS-Config ::= SEQUENCE { srs-ResourceSetToReleaseList srs-ResourceSetToAddModList SEQUENCE (SIZE(0maxNrofSRS-ResourceSets)) OF SEQUENCE { srs-ResourceSetId srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }	Value/remark Not present 0	O for Config 1 and Config 2 Sl1 for Config 1 sl2560 for Config	Condition
SRS-Config ::= SEQUENCE { srs-ResourceSetToReleaseList srs-ResourceSetToAddModList SEQUENCE (SIZE(0maxNrofSRS-ResourceSets)) OF SEQUENCE { srs-ResourceSetId srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE {	Not present 0	0 for Config 1 and Config 2	
srs-ResourceSetToReleaseList srs-ResourceSetToAddModList SEQUENCE (SIZE(0maxNrofSRS-ResourceSets)) OF SEQUENCE { srs-ResourceSetId srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }	0	Config 2 sl1 for Config 1	
srs-ResourceSetToAddModList SEQUENCE (SIZE(0maxNrofSRS-ResourceSets)) OF SEQUENCE { srs-ResourceSetId srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }	0	Config 2 sl1 for Config 1	
(SIZE(0maxNrofSRS-ResourceSets)) OF SEQUENCE { srs-ResourceSetId srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }		Config 2 sl1 for Config 1	
SEQUENCE { srs-ResourceSetId srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }		Config 2 sl1 for Config 1	
srs-ResourceSetId srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }		Config 2 sl1 for Config 1	
srs-ResourceIdList SEQUENCE (SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }		Config 2 sl1 for Config 1	
(SIZE(1maxNrofSRS-ResourcesPerSet)) OF { SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }	0	Config 2 sl1 for Config 1	
SRS-ResourceId[1] } resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }	0	sl1 for Config 1	
} resourceType CHOICE { periodic SEQUENCE { periodicityAndOffset-p } }			
periodic SEQUENCE { periodicityAndOffset-p } }			
periodic SEQUENCE { periodicityAndOffset-p } }			
periodicityAndOffset-p } }			
}			
}			
}		2	
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
110000			
usage	codebook		
alpha	Alpha		
p0	0		
pathlossReferenceRS CHOICE {			
ssb-Index	SSB-Index		
}			
srs-PowerControlAdjustmentStates	Not present		
}			
srs-ResourceToReleaseList	Not present		
srs-ResourceToAddModList SEQUENCE			
(SIZE(1maxNrofSRS-Resources)) OF SEQUENCE {			
srs-Resourceld	0		
nrofSRS-Ports	Port1		
ptrs-PortIndex	Not present		
transmissionComb CHOICE {			
n2 SEQUENCE {			
combOffset-n2	0		
cyclicShift-n2	0		
}			
}			
resourceMapping SEQUENCE {			
startPosition	0		
nrofSymbols	n1		
repetitionFactor	n1		
}	_ · · -		
freqDomainPosition	0		
freqDomainShift	0		
freqHopping SEQUENCE {			
c-SRS	1		
b-SRS	0		
b-hop	0		
υ-πορ l	<u> </u>		
arounOrCogueneel lenning		NOT DDECENT	
groupOrSequenceHopping		NOT PRESENT	
) aguanadd	0		
sequenceld	CDC Creatic Deletion nfe		
spatialRelationInfo SEQUENCE {	SRS-SpatialRelationInfo		
servingCellId	Not present		
referenceSignal CHOICE {			
ssb-Index	SSB-Index		
}			
}			
}			
tpc-Accumulation	Not present		
}			

5.4.1.1.5 Test Requirements

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is specified in Table 5.4.1.1.5-4.

The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{c}}$. The downlink timing is defined as the time when the first detected path (in time) of the corresponding downlink frame is received from the reference cell. N_{TA} for PRACH is defined as 0.

 $(N_{\rm TA} + N_{\rm TA~offset}) \times T_{\rm c}$ (in $T_{\rm c}$ units) for other channels is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance was applied. $N_{\rm TA}$ for other channels is not changed until next timing advance is received. The value of $N_{\rm TA~offset}$ depends on the duplex mode of the cell in which the uplink transmission takes place and the frequency range (FR). $N_{\rm TA~offset}$ is defined in Table 5.4.1.1.5-5.

Table 5.4.1.1.5-1: Cell Specific Test Parameters for UL Transmit Timing test

Parameter	Unit	Config	Test1	Test2	Band Group
SSB ARFCN		1,2	Freq1	Freq1	
Duplex Mode		1,2	TDD		
TDD configuration		1,2	TDDConf.1.2		
BW _{channel}	MHz	1,2	100: NRB,c = 66		
Initial BWP Configuration		1,2	DLBV	VP.0.1	
9		1,2		VP.0.1	
Dedicated BWP		1,2	DLBV	VP.1.1	
Configuration				VP.1.1	
TRS Configuration		1,2		.1 TDD	
TCI State		1,2	CSI-RS.	Config.0	
DRx Cycle	ms	1,2	N/A	DRX.5 ^{Note5}	
PDSCH Reference		1,2	CD 3	1 TDD	
measurement channel		1,2	JK.5.	1 100	
CORESET Reference		1,2	CB3	1 TDD	
Channel		·			
OCNG Patterns		1,2	OCNG pattern 1		
SSB Configuration		1,2	SSB.2 FR2		
SMTC Configuration		1,2	SM	ΓC.1	
PDSCH/PDCCH	kHz	1,2	1:	20	
subcarrier spacing	KIIZ		110		
EPRE ratio of PSS to					
SSS					
EPRE ratio of PBCH					
DMRS to SSS					
EPRE ratio of PBCH to					
PBCH DMRS					
EPRE ratio of PDCCH					
DMRS to SSS					
EPRE ratio of PDCCH to	dB	1,2	0	0	
PDCCH DMRS	l ab	,_			
EPRE ratio of PDSCH					
DMRS to SSS					
EPRE ratio of PDSCH to					
PDSCH					
EPRE ratio of OCNG					
DMRS to SSS(Note 1)					
EPRE ratio of OCNG to					
OCNG DMRS (Note 1)					
Propagation condition		1,2	AW	GN	
SRS Config		1,2	Config1 ^{Note6}	Config2 ^{Note6}	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 5: DRx related parameters are given in Table A.3.3.5-1

Note 6: SRS configs are given in Table A.5.4.1.1.1-3

Table 5.4.1.1.5-2: SRS Configuration for Timing Accuracy Test

	Field	Config1	Config 2	Comments
SRS-ResourceSet	srs-ResourceSetId	0	0	
	srs-ResourceIdList	0	0	
	resourceType	Periodic	Periodic	
	Usage	Codebook	Codebook	
SRS-Resource	SRS-Resourceld	0	0	
	nrofSRS-Ports	Port1	Port1	
	transmissionComb	n2	n2	
	combOffset-n2	0	0	
	cyclicShift-n2	0	0	
	resourceMapping startPosition	0	0	
	resourceMapping nrofSymbols	n1	n1	
	resourceMapping repetitionFactor	n1	n1	
	freqDomainPosition	0	0	
	freqDomainShift	0	0	
	freqHopping c-SRS	sl1	sl1	
	freqHopping b-SRS	0	0	
	freqHopping b-hop	0	0	
	groupOrSequenceHopping	Neither	Neither	
	resourceType	Periodic	Periodic	
	periodicityAndOffset-p	sl1,0	sl2560,0	Offset to align with DRx periodicity
	sequenceld	0	0	Any 10 bit number

Table 5.4.1.1.5-3: OTA re	lated test parameters
---------------------------	-----------------------

Parameter	Unit	Test 1	Test 2	
Angle of arrival configuration		Setup 1 def	ined in A.9.1	
$N_{_{OC}}^{}$ Note1	dBm/15kHz ^{Note4}	-1	12	
N_{oc} Note1	dBm/SCS ^{Note3}	-1	03	
\hat{E}_s/N_{oc}	dB		4	
SS-RSRP ^{Note2}	dBm/SCS Note4	-!	99	
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB		4	
Io ^{Note2}	dBm/95.04 MHz Note4	-6	8.5	
Note 1: Interference from other cells and noise sources not specified in the test is assumed to be				

- Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 5: As observed with OdBi gain antenna at the centre of the quiet zone

Table 5.4.1.1.5-4: Te Timing Error Limit

Frequency Range	SCS of SSB signals (kHz)	SCS of uplink signals (kHz)	T _e
	120	60	3.5*64*T _c
2	120	120	3.5*64*T _c
	240	60	3*64*T _c
		120	3*64*T _c
Note 1: T_c is the basic timing unit defined in TS 38.211 [6]			

Table 5.4.1.1.5-5: The Value of $N_{\mathrm{TA~offset}}$

Freque	ency range and band of cell used for uplink transmission	$N_{ m TA~offset}$ (Unit: T $_{ m c}$)			
FR2		13792			
Note 1:	IA offset				
	as specified in TS 38.331 [2]. If UE is not provided with the information n-				
	TimingAdvanceOffset, the default value of $N_{ m TA~offset}$ is set as 25600 for FR1				
	band. In case of multiple UL carriers in the same TAG, UE expects that the same value of n-TimingAdvanceOffset is provided for all the UL carriers				
	according to clause 4.2 in TS 38.213 [3] and the value 39936 of $N_{ m TA~offset}$ can				
	also be provided for a FDD serving cell.				
Note 2:	Void				

5.4.2 UE timer accuracy

5.4.3 Timing advance

5.4.3.0 Minimum conformance requirements

5.4.3.0.1 Minimum conformance requirements for timing advance adjustment accuracy

The timing advance is initiated from gNB with MAC message that implies and adjustment of the timing advance, as defined in clause 5.2 of TS 38.321 [12].

The UE shall adjust the timing of its transmissions with a relative accuracy better than or equal to the UE Timing Advance adjustment accuracy requirement in Table 5.4.3.0.3-1, to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command step is defined in TS38.213 [8].

Table 5.4.3.0.3-1: UE Timing Advance adjustment accuracy

Sub Carrier Spacing, SCS kHz	15	30	60	120
UE Timing Advance adjustment accuracy	±256 T _c	±256 T _c	±128 T _c	±32 T _c

The normative reference for this requirement is TS.38.133 [6] clause A.5.4.3.

5.4.3.1 EN-DC FR2 timing advance adjustment accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Cell mapping is TBD
- Test Procedure will need further modification and review

5.4.3.1.1 Test purpose

The purpose of the test is to verify UE timing advance adjustment delay and accuracy requirement defined in clause 7.3 of TS 38.133 [6].

5.4.3.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.4.3.1.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 5.4.3.0.1.

The normative reference for this requirement is TS.38.133 [6] clause A.5.4.3.1.

5.4.3.1.4 Test description

5.4.3.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table 5.3.5-1 of 38.521-2 [17].

This test shall be tested using any of the test configurations in Table 5.4.3.1.4.1-1.

Table 5.4.3.1.4.1-1: EN-DC FR2 timing advance adjustment accuracy supported test configurations

	Config	Description
	1	LTE FDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
	2	LTE TDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 5.4.3.1.4.1-2

Table 5.4.3.1.4.1-2: Initial conditions for EN-DC FR2 timing advance adjustment accuracy

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	I in Annex E.1.1, E.1.2, and T	able E.3-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 5.4.3.1.4.1-1		ected from Table 5.4.3.1.4.1-1
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	A.3.3.1.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.4.1.1	
Exceptions to connection diagram	N/A	1	

Table 5.4.3.1.4.1-3: General test parameters for timing advance

Parameter	Unit	Value	Comment
RF channel number		Cell 1: 1	1 for E-UTRAN PCell
		Cell 2: 2	2 for NR PSCell
Initial DL BWP		DLBWP.0.1	As specified in Table A.3.9.2.1-1 of TS 38.133 [6]
Dedicated DL BWP		DLBWP.1.1	As specified in Table A.3.9.2.2-1 of TS 38.133 [6]
Initial UL BWP		ULBWP.0.1	As specified in Table A.3.9.3.1-1 of TS 38.133 [6]
Dedicated UL BWP		ULBWP.1.1	As specified in Table A.3.9.3.2-1 of TS 38.133 [6]
Timing Advance Command (T_A) value during T1		31	N _{TA_new =} N _{TA_old} for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	$N_{TA_new} = N_{TA_old} + 1024*T_c$ (based on equation in TS 38.213 [3] section 4.2)
T1	S	5	
T2	S	5	

- 1. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is NR FR2 PSCell. The connection setup is done according to the settings in Annex C.1.1.
- 2. Downlink signals for NR cell are initially set up according to Annex [C.1.2], [C.1.3].

5.4.3.1.4.2 Test Procedure

The test consists of two cells, a single E-UTRA cell (PCell), and a single NR cell (PSCell). Cell 1 is the PCell in the primary Timing Advance Group (pTAG) and cell 2 is the PSCell is in the secondary Timing Advance Group (sTAG). The test consists of two successive time periods, with time durations of T1 and T2 respectively. In each time period, timing advance commands for sTAG are sent to the UE and Sounding Reference Signals (SRS), as specified in table 5.4.3.1.5-1, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured for PSCell in sTAG. The UE Time Alignment Timer (timeAlignmentTimer IE), described in Clause 5.2 in TS 38.321, shall be configured so that it does not expire in the duration of the test.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Message content are defined in clause 5.4.3.1.2.3.
- 2. Set the parameters according to values in Tables 5.4.3.1.4.1-3 and Table 5.4.3.1.5-1 as appropriate. Propagation conditions are set according to Annex C.2.2.
- 3. SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element for sTAG, as specified in Clause 6.1.3.4 in TS 38.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2 in TS 38.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance for sTAG used by the UE is established.
- 6. During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements for sTAG, with Timing Advance Command value of 39 as specified in table 5.4.3.1.4.1-3.
- 7. This value shall result in changes of the timing advance for sTAG used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.
- 8. As specified in Clause 7.3.2.1 of TS 38.133 [6], the UE adjusts its uplink timing at slot n+k for a timing advance command received in slot n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.
- 9. The UE Time Alignment Timer, described in Clause 5.2 in TS 38.321, shall be configured so that it does not expire in the duration of the test.
- 10. The result from the SRS and adjustment of the timing advance in step 7) is used to measure that the UE adjusts the timing of its transmission with a relative accuracy better than or equal to value specified in Table 5.4.3.1.3-1 to the signalled timing advance value compared to the timing of preceding uplink transmission.
- 11. If the UE adjust the timing of its transmission within a relative accuracy greater than or equal to value specified in Table 5.4.3.1.3-1 to the signalled timing advance value compared to the timing of preceding uplink transmission then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 12. The SS shall transmit RRCConnectionReconfiguration message with condition EN-DC_PSCell_Rel according to TS 36.508 [25] Table 4.6.1-8 to release NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 13. The SS then shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 14. If any of the above Reconfiguration in Step 12 or 13 fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 15. Repeat step 3-14 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.4.3.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1, with exceptions listed below in the Table 5.4.3.1.4.3-1

Table 5.4.3.1.4.3-1: srs-Config setup

Derivation Path: TS 38.508-1, Table 4.6.3-182			
Information Element	Value/remark	Comment	Condition
SRS-Config ::= SEQUENCE {			
srs-ResourceSetToAddModList SEQUENCE	[1 entry]		
(SIZE(0maxNrofSRS-ResourceSets)) OF			
SEQUENCE {			
srs-ResourceSetId	0		
srs-ResourceIdList SEQUENCE	1 entry		
(SIZE(1maxNrofSRS-ResourcesPerSet)) OF {			
SRS-Resourceld[1]	0		
}			
resourceType CHOICE {			
periodic SEQUENCE {			
}			
}			
Usage	Codebook		
pathlossReferenceRS CHOICE {			
ssb-Index	SSB-Index		
}			
srs-ResourceToAddModList SEQUENCE	1 entry		
(SIZE(1maxNrofSRS-Resources)) OF SEQUENCE {			
srs-Resourceld	0		
nrofSRS-Ports	port1		
transmissionComb CHOICE {			
n2 SEQUENCE {			
combOffset-n2	0		
cyclicShift-n2	0		
}			
}			
resourceMapping SEQUENCE {			
startPosition	0		
nrofSymbols	n1		
repetitionFactor	n1		
}			
freqDomainPosition	0		
fregDomainShift	0		
freqHopping SEQUENCE {			
c-SRS	16		
b-SRS	0		
b-hop	0		
}			
groupOrSequenceHopping	Neither		
resourceType CHOICE {			
periodic SEQUENCE {	Periodic		
}			
periodicityAndOffset-p	sl5 : 0	Once every 5	
p = 1.5 = 1.5 = 1.5 = p		Slots	
}			
}			
}			
			1

5.4.3.1.5 Test Requirement

The UE shall apply the signalled Timing Advance value for PSCell in sTAG to the transmission timing at the designated activation time i.e. k slots after the reception of the timing advance command, where k = 11.

The Timing Advance adjustment accuracy for PSCell in sTAG shall be within the limits specified in clause 7.3.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90% with a confidence level of 95%.

Table 5.4.3.1.5-1 and Table 5.4.3.1.5-2 define the primary level settings.

Table 5.4.3.1.5-1: Cell specific test parameters for timing advance

Parameter	Unit	Tes	t1
	Unit	T1	T2
Duplex mode		TD	D
TDD configuration		TDDConf.3.1	
BW _{channel}	MHz	100: N_{RJ}	$_{\rm B,c} = 66$
BWP BW	MHz	100: N _R I	_{B,c} = 66
DRx Cycle	ms	Not App	licable
PDSCH Reference measurement channel		SR.3.1	TDD
CORESET Reference Channel		CR.3.1	TDD
TRS configuration		TRS.2.	1 TDD
TCI configuration		CSI-RS.0	Config.0
OCNG Patterns		OCNG p	
SMTC configuration		SMTC.	1 FR2
PDSCH/PDCCH subcarrier spacing	kHz	120 ا	kHz
PUCCH/PUSCH subcarrier spacing	kHz	120	kHz
EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS to SSS			
EPRE ratio of PBCH to PBCH DMRS			
EPRE ratio of PDCCH DMRS to SSS			
EPRE ratio of PDCCH to PDCCH DMRS	dB	0	
EPRE ratio of PDSCH DMRS to SSS	ub ub	O	
EPRE ratio of PDSCH to PDSCH			
EPRE ratio of OCNG DMRS to SSS(Note 1)			
EPRE ratio of OCNG to OCNG DMRS (Note			
1)			
UE orientation around TBD axis and TBD	degrees	ТВ	D
axis			
$oldsymbol{N_{oc}}$ Note2	dBm/15kH z	-9	8
$N_{oc}^{$	dBm/SCS	-8	9
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathbf{I}_{_{\mathrm{ot}}}$	dB	3	
\hat{E}_s/N_{oc}	dB	3	
IO ^{Note3}	dBm/ 95.04MHz	-57.	96
Propagation condition	-	AWO	GN
Note 1: OCNG shall be used such that both			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Field Value Comment c-SRS 16 Frequency hopping is disabled 0 b-SRS 0 b-hop freqDomainPosition 0 Frequency domain position of SRS freqDomainShift 0 groupOrSequenceHopping neither No group or sequence hopping SRS-PeriodicityAndOffset sl5=0 Once every 5 slots SSB #0 is used for SRS path loss pathlossReferenceRS ssb-Index=0 estimation Codebook Codebook based UL transmission usage startPosition resourceMapping setting. SRS on last 0 nrofSymbols n1 symbol of slot, and 1symbols for SRS repetitionFactor n1 without repetition. combOffset-n2 0 transmissionComb setting cyclicShift-n2 0 nrofSRS-Ports port1 Number of antenna ports used for SRS transmission For further information see clause 6.3.2 in TS 38.331 [2]. Note:

Table 5.4.3.1.5-2: Sounding Reference Symbol Configuration for timing advance

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.5 Signaling characteristics

5.5.1 Radio link monitoring

The requirements in this section apply for radio link monitoring on PSCell in EN-DC operation mode. The UE shall monitor the downlink link quality based on the reference signal in the configured RLM-RS resource(s) in order to detect the downlink radio link quality of the PCell and PSCell as specified in TS 38.213 [8]. The configured RLM-RS resources can be all SSBs, or all CSI-RSs, or a mix of SSBs and CSI-RSs. UE is not required to perform RLM outside the active DL BWP.

On each RLM-RS resource, the UE shall estimate the downlink radio link quality and compare it to the thresholds Q_{out} and Q_{in} for the purpose of monitoring downlink radio link quality of the cell.

5.5.1.0 Minimum conformance requirements

5.5.1.0.1 Minimum conformance requirements for out-of-sync SSB-based RLM

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_out_SSB}}$ [ms] period becomes worse than the threshold $Q_{\text{out_SSB}}$ within $T_{\text{Evaluate_out_SSB}}$ [ms] evaluation period. The requirements in this section apply for each SSB based RLM-RS resource configured for PSCell, provided that the SSB configured for RLM is transmitted within UE active DL BWP during the entire evaluation period defined in Table 5.5.1.0.1-1.

T_{Evaluate out SSB} is defined in Table 5.5.1.0.1-1 for FR2.

Table 5.5.1.0.1-1: Evaluation period T_{Evaluate_out} for FR2

Configuration		T _{Evaluate_out_SSB} (ms)	
no DRX		max(200,ceil(10*P*N)*T _{SSB})	
DRX cycle≤320		$max(200,ceil(15*P*N)*max(T_{DRX},T_{SSB}))$	
DRX cycle>320		ceil(10*P*N)*T _{DRX}	
NOTE: T _{SSB} is the periodicity of SSB configured for RLM. T _{DRX}			
	is the DRX cycle length.		

For FR2,

- $P=1/(1-T_{SSB}/T_{SMTCperiod})$, when RLM-RS is not overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$).
- P is 3, when RLM-RS is not overlapped with measurement gap and RLM-RS is fully overlapped with SMTC period ($T_{SSB} = T_{SMTCperiod}$).
- P is $1/(1-T_{SSB}/MGRP-T_{SSB}/T_{SMTCperiod})$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
- T_{SMTCperiod} ≠ MGRP or
- $T_{SMTCperiod} = MGRP \text{ and } T_{SSB} \le 0.5*T_{SMTCperiod}$
- P is $1/(1-T_{SSB}/MGRP)^*3$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{SSB} = 0.5*T_{SMTCperiod}$
- P is $1/\{1-T_{SSB}/min(T_{SMTCperiod},MGRP)\}$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap
- P is $1/(1-T_{SSB}/MGRP)*3$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is fully overlapped with SMTC occasion ($T_{SSB} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)

The normative reference for this requirement is TS 38.133 [6] clauses 8.1.2.

5.5.1.0.2 Minimum conformance requirements for in-sync SSB-based RLM

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_out_SSB}}$ [ms] period becomes worse than the threshold $Q_{\text{out_SSB}}$ within $T_{\text{Evaluate_out_SSB}}$ [ms] evaluation period.

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_in_SSB}}$ [ms] period becomes better than the threshold $Q_{\text{in_SSB}}$ within $T_{\text{Evaluate_in_SSB}}$ [ms] evaluation period.

T_{Evaluate out SSB} and T_{Evaluate in SSB} are defined in Table 8.1.2.2-1 for FR1.

 $T_{\text{Evaluate_out_SSB}}$ and $T_{\text{Evaluate_in_SSB}}$ are defined in Table 8.1.2.2-2 for FR2 with scaling factor N=8.

For FR2,

$$P = \frac{1}{1 - \frac{T_{SSB}}{T_{SMTCperiod}}}$$
, when RLM-RS is not overlapped with measurement gap and the RLM-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$).

- P is $P_{\text{sharing factor}}$, when the RLM-RS is not overlapped with measurement gap and RLM-RS is fully overlapped with SMTC period ($T_{\text{SSB}} = T_{\text{SMTCperiod}}$).

$$P = \frac{1}{1 - \frac{T_{SSB}}{MRGP} - \frac{T_{SSB}}{T_{SMTCperiod}}}$$
, when the RLM-RS is partially overlapped with measurement gap and the RLM-RS is

partially overlapped with SMTC occasion ($T_{SSB} \le T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and

- $T_{SMTCperiod} \neq MGRP$ or
- $T_{SMTCperiod} = MGRP$ and $T_{SSB} < 0.5*T_{SMTCperiod}$

$$P = \frac{P_{sharing\ factor}}{1 - \frac{T_{SSB}}{MRGP}}$$
, when the RLM-RS is partially overlapped with measurement gap and the RLM-RS is

partially overlapped with SMTC occasion ($T_{SSB} \le T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{SSB} = 0.5*T_{SMTCperiod}$

$$P = \frac{1}{1 - \frac{T_{SSB}}{Min(MRGP, T_{SMTCperiod})}},$$
 when the RLM-RS is partially overlapped with measurement gap and the RLM-RS

is partially overlapped with SMTC occasion ($T_{SSB} \le T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap

$$P = \frac{\frac{P_{sharing\ factor}}{1 - \frac{T_{SSB}}{MRGP}}}{1 - \frac{T_{SSB}}{MRGP}}$$
, when the RLM-RS is partially overlapped with measurement gap and the RLM-RS is fully

overlapped with SMTC occasion ($T_{SSB} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)

- P_{sharing factor} = 1
 - if all of the reference signals configured for RLM outside measurement gap are not fully overlapped by intrafrequency SMTC occasions, or
 - if all of the reference signal configured for RLM outside measurement gap and fully-overlapped by intrafrequency SMTC occasions are not overlapped by with the SSB symbols indicated by SSB-ToMeasure and 1 symbol before each consecutive SSB symbols indicated by SSB-ToMeasure and 1 symbol after each consecutive SSB symbols indicated by SSB-ToMeasure, given that SSB-ToMeasure is configured;
- $P_{\text{sharing factor}} = 3$, otherwise.

If the high layer in TS 38.331 [2] signalling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; Otherwise $T_{SMTCperiod}$ follows smtc1.

Longer evaluation period would be expected if the combination of RLM-RS, SMTC occasion and measurement gap configurations does not meet previous conditions.

Table 5.5.1.0.2-1: Evaluation period T_{Evaluate_out_SSB} and T_{Evaluate_in_SSB} for FR2

Configuration	T _{Evaluate_out_SSB} (ms)	T _{Evaluate_in_SSB} (ms)
no DRX	Max(200, Ceil(10*P*N)*T _{SSB})	Max(100, Ceil(5*P*N)*T _{SSB})
DRX cycle≤320	Max(200,	Max(100,
_	Ceil(15*P*N)*Max(T _{DRX} ,T _{SSB}))	$Ceil(7.5*P*N)*Max(T_{DRX},T_{SSB}))$
DRX cycle>320	Ceil(10*P*N)*T _{DRX}	Ceil(5*P*N)*T _{DRX}
NOTE: T _{SSB} is the periodicity of the SSB configured for RLM. T _{DRX} is the DRX cycle length.		

Figure 5.5.1.2.4-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The rate of correct events observed during repeated tests shall be at least 90%.

5.5.1.0.3 Minimum conformance requirements for out-of-sync CSI-RS based RLM

[TS 38.133, clause 8.1.3.1]

The requirements apply for each CSI-RS based RLM-RS resource configured for PSCell, provided that the CSI-RS configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in TS 38.133, clause 8.1.3.2. UE is not expected to perform radio link monitoring measurements on the CSI-RS configured as RLM-RS if the CSI-RS is not in the active TCI state of any CORESET configured in the UE active BWP.

Table 5.5.1.0.3-1: PDCCH transmission parameters for out-of-sync

Attribute	Value for BLER Configuration #0
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	4dB
Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	4dB
Bandwidth (MHz)	48
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

[TS 38.133, clause 8.1.3.2]

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_out_CSI-RS}}$ [ms] period becomes worse than the threshold $Q_{\text{out_CSI-RS}}$ within $T_{\text{Evaluate_out_CSI-RS}}$ [ms] evaluation period.

T_{Evaluate_out_CSI-RS} is defined in Table 5.5.1.0.3-2 for FR2 with N=1. The requirements of T_{Evaluate_out_CSI-RS} applies provided that the CSI-RS for RLM is not in a resource set configured with repetition ON. The requirements doesn't apply when the CSI-RS resource in the active TCI state of CORESET is the same CSI-RS resource for RLM and the TCI state information of the CSI-RS resource is not given, wherein the TCI state information means QCL Type-D to SSB for L1-RSRP or CSI-RS with repetition ON.

For FR2,

- P=1, when RLM-RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.
- $P=1/(1-T_{CSI-RS}/MGRP)$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is not overlapped with SMTC occasion ($T_{CSI-RS} < MGRP$)
- $P=1/(1-T_{CSI-RS}/T_{SMTCperiod})$, when RLM-RS is not overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$).
- P is 3, when RLM-RS is not overlapped with measurement gap and RLM-RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$).
- P is $1/(1-T_{CSI-RS}/MGRP-T_{CSI-RS}/T_{SMTCperiod})$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
 - $T_{SMTCperiod} \neq MGRP$ or
 - T_{SMTCperiod} = MGRP and T_{CSI-RS} < 0.5*T_{SMTCperiod}

- P is $1/(1-T_{CSI-RS}/MGRP)^*$ 3, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTC,period}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTC,period} = MGRP$ and $T_{CSI-RS} = 0.5^*T_{SMTC,period}$
- P is $1/\{1-T_{CSI-RS} / min (T_{SMTCperiod}, MGRP)\}$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ 3, when RLM-RS is partially overlapped with measurement gap and RLM-RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)

If the high layer in TS 38.331 [2] signalling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; Otherwise $T_{SMTCperiod}$ follows smtc1.

Note:

The overlap between CSI-RS RLM and SMTC means that CSI-RS based RLM is within the SMTC window duration. Longer evaluation period would be expected if the combination of RLM-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The value of M_{out} used in Table 5.5.1.0.3-2 is defined as:

- M_{out} = 20 if the CSI-RS resource configured for RLM is transmitted with higher layer CSI-RS parameter *density* set to 3 and over the bandwidth \geq 24 PRBs.

requirements in this table apply for T_{CSI-RS} equal to 5 ms, 10 ms, 20 ms

Table 5.5.1.0.3-2: Evaluation period T_{Evaluate_out_CSI-RS} for FR2

[770 00 400] 0 4 0 0]

[TS 38.133, clause 8.1.3.3]

The UE is required to be capable of measuring CSI-RS for RLM without measurement gaps. The UE is required to perform the CSI-RS measurements with measurement restrictions as described in the following clauses.

For FR2, when the CSI-RS for RLM is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for RLM in the PRBs that overlap with an SSB.

or 40 ms. T_{DRX} is the DRX cycle length.

For FR2, when the CSI-RS for RLM is in the same OFDM symbol as SSB for RLM/BFD/L1-RSRP measurement, or in the same symbol as SSB for CBD when beam failure is detected, UE is required to measure one of but not both CSI-RS for RLM and SSB. Longer measurement period for CSI-RS based RLM is expected, and no requirements are defined.

For FR2, when the CSI-RS for RLM is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement,

- In the following cases, UE is required to measure one of but not both CSI-RS for RLM and the other CSI-RS. Longer measurement period for CSI-RS based RLM is expected, and no requirements are defined.
 - The CSI-RS for RLM or the other CSI-RS in a resource set configured with repetition ON, or
 - The other CSI-RS is configured in q1 and beam failure is detected, or
 - The two CSI-RS-es are not QCL-ed w.r.t. QCL-TypeD, or the QCL information is not known to UE,
- Otherwise, UE shall be able to measure the CSI-RS for RLM without any restriction.

[TS 38.133, clause 8.1.4 and 8.1.5]

When the UE transitions between DRX and no DRX or when DRX cycle periodicity changes, for each RLM-RS resource, for a duration of time equal to the evaluation period corresponding to the second mode after the transition

occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation period corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode for each RLM-RS resource. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of RLM-RS resources to a second configuration of RLM-RS resources that is different from the first configuration, for each RLM-RS resource present in the second configuration, for a duration of time equal to the evaluation period corresponding to the second configuration after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first configuration and the second configuration. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second configuration for each RLM-RS resource present in the second configuration. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of active TCI state of the CORESET to a second configuration of active TCI state of the CORESET, for each CSI-RS for RLM present in the second configuration, the UE shall use an evaluation period corresponding to the second configuration from the time of transition. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

The transmitter power of the UE in the monitored cell shall be turned off within 40ms after expiry of T310 timer as specified in TS 38.331.

[TS 38.133, clause 8.1.6]

When the downlink radio link quality on all the configured RLM-RS resources is worse than Q_{out} , Layer 1 of the UE shall send an out-of-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 38.331.

The out-of-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 in TS 38.213. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval}$.

When DRX is not used $T_{Indication_interval}$ is max(10ms, $T_{RLM-RS,M}$), where $T_{RLM,M}$ is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to T_{SSB} specified in clause 8.1.2 if the RLM-RS resource is SSB, or T_{CSI-RS} specified in clause 8.1.3 if the RLM-RS resource is CSI-RS.

In case DRX is used, $T_{Indication_interval}$ is max(10ms, 1.5*DRX_cycle_length, 1.5*T_{RLM-RS,M}) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms. Upon start of T310 timer as specified in TS 38.331 [2], the UE shall monitor the configured RLM-RS resources for recovery using the evaluation period and Layer 1 indication interval corresponding to the no DRX mode until the expiry or stop of T310 timer.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 8.1.3, 8.1.4, 8.1.5 and 8.1.6.

5.5.1.0.4 Minimum conformance requirements for in-sync CSI-RS based RLM

[TS 38.133, clause 8.1.3.1]

The requirements apply for each CSI-RS based RLM-RS resource configured for PSCell, provided that the CSI-RS configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in TS 38.133 clause 8.1.3.2. UE is not expected to perform radio link monitoring measurements on the CSI-RS configured as RLM-RS if the CSI-RS is not in the active TCI state of any CORESET configured in the UE active BWP.

Value for BLER Configuration #0 Attribute DCI payload size 1-0 Number of control OFDM 2 symbols Aggregation level (CCE) 4 Ratio of hypothetical PDCCH RE energy to average CSI-RS 0dB RE energy Ratio of hypothetical PDCCH [0]dB DMRS energy to average CSI-RS RE energy Bandwidth (MHz) 48 Sub-carrier spacing (kHz) SCS of the active DL BWP DMRS precoder granularity REG bundle size REG bundle size 6

Table 5.5.1.0.4-1: PDCCH transmission parameters for in-sync

[TS 38.133, clause 8.1.3.2]

CP length

Mapping from REG to CCE

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_in_CSI-RS}}$ [ms] period becomes better than the threshold $Q_{\text{in_CSI-RS}}$ within $T_{\text{Evaluate_in_CSI-RS}}$ [ms] evaluation period.

Normal

Distributed

T_{Evaluate_in_CSI-RS} is defined in Table 5.5.1.0.4-2 for FR2 with N=1. The requirements of T_{Evaluate_in_CSI-RS} applies provided that the CSI-RS for RLM is not in a resource set configured with repetition ON. The requirements doesn't apply when the CSI-RS resource in the active TCI state of CORESET is the same CSI-RS resource for RLM and the TCI state information of the CSI-RS resource is not given, wherein the TCI state information means QCL Type-D to SSB for L1-RSRP or CSI-RS with repetition ON.

For FR2,

- P=1, when RLM-RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.
- $P=1/(1-T_{CSI-RS}/MGRP)$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is not overlapped with SMTC occasion ($T_{CSI-RS} < MGRP$)
- $P=1/(1-T_{CSI-RS}/T_{SMTCperiod})$, when RLM-RS is not overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$).
- P is 3, when RLM-RS is not overlapped with measurement gap and RLM-RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$).
- P is $1/(1-T_{CSI-RS}/MGRP-T_{CSI-RS}/T_{SMTCperiod})$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
 - $T_{SMTCperiod} \neq MGRP$ or
 - $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} < 0.5*T_{SMTCperiod}$
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ 3, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTC,period}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTC,period} = MGRP$ and $T_{CSI-RS} = 0.5^*T_{SMTC,period}$
- P is $1/\{1-T_{CSI-RS} / min (T_{SMTCperiod}, MGRP)\}$, when RLM-RS is partially overlapped with measurement gap and RLM-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap
- P is $1/(1-T_{CSI-RS}/MGRP)*$ 3, when RLM-RS is partially overlapped with measurement gap and RLM-RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)

If the high layer in TS 38.331 [2] signalling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; Otherwise $T_{SMTCperiod}$ follows smtc1.

Note:

The overlap between CSI-RS RLM and SMTC means that CSI-RS based RLM is within the SMTC window duration. Longer evaluation period would be expected if the combination of RLM-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The values of M_{in} used in Table 5.5.1.0.4-2 are defined as:

- M_{in} = 10, if the CSI-RS resource configured for RLM is transmitted with higher layer CSI-RS parameter *density* set to 3 and over the bandwidth ≥ 24 PRBs.

Table 5.5.1.0.4-2: Evaluation period T_{Evaluate_in_CSI-RS} for FR2

	Configuration	T _{Evaluate_in_CSI-RS} (ms)	
	no DRX	$max(100, ceil(M_{in} \times P \times N) \times T_{CSI-RS})$	
DRX ≤ 320ms		max(100, ceil(1.5×M _{in} ×P×N)×	
		$max(T_{DRX}, T_{CSI-RS}))$	
	DRX > 320ms	$ceil(M_{in} \times P \times N) \times T_{DRX}$	
NOTE:	NOTE: T _{CSI-RS} is the periodicity of CSI-RS resource configured for RLM. The		
	requirements in this table apply for T_{CSI-RS} equal to 5 ms, 10 ms, 20		
	ms or 40 ms. T _{DRX} is the DRX cycle length.		

[TS 38.133, clause 8.1.3.3]

The UE is required to be capable of measuring CSI-RS for RLM without measurement gaps. The UE is required to perform the CSI-RS measurements with measurement restrictions as described in the following clauses.

For FR2, when the CSI-RS for RLM is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for RLM in the PRBs that overlap with an SSB.

For FR2, when the CSI-RS for RLM is in the same OFDM symbol as SSB for RLM/BFD/L1-RSRP measurement, or in the same symbol as SSB for CBD when beam failure is detected, UE is required to measure one of but not both CSI-RS for RLM and SSB. Longer measurement period for CSI-RS based RLM is expected, and no requirements are defined.

For FR2, when the CSI-RS for RLM is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement,

- In the following cases, UE is required to measure one of but not both CSI-RS for RLM and the other CSI-RS. Longer measurement period for CSI-RS based RLM is expected, and no requirements are defined.
 - The CSI-RS for RLM or the other CSI-RS in a resource set configured with repetition ON, or
 - The other CSI-RS is configured in q1 and beam failure is detected, or
 - The two CSI-RS-es are not QCL-ed w.r.t. QCL-TypeD, or the QCL information is not known to UE,
- Otherwise, UE shall be able to measure the CSI-RS for RLM without any restriction.

[TS 38.133, clause 8.1.4 and 8.1.5]

When the UE transitions between DRX and no DRX or when DRX cycle periodicity changes, for each RLM-RS resource, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation period corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode for each RLM-RS resource. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of RLM-RS resources to a second configuration of RLM-RS resources that is different from the first configuration, for each RLM-RS resource present in the second configuration, for a duration of time equal to the evaluation period corresponding to the second configuration after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first configuration and the second configuration. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second configuration for each RLM-RS resource present in the second configuration. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of active TCI state of the CORESET to a second configuration of active TCI state of the CORESET, for each CSI-RS for RLM present in the second configuration, the UE shall use an evaluation period corresponding to the second configuration from the time of transition. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

The transmitter power of the UE in the monitored cell shall be turned off within 40ms after expiry of T310 timer as specified in TS 38.331 [2].

[TS 38.133, clause 8.1.6]

When the downlink radio link quality on at least one of the configured RLM-RS resources is better than Q_{in} , Layer 1 of the UE shall send an in-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the in-sync indications as specified in TS 38.331 [2].

The in-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 in TS 38.213 [3]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication\ interval}$.

When DRX is not used $T_{Indication_interval}$ is max(10ms, $T_{RLM-RS,M}$), where $T_{RLM,M}$ is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to T_{SSB} specified in clause 8.1.2 if the RLM-RS resource is SSB, or T_{CSI-RS} specified in clause 8.1.3 if the RLM-RS resource is CSI-RS.

In case DRX is used, $T_{Indication_interval}$ is max(10ms, 1.5*DRX_cycle_length, 1.5*T_{RLM-RS,M}) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms. Upon start of T310 timer as specified in TS 38.331 [2], the UE shall monitor the configured RLM-RS resources for recovery using the evaluation period and Layer 1 indication interval corresponding to the no DRX mode until the expiry or stop of T310 timer.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 8.1.3, 8.1.4, 8.1.5 and 8.1.6.

5.5.1.1 EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- -Initial Conditions has some TBD
- -Test Requirement has some TBD
- Test Procedure will need further editing and review

5.5.1.1.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell configured with SSB-based RLM RS in non-DRX mode. This test will partly verify the NR cell radio link monitoring requirements in TS 38.133 [6] section 8.1.2.

5.5.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.5.1.1.3 Minimum conformance requirement

The minimum requirements are specified in clause 5.5.1.0.1. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.1.

5.5.1.1.4 Test description

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1 as defined in 38.133 [6]. The test consists of three successive time periods, with time

duration of T1, T2 and T3 respectively. Figure 5.5.1.1.4-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 2.

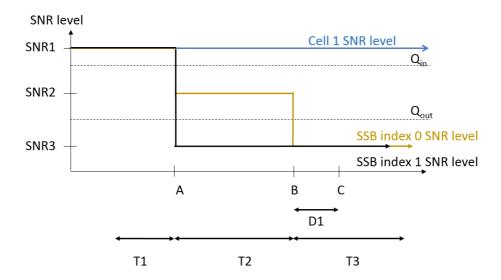


Figure 5.5.1.1.4-1: SNR variation for out-of-sync testing

5.5.1.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table 5.3.5-1 of 38.521-2 [18].

This test shall be tested using any of the test configurations in Table 5.5.1.1.4.1-1.

Table 5.5.1.1.4.1-1: EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode supported test configurations

Configuration	Description		
1	FDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode		
2	TDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode		
Note: The UE is only required to pass in one of the supported test configurations in FR2			

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.1.4.1-2

Table 5.5.1.1.4.1-2: Initial conditions for EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Parameter	Value		Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies			2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth		As specified by the test configuration	on selected from Table 5.5.1.1.4.1-1
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.3.1.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.4.1.1	
Exceptions to connection diagram	N/A		

PDCCH transmission parameters are given in Table 5.5.1.1.4.1-3

Table 5.5.1.1.4.1-3: PDCCH transmission parameters for out-of-sync

Attribute	Value for BLER Configuration #0
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	4dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	4dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 5.5.1.1.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR2 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The test parameters are given in Table 5.5.1.1.4.1-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex [C.x].

Table 5.5.1.1.4.1-4: General test parameters for FR2 out-of-sync testing in non-DRX mode

Parameter			Unit	Value	
				Test 1	
Active E-UTRA PCell				Cell 1	
E-UTRA RF Channel Number				1	
Active PSCell	anner Number			Cell 2	
RF Channel Nur	mher			2	
Duplex mode	TIDEI	Config 1, 2		TDD	
BW _{channel}		Config 1, 2		100: N _{RB,c} = 66	
DL initial BWP c	onfiguration	Config 1, 2		DLBWP.0.1	
DL dedicated B\		Config 1, 2		DLBWP.1.1	
configuration	, • .	Coming 1, 2		DEBVVI.I.I	
UL initial BWP c	onfiguration	Config 1, 2		ULBWP.0.1	
UL dedicated B\		Config 1, 2		ULBWP.1.1	
configuration		001111g 1, 1		015777.11.1	
TDD Configurati	ion	Config 1, 2		TBD	
CORESET Refe		Config 1, 2		CR.3.1 TDD	
SSB Configurati		Config 1, 2		SSB.1 FR2	
SMTC Configura		Config 1, 2		SMTC.1	
PDSCH/PDCCH		Config 1, 2		120 KHz	
spacing		J ,			
PRACH Configu	ıration	Config 1, 2		Table A.3.8.3.4	
SSB index assig		Config 1, 2		0,1	
RS	,			,	
TCI Configuration	n	Config 1, 2		TBD	
OCNG paramete	ers	<u> </u>		OP.1	
CP length				Normal	
Correlation Matr	rix and Antenna C	Configuration		2x2 Low	
Out of sync	DCI format			1-0	
transmission		trol OFDM symbols		2	
parameters	Number of Con	iti of Of Divi Symbols		2	
paramotoro	Aggregation lev		CCE	8	
		etical PDCCH RE	dB	4	
	energy to avera	age SSS RE energy			
	Datic of by moth	atical DDCCH DMDC	4D		
		etical PDCCH DMRS	dB	4	
	energy to avera	age SSS RE energy			
	_			REG bundle size	
	DMRS precode	er granularity		REG buildle size	
	REG bundle siz	ze		6	
DRX	•			OFF	
Gap pattern ID				gp0	
Layer 3 filtering				Enabled	
T040 1					
T310 timer			ms	0	
T311 timer			ms	1000	
N310 N311				1	
				1	
CSI-RS configuration Config 1, 2				[CSI-RS.3.3 TDD]	
T1			S S	[1]	
	T2			[10]	
T3			S	[12]	
D1 Note 1: All co	onfigurations are	accianad to the LIE aria	S S	[9.64]	
		assigned to the UE pric s not transmitted after T		ume penou rt.	
		RX mode under test.	± 3(a) (3.		
Note 5. E-0 TRAIN IS III NOTE DICK Mode under test.					

5.5.1.1.4.2 Test Procedure

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 5.5.1.1.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [6] clause 5.5.
- 2. Set the parameters according to T1 in Table 5.5.1.1.4.4-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.1.1.4.4-1 for subtests 1 and 2. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.1.1.4.4-1 for subtests 1 and 2. T3 starts.

5. If the SS:

a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each subframe configured for CQI transmission (according to configured CQI periodicity on PUCCH [format 1]) during the period from time point A to time point B

and

b) does not detect any uplink power higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C (240 ms after the start of T3) until T3 expires,

the number of successful tests is increased by one.

- 6. Otherwise the number of failed tests is increased by one and proceed to Step 10.
- 7. When T3 expires the SS shall change the SNR value to T1 as specified in Table 5.5.1.1.4.4-1.
- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 9. The SS then shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions:

Table 5.5.1.1.4.3-1: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
searchSpaceId	0	SearchSpaceId with condition CSS	CSS
controlResourceSetId	0	ControlResourceS etId	
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
Duration	2		
monitoringSymbolsWithinSlot	1100000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
common SEQUENCE {			CSS, SISS
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 5.5.1.1.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200			
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		
}			

Table 5.5.1.1.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	66	100 MHz (120	
		KHz SCS)	
}			

5.5.1.1.5 Test Requirement

Table 5.5.1.1.5-1 defines the cell specific primary level settings.

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

Table 5.5.1.1.5-1: OTA related cell specific test parameters for FR2 (Cell 2) for out-of-sync radio link monitoring tests in non-DRX mode

Parar	Unit		Test 1		
		T1	T2	T3	
AoA setup		Setup	3 defined in	A.3.15	
EPRE ratio of PDCCH	I DMRS to SSS	dB		4	
EPRE ratio of PDCCH	I to PDCCH DMRS	dB		0	
EPRE ratio of PBCH [DMRS to SSS	dB			
EPRE ratio of PBCH t	o PBCH DMRS	dB			
EPRE ratio of PSS to	SSS	dB			
EPRE ratio of PDSCH	DMRS to SSS	dB		0	
EPRE ratio of PDSCH	to PDSCH DMRS	dB			
EPRE ratio of OCNG	DMRS to SSS	dB			
EPRE ratio of OCNG	to OCNG DMRS	dB			
ssb-Index 0 SNR	Config 1, 2	dB	1	-7	-15
ssb-Index 1 SNR	Config 1, 2		1	-15	-15
N_{oc}	Config 1, 2	dBm/1		TBD	
OC .		5KHz		160	
Propagation condition				L-A 30ns 75	
	ll be used such that the				
constant to	pectral de	ensity is achie	eved for all C	DFDM	
symbols.					
	Es other t	han the devi	ce under tes	t as part of	
000.	OCNG.				
Note 3: SNR levels correspond to the signal to noise					
		JE which su			
	ch suppor	ts 4RX on al	I bands, the	SNR	
during T3 is A.3.6.					

Table 5.5.1.1.5-2: Measurement gap configuration for out-of-sync tests in non-DRX mode

Field		Test 1	
	Fielu	Value	
ga	apOffset	0	
Note 1: E-UTRAN PCell a		l and PSCell are SFN-synchronous and frame boundary aligned. (Ensure	
that RLM RS is partially overlapped with measurement gap).			

5.5.1.2 EN-DC FR2 Radio Link Monitoring In-sync Test for FR2 PSCell configured with SSB-based RLM RS in non-DRX mode

Editor's Notes: This test case is incomplete. The following aspects are either missing or not yet determined

- Test procedure is needs further updates specific to OTA aspect
- MU/TT is FFS

5.5.1.2.1 Test Purpose

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell. This test will partly verify the FR2 PSCell radio link monitoring requirements in clause 8.1 of TS 38.133 [3].

5.5.1.2.2 Test Applicability

This test applies to all types of E-UTRA UEs Release 15 and forward supporting EN-DC FR2.

5.5.1.2.3 Minimum Conformance Requirements

The minimum requirements are specified in clause 5.5.1.0.2. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.2.

5.5.1.2.4 Test Description

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-2. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 5.5.1.2.4-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5ms.

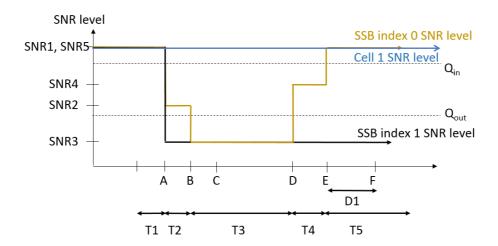


Figure 5.5.1.2.4-1: SNR variation for in-sync testing

5.5.1.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table [5.3.5-1] and Table 5.3.5-1 of 38.521-2 [18].

This test shall be tested using any of the test configurations in Table 5.5.1.2.4.1-1.

Table 5.5.1.2.4.1-1: Supported test configurations for FR2 PSCell

Configuration	Description
1	FDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode
2	TDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note: The U	JE is only required to pass in one of the supported test configurations in FR2

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.2.4.1-2.

Table 5.5.1.2.4.1-2: Initial conditions for EN-DC FR2 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Parameter	Value		Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies			2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth		As specified by the test configuration	on selected from Table 5.5.1.3.4.1-1
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part A.3.3.1.1		As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.4.1.1	
Exceptions to connection diagram	N/A		

PDCCH transmission parameters are given in Table 5.5.1.2.4.1-3.

Table 5.5.1.2.4.1-3: PDCCH transmission parameters for in-sync

Attribute	Value for BLER Configuration #0
DCI payload size	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	4
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	OdB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	0dB
Bandwidth (MHz)	TBD
Sub-carrier spacing (kHz)	TBD
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 5.5.1.2.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR2 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The general test parameters are given in Table 5.5.1.2.5-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.

Table 5.5.1.2.4.1-4: General test parameters for FR2 in-sync testing in non-DRX mode

Parameter		Unit	Value
			Test 1
Active E-UTRA PCell			Cell 1
E-UTRA RF Channel Number			1
Active PSCell			Cell 2
RF Channel Number			2
Duplex mode	Config 1, 2		TDD
BW _{channel}	Config 1, 2		100: $N_{RB,c} = 66$
DL initial BWP configuration	Config 1, 2		DLBWP.0.1
DL dedicated BWP Config 1, 2			DLBWP.1.1
configuration			
UL initial BWP configuration	Config 1, 2		ULBWP.0.1

UL dedicated B\	ΝP	Config 1, 2		ULBWP.1.1
	configuration			OLDWI II.I
TDD Configurati	ion	Config 1, 2		TDDConf.3.1
CORESET Refe		Config 1, 2		CR.3.1 TDD
SSB Configurati		Config 1, 2		SSB.1 FR2
SMTC Configura		Config 1, 2		SMTC.3
PDSCH/PDCCH		Config 1, 2		120 KHz
spacing	roubourior	301.11g 1, 1		120 11.12
PRACH Configu	ıration	Config 1, 2		Table A.3.8.3.4
	ned as RLM RS	Config 1, 2		0,1
OCNG paramete		,g -, -		OP.2
CP length				Normal
	rix and Antenna C	onfiguration		2x2 Low
In sync	DCI format	<u> </u>		1-0
transmission		rol OFDM symbols		2
parameters	Aggregation leve		CCE	4
-		etical PDCCH RE	dB	0
		ge SSS RE energy		
		etical PDCCH DMRS	dB	0
		ge SSS RE energy		
	DMRS precoder			REG bundle size
	REG bundle size	9		6
Out of sync	DCI format			1-0
transmission	Number of Control OFDM symbols			2
parameters	Aggregation leve	el	CCE	8
	Ratio of hypothe	tical PDCCH RE	dB	4
		ge SSS RE energy		
		etical PDCCH DMRS	dB	4
		ge SSS RE energy		
	DMRS precoder			REG bundle size
	REG bundle size	9		6
DRX				OFF
Gap pattern ID				N.A.
Layer 3 filtering				Enabled
T310 timer			ms	4000
T311 timer			ms	1000
N310				1
N311				1
CSI-RS for CSI		Config 1, 2		CSI-RS.3.1 TDD
TCI states for P				TCI.State.2
CSI-RS for track	king	Config 1, 2		TRS.2.1 TDD
T1			S	0.2
T2			S	0.2
T3		S	1.88	
T4			S	0.2
T5			S	3.84
D1	· · ·		S	3.8
		ssigned to the UE prior		me period 11.
		not transmitted after T1	. starts.	
Note 3: E-UT	KAN IS IN NON-DR	X mode under test.		

5.5.1.2.4.2 Test procedure

Editor's Note: Test procedure updates to ensure accurate FR2 test measurement state is TBD

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 5.5.1.2.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release On according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.5.1.2.4-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.

- 3. When T1 expires, the SS shall change the SNR value to T2 as specified in Table 5.5.1.2.5-1. T2 starts.
- 4. When T2 expires, the SS shall change the SNR value to T3 as specified in Table 5.5.1.2.5-1. T3 starts.
- 5. When T3 expires, the SS shall change the SNR value to T3 as specified in Table 5.5.1.2.5-1. T4 starts.
- 6. When T4 expires, the SS shall change the SNR value to T3 as specified in Table 5.5.1.2.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than [-50] dBm in the On-duration part of every DRX cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point F (1120 ms after the start of time duration T5) the number of successful tests is increased by one.
 - Otherwise the number of failed tests is increased by one.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.2.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions.

Table 5.5.1.2.4.3-1: Common Exception messages for EN-DC FR2 Radio Link Monitoring In-Sync Test for FR2 PSCell configured with SSB-based RLM RS in non-DRX mode

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions.

Table 5.5.1.2.4.3-2: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
duration	2		
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 5.5.1.2.4.3-3: RLF-TimersAndConstant

Derivation Path: TS 38.508-1 [14], Table 4.6.3-150						
Information Element	Value/remark	Comment	Condition			
RLF-TimersAndConstants ::= SEQUENCE {						
t310	ms4000					
n310	n1					
n311	n1					
t311-v1530	ms1000					
}						

Table 5.5.1.2.4.3-4: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	66	100 MHz (120	
		KHz SCS)	
}			

5.5.1.2.5 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The rate of correct events observed during repeated tests shall be at least 90% with a 95% confidence interval.

5.5.1.2.5-1: OTA related cell specific test parameters for FR2 (Cell 2) for in-sync radio link monitoring tests in non-DRX mode

Parameter		Unit	Test 1				
			T1 T2 T3 T4				T5
AoA setup			Setup 3 defined in A.9.3				
EPRE ratio of PDCCH D	EPRE ratio of PDCCH DMRS to SSS				4		
EPRE ratio of PDCCH to	EPRE ratio of PDCCH to PDCCH DMRS				0		
EPRE ratio of PBCH DM	RS to SSS	dB					
EPRE ratio of PBCH to F	PBCH DMRS	dB					
EPRE ratio of PSS to SS	SS	dB					
EPRE ratio of PDSCH D	MRS to SSS	dB			0		
EPRE ratio of PDSCH to	PDSCH DMRS	dB					
EPRE ratio of OCNG DM	IRS to SSS	dB					
EPRE ratio of OCNG to	OCNG DMRS	dB					
ssb-Index 0 SNR	Config 1, 2	dB	2	-6	-15	-4.5	2
ssb-Index 1 SNR	Config 1, 2		2 -15 -15 -15 -			-15	
SNR on other channels	Config 1, 2	dB			2		
and signals							
N_{oc}	Config 1, 2	dBm/1		_	92.1dBr	n	
		5KHz			92.1UDI		
Propagation condition					-A 30ns		
	e used such that the res						stant
	total transmitted power spectral density is achieved for all OFDM symbols.						
Note 2: The signal contains PDCCH for UEs other than the device under test as part of C				art of OC	NG.		
Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.							
	es are specified for testir						band.
For testing of	a UE which supports 4R	X on all ba	ınds, the	SNR du	ring T3 is	s A.3.6.	

5.5.1.3 EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- -Initial Conditions has some TBD
- -Test Requirement has some TBD
- Test Procedure needs to be finalized and reviewed.

5.5.1.3.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PSCell configured with SSB-based RLM RS when DRX is used. This test will partly verify the NR cell radio link monitoring requirements in TS 38.133 [6] section 8.1.2.

5.5.1.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.5.1.3.3 Minimum conformance requirement

The minimum requirements are specified in clause 5.5.1.0.1. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.3.

5.5.1.3.4 Test description

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-2 as defined in 38.133 [6]. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 5.5.1.3.4-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 2.

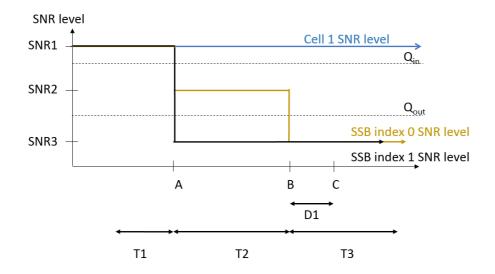


Figure 5.5.1.3.4-1: SNR variation for out-of-sync testing

5.5.1.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table 5.3.5-1 of 38.521-2 [18].

This test shall be tested using any of the test configurations in Table 5.5.1.3.4.1-1.

Table 5.5.1.3.4.1-1: EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode supported test configurations

Configuration	Description
1	FDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode
2	TDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note: The U	JE is only required to pass in one of the supported test configurations in FR2

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.3.4.1-2

Table 5.5.1.3.4.1-2: Initial conditions for EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Parameter	Value		Comment	
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies			2-1 and TS 38.508-1 [14] clause 4.3.1.	
Channel bandwidth		As specified by the test configuration selected from Table 5.5.1.3.4.1-1		
Propagation conditions		AWGN	As specified in Annex C.2.2.	
Connection	TE Part	A.3.3.1.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.4.1.1		
Exceptions to connection diagram		N/A		

PDCCH transmission parameters are given in Table 5.5.1.3.4.1-3

Table 5.5.1.3.4.1-3: PDCCH transmission parameters for out-of-sync

Attribute	Value for BLER Configuration #0
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	4dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	4dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 5.5.1.3.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR2 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The test parameters are given in Table 5.5.1.3.4.1-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex [C.x].

Table 5.5.1.3.4.1-4: General test parameters for FR2 out-of-sync testing in DRX mode

Parameter		Unit	Value	
				Test 1
Active E-UTRA F	OCall .			Cell 1
E-UTRA RF Cha				
Active PSCell	uniei Numbei			Cell 2
RF Channel Nur	mhor			2
Duplex mode	ilibei	Config 1, 2		TDD
BW _{channel}		Config 1, 2		100: N _{RB,c} = 66
DL initial BWP co	onfiguration	Config 1, 2		DLBWP.0.1
DL dedicated BV		Config 1, 2		DLBWP.1.1
configuration	VI	Coming 1, 2		DLBWI .I.I
UL initial BWP co	onfiguration	Config 1, 2		ULBWP.0.1
UL dedicated BV		Config 1, 2		ULBWP.1.1
configuration	VI	Coming 1, 2		OLDWI .I.I
TDD Configuration	On.	Config 1, 2		TBD
CORESET Refe		Config 1, 2		CR.3.1 TDD
SSB Configuration		Config 1, 2		SSB.1 FR2
SMTC Configura		Config 1, 2		SMTC.1
PDSCH/PDCCH		Config 1, 2		120 KHz
spacing	Jubeanier	Coming 1, 2		120 KHZ
PRACH Configu	ration	Config 1, 2		Table A.3.8.3.4
SSB index assig		Config 1, 2		0,1
RS RS	ned as relivi	Coming 1, 2		0,1
TCI Configuratio	n	Config 1, 2		TBD
OCNG paramete		Coming 1, 2		OP.1
CP length	<i>7</i> 10			Normal
Correlation Matr	ix and Antenna (Configuration		2x2 Low
Out of sync	DCI format			1-0
transmission	Number of Control OFDM symbols			2
parameters	Aggregation lev	/el	CCE	8
		etical PDCCH RE	dB	4
		age SSS RE energy	""	·
		etical PDCCH DMRS	dB	4
	energy to avera	age SSS RE energy		
	DMRS precode	er granularity		REG bundle size
	<u> </u>			-
DDV Configurati	REG bundle siz	<u> </u>		6 6
DRX Configurati	OH			[DRX.3]
Gap pattern ID Layer 3 filtering				N.A. Enabled
Layer 3 illering				Enableu
T310 timer			ms	0
T311 timer			ms	1000
N310			1	
N311			1	
CSI-RS configuration Config 1, 2			[CSI-RS.3.3 TDD]	
T1			S	[4]
T2			S	[15]
T3			S	[15]
D1			S	[14.44]
		assigned to the UE pric		of time period T1.
		not transmitted after T	1 starts.	
Note 3: E-UTI	RAN is in non-DF	RX mode under test.		

5.5.1.3.4.2 Test Procedure

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 5.5.1.3.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [6] clause 5.5.
- 2. Set the parameters according to T1 in Table 5.5.1.3.5-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.1.3.5-1 for subtests 1 and 2. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.1.3.5-1 for subtests 1 and 2. T3 starts.

5. If the SS:

a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each subframe configured for CQI transmission (according to configured CQI periodicity on PUCCH [format 1]) during the period from time point A to time point B

and

b) does not detect any uplink power higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C (240 ms after the start of T3) until T3 expires,

the number of successful tests is increased by one.

- 6. Otherwise the number of failed tests is increased by one and proceed to Step 10.
- 7. When T3 expires the SS shall change the SNR value to T1 as specified in Table 5.5.1.3.4.4-1.
- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 9. The SS then shall transmit RRCConnectionReconfiguration message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit RRCConnectionReconfigurationComplete message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.3.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions:

Table 5.5.1.3.4.3-1: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
searchSpaceId	0	SearchSpaceId with condition CSS	CSS
controlResourceSetId	0	ControlResourceS etId	
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
Duration	2		
monitoringSymbolsWithinSlot	1100000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
common SEQUENCE {			CSS, SISS
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			

Table 5.5.1.3.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200			
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		
}			

Table 5.5.1.3.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	66	100 MHz (120	
		KHz SCS)	
}			

5.5.1.3.5 Test Requirement

Table 5.5.1.3.5-1 defines the cell specific primary level settings.

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

Table 5.5.1.3.5-1: OTA related cell specific test parameters for FR2 (Cell 2) for out-of-sync radio link monitoring tests in DRX mode

	Parameter		Unit		Test 1	
				T1	T2	T3
ssb-Inde	x 0 AoA	Config 1, 2			TBD	
Configura	ation				ושט	
ssb-Index	x 1 AoA	Config 1, 2			TBD	
Configura	ation				100	
EPRE rat	tio of PDCCH	DMRS to SSS	dB		4	
EPRE rat	tio of PDCCH	to PDCCH DMRS	dB		0	
EPRE rat	tio of PBCH D	MRS to SSS	dB			
EPRE rat	tio of PBCH to	PBCH DMRS	dB			
EPRE rat	tio of PSS to S	SSS	dB			
EPRE rat	tio of PDSCH	DMRS to SSS	dB		0	
EPRE rat	tio of PDSCH	to PDSCH DMRS	dB			
EPRE rat	tio of OCNG [DMRS to SSS	dB			
EPRE rat	tio of OCNG t	o OCNG DMRS	dB			
ssb-Index	x 0 SNR	Config 1, 2	dB	1	-7	-15
ssb-Inde	x 1 SNR	Config 1, 2		1	-15	-15
N_{oc}		Config 1, 2	dBm/1		-98	
			5KHz		-90	
Propagat	ion condition				L-A 30ns 75	
Note 1:		be used such that the				
		al transmitted power s	pectral de	ensity is achie	eved for all C	FDM
	symbols.					
Note 2:	The signal contains PDCCH for UEs other than the device under test as part o OCNG.					t as part of
Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.						
Note 4: The SNR values are specified for testing a UE which supports 2RX on at least						
		or testing of a UE which				
	during T3 is	A.3.6.				

5.5.1.4 EN-DC FR2 Radio Link Monitoring In-sync Test for FR2 PSCell configured with SSB-based RLM RS in DRX mode

Editor's Notes: This test case is incomplete. The following aspects are either missing or not yet determined

- Test procedure needs further updates specific to OTA aspect
- MU/TT is FFS

5.5.1.4.1 Test Purpose

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell with DRX configured. This test will partly verify the FR2 PSCell radio link monitoring requirements in clause 8.1.

5.5.1.4.2 Test Applicability

This test applies to all types of E-UTRA UEs Release 15 and forwared supporting EN-DC

5.5.1.4.3 Minimum Conformance Requirements

The minimum requirements are specified in clause 5.5.1.0.2. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.2.

5.5.1.4.4 Test Description

5.5.1.4.4 Test Description

There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-2. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.5.5.1.4.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

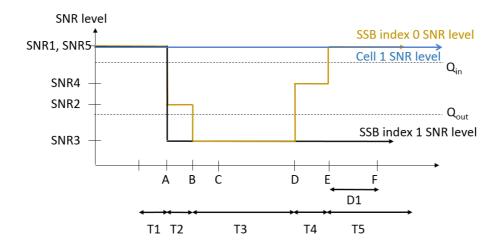


Figure 5.5.1.4.4-1: SNR variation for in-sync testing

5.5.1.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table [5.3.5-1] and Table 5.3.5-1 of 38.521-2 [18].

This test shall be tested using any of the test configurations in Table 5.5.1.4.4.1-1.

Table 5.5.1.4.4.1-1: Supported test configurations for FR2 PSCell

Configuration	Description
1	FDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode
2	TDD LTE PCell, NR 120 KHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note: The	JE is only required to pass in one of the supported test configurations in FR2

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.4.4.1-2.

Table 5.5.1.4.4.1-2: Initial conditions for EN-DC FR2 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Parameter		Value	Comment	
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies			2-1 and TS 38.508-1 [14] clause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 5.5.1.3.4.1-1			
Propagation conditions		AWGN	As specified in Annex C.2.2.	
Connection	TE Part	A.3.3.1.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.4.1.1		
Exceptions to connection diagram		N/A		

PDCCH transmission parameters are given in Table 5.5.1.4.4.1-3.

Table 5.5.1.4.4.1-3: PDCCH transmission parameters for in-sync

Attribute	Value for BLER Configuration #0
DCI payload size	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	4
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	0dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	0dB
Bandwidth (MHz)	TBD
Sub-carrier spacing (kHz)	TBD
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 5.5.1.4.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR2 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The general test parameters are given in Table 5.5.1.4.5-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.

Table 5.5.1.4.4.1-4: General test parameters for FR2 in-sync testing in DRX mode

Paramete	Parameter		Value
			Test 1
Active E-UTRA PCell			Cell 1
E-UTRA RF Channel Number			1
Active PSCell	Active PSCell		Cell 2
RF Channel Number			2
Duplex mode	Config 1, 2		TDD
BW _{channel}	Config 1, 2		100: $N_{RB,c} = 66$
DL initial BWP configuration	Config 1, 2		DLBWP.0.1
DL dedicated BWP	Config 1, 2		DLBWP.1.1
configuration			
UL initial BWP configuration	Config 1, 2		ULBWP.0.1

UL dedicated BWP configuration		Config 1, 2		ULBWP.1.1
TDD Configuration	tion	Config 1, 2		TDDConf.3.1
CORESET Refe	arence Channel	Config 1, 2		CR.3.1 TDD
SSB Configurat		Config 1, 2		SSB.1 FR2
SMTC Configur		Config 1, 2		SMTC.3
PDSCH/PDCCI		Config 1, 2		120 KHz
spacing	i subcarrier	Coming 1, 2		120 KHZ
PRACH Config	uration	Config 1, 2		Table A.3.8.3.4
	gned as RLM RS	Config 1, 2		0,1
OCNG paramet		Cornig 1, 2		OP.1
CP length	ici3			Normal
	rix and Antenna C	onfiguration		2x2 Low
In sync	DCI format	oringuration		1-0
transmission		rol OFDM symbols		2
parameters	Aggregation leve		CCE	4
parameters		tical PDCCH RE	dB	0
		ge SSS RE energy	ub	U
		etical PDCCH DMRS	dB	0
		ge SSS RE energy	ub	U
	DMRS precoder			REG bundle size
	REG bundle size			6
Out of sync	DCI format	<u> </u>		1-0
transmission		rol OEDM symbols		2
parameters		Number of Control OFDM symbols Aggregation level		8
parameters		tical PDCCH RE	CCE dB	4
		ge SSS RE energy	ub	4
		tical PDCCH DMRS	dB	4
		ge SSS RE energy	45	-
	DMRS precoder			REG bundle size
	REG bundle size			6
DRX Configura		<u> </u>		DRX.11
Gap pattern ID	шоп			N.A.
Layer 3 filtering				Enabled
T310 timer			ms	4000
T311 timer			ms	1000
N310			1113	1
N311				1
CSI-RS for CSI	reporting	Config 1, 2		CSI-RS.3.1 TDD
TCI states for P		Corning 1, Z		TCI.State.2
CSI-RS for trac		Config 1 2		TRS.2.1 TDD
T1	KIIIY	Config 1, 2	6	0.2
T2			S S	0.2
T3				2.8
T4			S	0.2
T5			S	3.88
D1			S	3.84
	anfigurations are a	opigned to the LIC price	S S	
Note 2: UE-s	pecific PDCCH is	ssigned to the UE prior not transmitted after Ta X mode under test.		πε ρ ε που 11.

5.5.1.4.4.2 Test procedure

Editor's Note: Test procedure updates to ensure accurate FR2 measurement state is TBD

The test consists of two cells, a single E-UTRA cell (Pcell), and a single NR cell (PSCell). Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 5.5.1.4.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release On according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.5.1.4.4-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.

- 3. When T1 expires, the SS shall change the SNR value to T2 as specified in Table 5.5.1.4.5-1. T2 starts.
- 4. When T2 expires, the SS shall change the SNR value to T3 as specified in Table 5.5.1.4.5-1. T3 starts.
- 5. When T3 expires, the SS shall change the SNR value to T3 as specified in Table 5.5.1.4.5-1. T4 starts.
- 6. When T4 expires, the SS shall change the SNR value to T3 as specified in Table 5.5.1.4.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than [-50] dBm in the On-duration part of every DRX cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point F (1120 ms after the start of time duration T5) the number of successful tests is increased by one.
 - Otherwise the number of failed tests is increased by one.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.4.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions.

Table 5.5.1.4.4.3-1: Common Exception messages for EN-DC FR1 Radio Link Monitoring In-Sync Test for FR1 PSCell configured with SSB-based RLM RS in DRX mode

TBD

Table 5.5.1.4.4.3-2: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
duration	2		
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 5.5.1.4.4.3-3: RLF-TimersAndConstant

Derivation Path: TS 38.508-1 [14], Table 4.6.3-150			
Information Element	Value/remark	Comment	Condition
RLF-TimersAndConstants ::= SEQUENCE {			
t310	ms4000		
n310	n1		
n311	n1		
t311-v1530	ms1000		
}			

Table 5.5.1.4.4.3-4: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	66	100 MHz (120	
		KHz SCS)	
}			

5.5.1.4.5 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The rate of correct events observed during repeated tests shall be at least 90% with a 95% confidence interval.

5.5.1.4.5-1: OTA related cell specific test parameters for FR2 (Cell 2) for in-sync radio link monitoring tests in DRX mode

Parameter		Unit			Test 1		
			T1	T2	T3	T4	T5
AoA setup				Setup 1	L define	d in A.9.	1
EPRE ratio of PDCCH D	MRS to SSS	dB			4		
EPRE ratio of PDCCH to	PDCCH DMRS	dB			0		
EPRE ratio of PBCH DM	IRS to SSS	dB					
EPRE ratio of PBCH to I	PBCH DMRS	dB					
EPRE ratio of PSS to SS	SS	dB					
EPRE ratio of PDSCH D	MRS to SSS	dB			0		
EPRE ratio of PDSCH to	PDSCH DMRS	dB					
EPRE ratio of OCNG DN	MRS to SSS	dB					
EPRE ratio of OCNG to	OCNG DMRS	dB					
ssb-Index 0 SNR	Config 1, 2	dB	2	-6	-15	-4.5	2
ssb-Index 1 SNR	Config 1, 2		2	-15	-15	-15	-15
SNR on other	Config 1, 2	dB			2		
channels and signals							
N_{oc}	Config 1, 2	dBm/1		_	104.7dE	Rm	
		5KHz					
Propagation condition					-A 30ns		
	e used such that the res						
constant total transmitted power spectral density is achieved for all OFDM symbols.					ools.		
OCNG.3							
Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs. Note 4: The SNR values are specified for testing a UE which supports 2RX on at least one							
	•	-					I
band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is				IS			

5.5.1.5 EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- TT analysis is missing.
- Connection diagram is TBD

A.3.6.

- RAN4 dependency: There are brackets and TBDs in test parameters.

5.5.1.5.1 Test purpose

The purpose of this test is:

- To verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when no DRX is used.
- To verify partly the FR2 TDD PSCell CSI-RS Out-of-sync radio link monitoring requirements in TS 38.133 clause 8.1.

5.5.1.5.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC and CSI-RS based RLM.

5.5.1.5.3 Minimum conformance requirements

The minimum requirements are specified in clause 5.5.1.0.3. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.5.

5.5.1.5.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 5.5.1.5.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

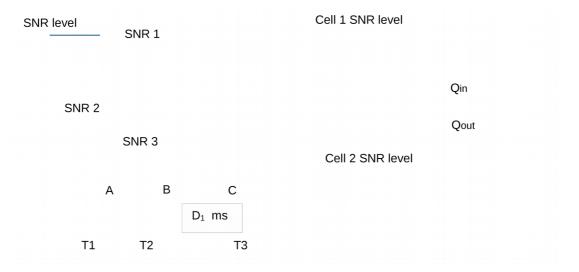


Figure 5.5.1.5.4-1: SNR variation for out-of-sync testing

5.5.1.5.4.1 Initial conditions

Test 5.5.1.5 can be run in one of the configurations defined in Table 5.5.1.5.4.1-1.

Table 5.5.1.5.4.1-1: Supported test configurations for FR2 PSCell

Configuration	Description		
5.5.1.5-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
5.5.1.5-2 LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode			
Note: The UE is only r	Note: The UE is only required to pass in one of the supported test configurations in FR2		

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.5.4.1-2

Table 5.5.1.5.4.1-2: Initial conditions for CSI-RS In-sync radio link monitoring in non-DRX mode

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.5	508-1 [14] clause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 4.5.1.6.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The test parameters are given in Table 5.5.1.5.4.1-3 below.
- 2. Message contents are defined in clause 5.5.1.5.4.3.
- 3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to TS 38.133 [6] Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 5.5.1.5.4.1-3: General test parameters for FR2 PSCell for CSI-RS out-of-sync testing in non-DRX mode

Parameter		Unit	Value
			Test 1
Active E-UTRA PCell			Cell 1
E-UTRA RF Channel N	lumher		1
Active PSCell	diffici		Cell 2
RF Channel Number			2
Duplex Mode			TDD
TDD Configuration	Config 1		TDDConf.3.1
	Config 2		TDDConf.3.1
RMC CORESET	Config 1		CCR.3.1 TDD
Reference Channel	Config 2		CCR.3.1 TDD
SSB Configuration	Config 1		SSB.1 FR2
	Config 2		SSB.1 FR2
SMTC Configuration	Config 1		SMTC.1
	Config 2		SMTC.1
PDSCH/PDCCH	Config 1		120 KHz
subcarrier spacing	Config 2		120 KHz
csi-RS-Index assigned	as RLM RS		TRS.2.1 TDD
TRS configuration			TRS.2.1 TDD
TCI configuration			TCI.State.2
OCNG parameters			OP.1
CP length			Normal
Correlation Matrix and	Antenna Configuration		2x2 Low
Out of sync	DCI format		1-0
transmission parameters	Number of Control OFDM symbols		2
	Aggregation level	CCE	8
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	dB	4
	Ratio of hypothetical PDCCH DMRS energy to average CSI- RS RE energy	dB	4

	DMRS precoder granularity		REG bundle size
	REG bundle size		6
DRX			OFF
Gap pattern ID			gp0
Layer 3 filtering			Enabled
T310 timer		ms	0
T311 timer		ms	1000
N310			1
N311			1
CSI-RS configuration	Config 1		CSI-RS.3.2 TDD
	Config 2		CSI-RS.3.2 TDD
T1		S	1
T2		S	0.4
T3		S	0.6
D1		S	0.44
Note 1: UE-specific PDCCH is not transmitted after T1 starts. Note 2: E-UTRAN is in non-DRX mode under test.			

Table 5.5.1.5.4.1-4: Measurement gap configuration for FR2 CSI-RS out-of-sync radio link monitoring in non-DRX mode

	Field		
	Field		
	gapOffset	0	
Note 1:	E-UTRAN PCell and PSCe synchronous and frame bo aligned. (Ensure that RLM partially overlapped with m gap)	oundary RS is	

5.5.1.5.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 2. Set the parameters of Cell 2 according to T1 in Table 5.5.1.5.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.1.5.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.1.5.5-1. T3 starts.
- 5. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C (D1 after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 5.5.1.5.5-1.

- 7. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 8. The SS then shall transmit *RRCConnectionReconfiguration* message with condition MCG and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 9. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 10. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.1.5.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED;			
·	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR2, SMTC.1 and RLM			
	Table H.3.1-4 with a3-offset = -6dB;			
	Table H.3.1-8 with Condition CSI RLM			
	Table H.3.1-9			

Table 5.5.1.5.4.3-2: MeasConfig for E-UTRAN PCell

Derivation Path: TS 36.508 [25], Table 4.6.6-1 with condition RF					
Information Element	Value/remark	Comment	Condition		
MeasConfig-DEFAULT ::= SEQUENCE {					
reportConfigToAddModList	Not present				
measIdToAddModList	Not present				
measGapConfig	MeasGapConfig-GP1	TS 36.508, table 4.6.6-1A			
}					

5.5.1.5.5 Test requirement

Tables 5.5.1.5.4.1-2 and 5.5.1.5.5-1 define the primary level settings including test tolerances for Radio Link Monitoring Out-of-sync Test for FR2 PSCell configured with CSI-RS-based RLM in non-DRX mode.

Table 5.5.1.5.5-1: Cell specific test parameters for FR2 for CSI-RS out-of-sync radio link monitoring in non-DRX mode

Parameter		Unit		Test 1	
			T1	T2	T3
PDCCH_I	oeta	dB	4		
PDCCH_I	DMRS_beta	dB		4	
PBCH_be	eta	dB			
PSS_beta	ì	dB			
SSS_beta	ì	dB		0	
PDSCH_k	oeta	dB			
OCNG_be	eta	dB			
SNR	Config 1	dB	[1]	[-7]	[-15]
SINK	Config 2		[1]	[-7]	[-15]
N_{oc}	Config 1	dBm/15KHz		TBD	
	Config 2			TBD	
Propagati	on condition			[TDL-A 30ns 75Hz]	
Note 1:	OCNG shall be	e used such that the r	esources in Cell 2 a	are fully allocated a	nd a constant
		d power spectral den			
Note 2:	The uplink reso	ources for CSI reporti	ng are assigned to	the UE prior to the	start of time
	period T1.				
Note 3:		esource set configura	tion for CSI reportir	ng are assigned to t	the UE prior to
	the start of time	•			
Note 4:		gap configuration is a			
Note 5:		l layer 3 filtering relate	ed parameters are	configured prior to	the start of time
	period T1.				
	Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.			art of OCNG.	
Note 7:					
Note 8:		ne periods T1, T2 and	IT3 is denoted as S	SNR1, SNR2 and S	NR3 respectively
	in figure A.5.5.1.5.1-1.				
Note 9: The SNR values are specified for testing a UE					
For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].			s [A.3.6].		

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all slots configured for CQI transmission according the configured CQI reporting mode on PUCCH.

The UE shall stop transmitting uplink signal no later than time point C (D1 after the start of time duration T3).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal
- UE output power equal to or less than Transmit OFF power (as defined in TS 38.521-1 [17] clause 6.3.2.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

5.5.1.6 EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- TT analysis is missing.
- Connection diagram is TBD.
- RAN4 dependency: There are brackets and TBDs in test parameters

5.5.1.6.1 Test purpose

The purpose of this test is:

- To verify that the UE properly detects the in-sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when no DRX is used.
- To verify partly the FR2 TDD PSCell CSI-RS in-sync radio link monitoring requirements in TS 38.133 clause 8.1.

5.5.1.6.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC and CSI-RS based RLM.

5.5.1.6.3 Minimum conformance requirements

The minimum requirements are specified in clause 4.5.1.0.4. DRX configuration is not used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.6.

5.5.1.6.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 5.5.1.6.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

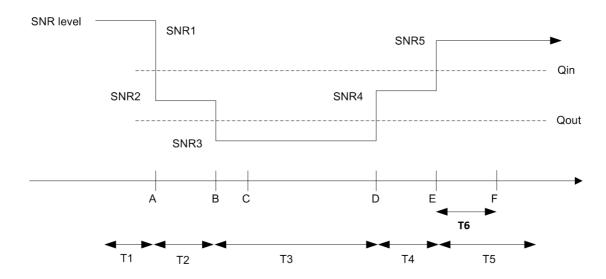


Figure 5.5.1.6.4-1: SNR variation for in-sync testing

5.5.1.6.4.1 Initial conditions

Test 5.5.1.6 can be run in one of the configurations defined in Table 5.5.1.6.4.1-1.

Table 5.5.1.6.4.1-1: Supported test configurations for FR2 PSCell

Configuration	Description	
5.5.1.6-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
5.5.1.6-2 LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
Note: The UE is only required to pass in one of the supported test configurations in FR2		

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.6.4.1-2

Table 5.5.1.6.4.1-2: Initial conditions for CSI-RS in-sync radio link monitoring in non-DRX mode

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 4.5.1.6.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to connection diagram	N/A		

- 1. The test parameters are given in Table 5.5.1.6.4.1-3 below.
- 2. Message contents are defined in clause 5.5.1.6.4.3.
- 3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to TS 38.133 [6] Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 5.5.1.6.4.1-3: General test parameters for FR2 PSCell for CSI-RS in-sync testing in non-DRX mode

Parameter	Unit	Value
		Test 1
		1651.1

Active E-UTRA PC	ell		Cell 1
E-UTRA RF Chann	el Number		1
Active PSCell			Cell 2
RF Channel Numb	er		2
Duplex Mode			TDD
TDD	Config 1		TDDConf.3.1
Configuration	Config 2		TDDConf.3.1
RMC CORESET Reference	Config 1		CCR.3.1 TDD
Channel	Config 2		CCR.3.1 TDD
SSB	Config 1		SSB.1 FR2
Configuration	Config 2		SSB.1 FR2
SMTC	Config 1		SMTC.1
Configuration	Config 2		SMTC.1
PDSCH/PDCCH	Config 1		120 KHz
subcarrier	Config 2		120 KHz
spacing			120 KHZ
csi-RS-Index assig			TRS.2.1 TDD
OCNG parameters			OP.1
TRS configuration			TRS.2.1 TDD
TCI configuration			TCI.State.2
CP length			Normal
Correlation Matrix a	and Antenna Configuration		2x2 Low
Out of sync	DCI format		1-0
transmission	Number of Control		2
parameters	OFDM symbols		-
	Aggregation level	CCE	8
	Ratio of hypothetical	dB	4
	PDCCH RE energy to		
	average CSI-RS RE		
	energy		
	Ratio of hypothetical	dB	4
	PDCCH DMRS energy to		
	average CSI-RS RE		
	energy		DEC hundle size
	DMRS precoder		REG bundle size
	granularity REG bundle size		6
In sync	DCI format		1-0
transmission	Number of Control		2
parameters	OFDM symbols		_
	Aggregation level	CCE	4
	Ratio of hypothetical	dB	0
	PDCCH RE energy to		
	average CSI-RS RE		
	energy		
	Ratio of hypothetical	dB	0
	PDCCH DMRS energy to		
	average CSI-RS RE		
	energy		
	DMRS precoder		REG bundle size
	granularity		
DDV	REG bundle size		6
DRX Gap pattern ID			OFF N.A.
Layer 3 filtering			N.A. Enabled
			Enabled
T310 timer			0
T311 timer		ms	1000
N310			1
N311			1
CSI-RS Config 1			CSI-RS.3.2 TDD
configuration Config 2			CSI-RS.3.2 TDD
T1		S	1
T2		S	0.4
T3		S	[0.6]

D1		S	[0.24]		
Note 1:	te 1: UE-specific PDCCH is not transmitted after T1 starts.				
Note 2:	e 2: E-UTRAN is in non-DRX mode under test.				

5.5.1.6.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is not enabled.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 2. Set the parameters of Cell 2 according to T1 in Table 5.5.1.6.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.1.6.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.1.6.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 5.5.1.6.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 5.5.1.6.5-1. T5 starts.
- 7. If the SS detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point F (T6 ms after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 9. The SS then shall transmit *RRCConnectionReconfiguration* message with condition MCG_and_SCG according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release On according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.1.6.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ, L3 FILTERING NEEDED;				
·	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR2, SMTC.1 and RLM				
	Table H.3.1-8 with Condition CSI RLM				
	Table H.3.1-9				

5.5.1.6.5 Test requirement

Tables 5.5.1.6.4.1-2 and 5.5.1.6.5-1 define the primary level settings including test tolerances for Radio Link Monitoring in-sync Test for FR2 PSCell configured with CSI-RS-based RLM in non-DRX mode.

Table 5.5.1.6.5-1: Cell specific test parameters for FR2 for CSI-RS is-sync radio link monitoring in non-DRX mode

Parameter		Unit	Test 1						
				T1	T2	T3	T4	T5	
PDCCH_beta			dB	4					
PDCCH_DMRS_beta		dB	4						
PBCH_beta		dB	0						
PSS_beta		dB							
SSS_beta		dB							
PDSCH beta		dB							
OCNG_beta		dB							
SNR		Config 1, 2	dB	[1]	[-7]	[-15]	[-4.5]	[1]	
N_{oc}		Config 1, 2	dBm/15KHz			TBD		Y	
Propagation condition			[TDL-A 30ns 75Hz]						
Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.									
Note 2:									
Note 3:	Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.								
Note 4:	Measurement gap configuration is assigned to the UE prior to the start of time period T1.								
Note 5:	The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.								
Note 6:	The signal contains PDCCH for UEs other than the device under test as part of OCNG.								
Note 7:	: SNR levels correspond to the signal to noise ratio over the SSS REs.								

Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.

Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5

respectively in figure A.5.5.1.6.1-1.

Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (T6 after the start of time duration T5) the UE shall transmit uplink signal at least in all slots configured for CQI transmission according to the configured CQI reporting mode on PUCCH.

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

5.5.1.7 EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- TT analysis is missing.
- Connection Diagrams are TBD
- RAN4 dependency: There are brackets and TBDs in test parameters.

5.5.1.7.1 Test purpose

The purpose of this test is:

- To verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when DRX is used.

- To verify partly the FR2 TDD PSCell CSI-RS Out-of-sync radio link monitoring requirements in TS 38.133 clause 8.1.

5.5.1.7.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC, CSI-RS based RLM and long DRX cycle.

5.5.1.7.3 Minimum conformance requirements

The minimum requirements are specified in clause 5.5.1.0.3. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.7.

5.5.1.7.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 5.5.1.7.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

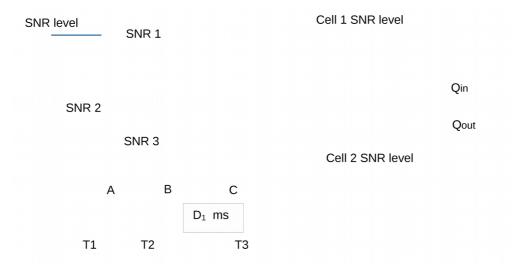


Figure 5.5.1.7.4-1: SNR variation for out-of-sync testing

5.5.1.7.4.1 Initial conditions

Test 5.5.1.7 can be run in one of the configurations defined in Table 5.5.1.7.4.1-1.

Table 5.5.1.7.4.1-1: Supported test configurations for FR2 PSCell

Configuration	tion Description			
5.5.1.7-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode			
5.5.1.7-2	LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode			
Note: The UE is only r	e: The UE is only required to pass in one of the supported test configurations in FR2			

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.7.4.1-2

Table 5.5.1.7.4.1-2: Initial conditions for CSI-RS out-of-sync radio link monitoring in DRX mode

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.9	508-1 [14] clause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 5.5.1.7.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	TBD		
Exceptions to connection diagram	N/A			

- 1. The test parameters are given in Table 5.5.1.7.4.1-3 below.
- 2. Message contents are defined in clause 5.5.1.7.4.3.
- 3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 5.5.1.7.4.1-3: General test parameters for FR2 PSCell for CSI-RS out-of-sync testing in DRX mode

Parameter	Unit	Value
		Test 1

Active E-UTRA P			Cell 1
	E-UTRA RF Channel Number		1
Active PSCell			Cell 2
RF Channel Num	ber		2
Duplex Mode			TDD
TDD	Config 1		TDDConf.3.1
Configuration	Config 2]	TDDConf.3.1
RMC	Config 1		CCR.3.1 TDD
CORESET	Config 2	-	CCR.3.1 TDD
Reference	Jan. 19		000.2
Channel			
SSB	Config 1		SSB.1 FR2
Configuration	Config 2		SSB.1 FR2
SMTC	Config 1		SMTC.1
Configuration	Config 2		SMTC.1
PDSCH/PDCC	Config 1		120 KHz
H subcarrier			
	Config 2		120 KHz
spacing	inned on DLM DC		TDC 2.4 TDD
	igned as RLM RS		TRS.2.1 TDD
TRS configuration			TRS.2.1 TDD
TCI configuration			TCI.State.2
OCNG paramete	rs		OP.1
CP length			Normal
Correlation Matrix	and Antenna		2x2 Low
Configuration			
Out of sync	DCI format		1-0
transmission	Number of Control		2
parameters	OFDM symbols		
	Aggregation level	CCE	8
	Ratio of hypothetical	dB	4
	PDCCH RE energy to		
	average CSI-RS RE		
	energy		
	Ratio of hypothetical	dB	4
	PDCCH DMRS energy		7
	to average CSI-RS RE		
	energy		
	DMRS precoder		REG bundle size
	•		REG DUITUIE SIZE
	granularity		
DDV	REG bundle size		6 DDV 7
DRX			DRX.7
Gap pattern ID			N.A.
Layer 3 filtering			Enabled
T310 timer		me	0
T310 timer		ms ms	1000
		ms	
N310			1
N311	Confin 1		1
CSI-RS	Config 1		CSI-RS.3.2 TDD
configuration	Config 2		CSI-RS.3.2 TDD
T1		S	1
T2		S	0.4
T3		S	[0.6]
D1		S	[0.24]
Note 1: UE-sp	Note 1: UE-specific PDCCH is not transi		
		miliou anton 1 ± otante	- .
Note 2: E-UTR	AN is in non-DRX mode u		

5.5.1.7.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is enabled in PSCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 2. Set the parameters of Cell 2 according to T1 in Table 5.5.1.7.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.1.7.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.1.7.5-1. T3 starts.
- 5. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in the On-duration part of every DRX cycle in the slots configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C (D1 after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 5.5.1.7.5-1.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.7.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.1.7.4.3-1: Common Exception messages

	Default Message Contents				
Common contents of system information					
blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ, L3 FILTERING NEEDED;				
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR2, SMTC.1 and RLM				
	Table H.3.1-8 with Condition CSI RLM				
	Table H.3.1-9				
	Table H.3.7-1 with condition DRX.7				

5.5.1.7.5 Test requirement

Tables 5.5.1.7.4.1-2 and 5.5.1.7.5-1 define the primary level settings including test tolerances for Radio Link Monitoring Out-of-sync Test for FR2 PSCell configured with CSI-RS-based RLM in DRX mode.

Table 5.5.1.7.5-1: Cell specific test parameters for FR2 for CSI-RS out-of-sync radio link monitoring in DRX mode

Parameter		Unit	Test 1		
			T1	T2	T3
PDCCH beta		dB		4	
PDCCH_I	DMRS_beta	dB		4	
PBCH_be	ta	dB			
PSS_beta	l	dB			
SSS_beta	l	dB		0	
PDSCH_k	peta	dB			
OCNG_be	eta	dB			
SNR	Config 1	dB	[1]	[-7]	[-15]
SINK	Config 2		[1]	[-7]	[-15]
N_{oc}	Config 1	dBm/15KHz		TBD	
1 voc	Config 2		TBD		
Propagati	on condition		[TDL-A 30ns 75Hz]		
Note 1:	OCNG shall be used su				a constant
	total transmitted power				
Note 2:	The uplink resources fo	r CSI reporting are as	ssigned to the U	E prior to the sta	rt of time
	period T1.				
Note 3:	NZP CSI-RS resource s	et configuration for C	SI reporting are	e assigned to the	UE prior to the
	start of time period T1.				
Note 4:	Measurement gap confi				
Note 5:	The timers and layer 3 f	iltering related param	ieters are config	jured prior to the	start of time
No.	period T1.	2011 (- 115 11 11			1.00010
Note 6:	The signal contains PD				of OCNG.
Note 7:	SNR levels correspond				
Note 8: The SNR in time periods		s 11, 12 and 13 is de	noted as SNR1	, SNR2 and SNF	3 respectively
in figure A.5.5.1.7.1-1. Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one base.					
Note 9:					
For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].				۸.۵.۵].	

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least once every DRX cycle, in the On-duration part of the cycle in the slots configured for CQI transmission according the configured CQI reporting mode on PUCCH.

The UE shall stop transmitting uplink signal no later than time point C (D1 after the start of time duration T3).

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal
- UE output power equal to or less than Transmit OFF power (as defined in TS 38.521-1 [17] clause 6.3.2.5) means no uplink signal.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

5.5.1.8 EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- TT analysis is missing.
- Connection Diagram is TBD.
- RAN4 dependency: There are brackets and TBDs in test parameters.

5.5.1.8.1 Test purpose

The purpose of this test is:

- To verify that the UE properly detects the in sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when DRX is used.
- To verify partly the FR2 PSCell CSI-RS in-sync radio link monitoring requirements in TS 38.133 clause 8.1.

5.5.1.8.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC, CSI-RS based RLM and long DRX cycle.

5.5.1.8.3 Minimum conformance requirements

The minimum requirements are specified in clause 5.5.1.0.4. DRX configuration is used for this test.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.1.8.

5.5.1.8.4 Test description

There are two cells configured in this test, the E-UTRA PCell and NR PSCell. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 5.5.1.8.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

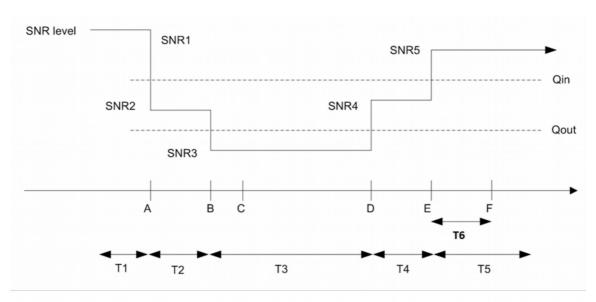


Figure 5.5.1.8.4-1: SNR variation for In-sync testing

5.5.1.8.4.1 Initial conditions

Test 5.5.1.8 can be run in one of the configurations defined in Table 5.5.1.8.4.1-1.

Table 5.5.1.8.4.1-1: Supported test configurations for FR2 PSCell

Configuration	Description		
5.5.1.8-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
5.5.1.8-2 LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode			
Note: The UE is only required to pass in one of the supported test configurations in FR2			

Configure the test equipment and the DUT according to the parameters in Table 5.5.1.8.4.1-2

Table 5.5.1.8.4.1-2: Initial conditions for CSI-RS In-sync radio link monitoring in DRX mode

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, table E.2-1 and TS 38.9	508-1 [14] clause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 5.5.1.8.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	TBD		
Exceptions to connection diagram	N/A			

- 1. The test parameters are given in Table 5.5.1.8.4.1-2 below.
- 2. Message contents are defined in clause 5.5.1.8.4.3.
- 3. There are two cells in the test, where Cell 1 is the E-UTRAN PCell on the E-UTRA carrier, and Cell 2 is the NR PSCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 5.5.1.8.4.1-3: General test parameters for FR2 PSCell for CSI-RS In-sync testing in DRX mode

Parameter		Unit	Value	
	- aramotor	5	Test 1	
Active E-UTRA	PCall		Cell 1	
E-UTRA RF Channel Number			1	
Active PSCell			Cell 2	
RF Channel Nu	ımher		2	
Duplex Mode	arriber		TDD	
TDD	Config 1		TDDConf.3.1	
Configuration	Config 2		TDDConf.3.1	
RMCCORES	Config 1		CCR.3.1 TDD	
ET Reference	Config 2		CCR.3.1 TDD	
Channel	Cornig 2		GGIV.3.1 1DD	
SSB	Config 1		SSB.1 FR2	
Configuration	Config 2		SSB.1 FR2	
SMTC	Config 1		SMTC.1	
Configuration	Config 2		SMTC.1	
PDSCH/PDC	Config 1		120 KHz	
CH subcarrier		-		
spacing	Config 2		120 KHz	
	ssigned as RLM RS		TRS.2.1 TDD	
TRS configurat			TRS.2.1 TDD	
TCI configuration			TCI.State.2	
OCNG parame			OP.1	
CP length			Normal	
	trix and Antenna Configuration		2x2 Low	
Out of sync	DCI format		1-0	
transmission	Number of Control OFDM		2	
parameters	symbols			
	Aggregation level	CCE	8	
	Ratio of hypothetical PDCCH RE energy to average CSI- RS RE energy	dB	4	
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	4	
	DMRS precoder granularity		REG bundle size	
	REG bundle size		6	
In sync	DCI format		1-0	
transmission	Number of Control OFDM		2	
parameters	symbols	225		
	Aggregation level	CCE	4	
	Ratio of hypothetical PDCCH RE energy to average CSI- RS RE energy	dB	0	
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	0	
	DMRS precoder granularity		REG bundle size	
	REG bundle size		6	
DRX			DRX.7	
Gap pattern ID	1		gp0	
Layer 3 filtering			Enabled	
T310 timer		ms	0	
T311 timer		ms	1000	
N310			1	
N311			1	

CSI-RS	Config 1		CSI-RS.3.2 TDD
configuration	Config 2		CSI-RS.3.2 TDD
T1		S	1
T2		S	0.4
T3		S	[0.6]
D1		S	[0.44]
Note 1: UE-specific PDCCH is not transmitted after T1 starts.			
Note 2: E-UTRAN is in non-DRX mode under test.			

Table 5.5.1.8.4.1-4: Measurement gap configuration for FR2 CSI-RS In-sync radio link monitoring in DRX mode

Field		Test 1	
		Value	
	gapOffset	0	
Note 1:	E-UTRAN PCell and PSCe synchronous and frame bo aligned. (Ensure that RLM partially overlapped with m gap)	oundary RS is	

5.5.1.8.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is enabled in PSCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 2. Set the parameters of Cell 2 according to T1 in Table 5.5.1.8.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.1.8.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.1.8.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 5.5.1.8.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 5.5.1.8.5-1. T5 starts.
- 7. If the SS detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in the On-duration part of every DRX cycle in the configured slots for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point F (T6 after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. If the UE has not re-established the connection in at least 1s, the SS shall ensure PSCell is released.
- 9. The SS then shall transmit *RRCConnectionReconfiguration* message with condition *MCG_and_SCG* according to TS 36.508 [25] Table 4.6.1-8 to add NR cell (PSCell). The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 10. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.1.8.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.1.8.4.3-1: Common Exception messages

Default Message Contents			
Common contents of system information blocks exceptions			
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED;		
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR2, SMTC.1 and RLM		
	Table H.3.1-4 with a3-offset = -6dB;		
	Table H.3.1-8 with Condition CSI RLM		
	Table H.3.1-9		
	Table H.3.7-1 with condition DRX.7		

Table 5.5.1.8.4.3-2: MeasConfig for E-UTRAN PCell

Derivation Path: TS 36.508, Table 4.6.6-1 with condition RF				
Information Element	Value/remark	Comment	Condition	
MeasConfig-DEFAULT ::= SEQUENCE {				
reportConfigToAddModList	Not present			
measIdToAddModList	Not present			
measGapConfig	MeasGapConfig-GP1	TS 36.508, table 4.6.6-1A		
}				

5.5.1.8.5 Test requirement

Tables 5.5.1.8.4.1-2 and 5.5.1.8.5-1 define the primary level settings including test tolerances for Radio Link Monitoring In-sync Test for FR2 PSCell configured with CSI-RS-based RLM in DRX mode.

Note 9:

Table 5.5.1.8.5-1: Cell specific test parameters for FR2 for CSI-RS In-sync radio link monitoring in DRX mode

Parameter		Unit			Test 1			
				T1	T2	T3	T4	T5
PDCCH_beta			dB			4		
PDCCH DMRS beta			dB	4				
PBCH_b	eta		dB	0				
PSS_bet	a		dB					
SSS_bet	a		dB					
PDSCH_	beta		dB					
OCNG_b	eta		dB					
SNR	NR Config 1, 2		dB	[1]	[-7]	[-15]	[-4.5]	[1]
N_{oc}	N_{oc} Config 1, 2 dBm/15		dBm/15KHz			TBD		
Propagat	tion co	ndition		[TDL-A 30ns 75Hz]				
Note 1:	OCN	G shall be used suc	ch that the resources	in Cell 2 are	fully allocated	d and a consta	ant total trans	mitted
			achieved for all OFD					
Note 2:			CSI reporting are ass					
Note 3:			et configuration for CS	SI reporting a	are assigned t	to the UE prio	r to the start	of time
	•	d T1.						
Note 4: Measurement gap configuration is assigned to			•		•			
Note 5: The timers and layer 3 filtering related para								1.
Note 6: The signal contains PDCCH for UEs other than					s part of OCN	G.		
Note 7:	Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.							
Note 8: The SNR in time periods T1, T2, T3, T4 and T respectively in figure A.5.5.1.8.1-1.				5 is denoted	as SNR1, SN	NR2, SNR3, S	SNR4 and SN	R5

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

which supports 4RX on all bands, the SNR during T3 is [A.3.6].

During the period from time point A to time point F (T6 after the start of time duration T5) the UE shall transmit uplink signal at least once every DRX cycle, in the ON-duration part of the cycle in the slots configured for CQI transmission according to the configured CQI reporting mode on PUCCH.

The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE

The uplink signal is verified on the basis of the UE output power:

- UE output power equal to or higher than Transmit minimum power (as defined in TS 38.521-1 [17] clause 6.3.1.5) means uplink signal

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

5.5.2 Interruption

5.5.2.0 Minimum conformance requirements

5.5.2.0.1 Minimum conformance requirements for interruptions at transitions between active and non-active during DRX

[TS 38.133, clause 8.2.1.2.1]

Interruption on PSCell and the activated SCell if configured due to E-UTRA PCell transitions between active and non-active during DRX when PSCell or SCell is in non-DRX are allowed with up to 1% probability of missed ACK/NACK when the configured E-UTRA PCell DRX cycle is less than 640 ms, and 0.625% probability of missed ACK/NACK is allowed when the configured E-UTRA PCell DRX cycle is 640 ms or longer. Each interruption shall not exceed X slot as defined in table 5.5.2.0.1-1.

Each interruption shall not exceed X slot as defined in table 5.5.2.0.1-1.

Table 5.5.2.0.1-1: Interruption length X at transition between active and non-active during DRX

11	NR Slot	Interruption length X		
μ.	length (ms)	Sync	Async	
0	1	1	2	
1	0.5	1	2	
2	0.25	(3	
3	0.125	Ĺ	5	

When both E-UTRA PCell and PSCell are in DRX, no interruption is allowed.

The normative reference for this requirement is TS 38.133 [6] clause 8.2.1.2.1.

5.5.2.0.2 Minimum conformance requirements for interruptions during measurements on deactivated NR SCC

[TS 38.133, clause 8.2.1.2.5.1]

Interruption on PSCell and other active NR SCell(s) during measurement on the deactivated NR SCC shall meet requirements in clause 8.2.2.2.3, where the term PCell in clause 8.2.2.2.3 shall be deemed to be replaced with PSCell.

[TS 38.133, clause 8.2.2.2.3]

Interruptions on PCell due to measurements when an SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 5.5.2.0.2-1 if the PCell is not in the same band as the deactivated SCell. Each interruption shall not exceed requirement in Table 5.5.2.0.2-2 if the PCell is in the same band as the deactivated SCell.

Interruptions on active SCell due to measurements when an SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 5.5.2.0.2-1 if the active SCell is not in the same band as the deactivated SCell. Each interruption shall not exceed requirement in Table 5.5.2.0.2-2 if the active SCell is in the same band as the deactivated SCell.

[TS 38.133, clause 8.2.2.2.2]

Table 5.5.2.0.2-1: Interruption duration for SCell activation/deactivation for inter-band CA

μ	NR Slot length (ms)	Interruption length
0	1	1
1	0.5	1
2	0.25	2
3	0.125	4

Table 5.5.2.0.2-2: Interruption duration for SCell activation/deactivation for intra-band CA

ND Clot

Interviention length

μ	INK SIOL	interruption length
ļ.	length (ms)	
0	1	1 + T _{SMTC_duration}
1	0.5	1 + T _{SMTC_duration}
2	0.25	2 + T _{SMTC duration}
3	0.125	4 + T _{SMTC_duration}
- a b - a	bove activated soleling activated when the longest SMT	C duration among all erving cells and the SCell hen one SCell is activated; C duration among all cells in the same band deactivated.

The normative reference for this requirement is TS 38.133 [6] clause 8.2.1.2.5.1.

5.5.2.0.3 Minimum conformance requirements for interruptions during measurements on deactivated E-UTRAN SCC

[TS 38.133 clause 8.2.1.2.5.2]

When one E-UTRA SCell in MCG is deactivated, the UE is allowed due to measurements on the E-UTRA SCC with the deactivated E-UTRA SCell:

- an interruption on PSCell or any activated SCell with up to 0.5% probability of missed ACK/NACK when any of the configured *measCycleSCell* [2] for the deactivated E-UTRA SCells is 640 ms or longer.
- an interruption on PSCell or any activated SCell with up to 0.5% probability of missed ACK/NACK regardless of the configured *measCycleSCell* [2] for the deactivated E-UTRA SCells if indicated by the network using IE *allowInterruptions* [2].

Each interruption shall not exceed

- X3 slot, if the PSCell or activated SCell is not in the same band as the E-UTRA deactivated SCC being measured, or
- Y3 slot + SMTC duration, if the PSCell or activated SCell is in the same band as the E-UTRA deactivated SCC being measured, provided the cell specific reference signals from the PSCell or activated SCell and the E-UTRA deactivated SCC being measured are available in the same slot.

Table 5.5.2.0.3-1: Interruption length X3 and Y3 at measurements on deactivated E-UTRA SCC

μ	NR Slot length (ms)	Interruption length X3 slot	Interruption length Y3 slot
0	1	1	1
1	0.5	1	1
2	0.25	2	2
3	0.125	4	4

The normative reference for this requirement is TS 38.133 [6] clause 8.2.1.2.5.1.

5.5.2.1 EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Editor's note:

- Connection diagram is TBD.
- Test tolerance is missing.

5.5.2.1.1 Test purpose

The purpose of this test is:

- To verify that when LTE PCell is in DRX and NR PSCell is in non-DRX, NR PSCell interruptions due to transitions from active to non-active and from non-active to active during LTE PCell DRX the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for NR PSCell in EN-DC.

5.5.2.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

5.5.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.2.1.

5.5.2.1.4 Test description

5.5.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.5.2.1.4.1-1.

Table 5.5.2.1.4.1-1: Supported test configurations for EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Configuration	Description
5.5.2.1-1	LTE FDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
5.5.2.1-2	LTE TDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode

Configure the test equipment and the DUT according to the parameters in Table 5.5.2.1.4.1-2.

Table 5.5.2.1.4.1-2: Initial conditions for EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified in Annex E, table E.3-1 and TS 38.508-1 [14] clause 4.3.1.			
Channel	As specified by the test configuration selected from Table 5.5.2.1.4.1-1.			
bandwidth				
Propagation	AWGN		As specified in Annex C.2.1.	
conditions				
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.TBD		
Exceptions to	N/A			
connection				
diagram				

- 1. The general test parameter settings are set up according to Table 5.5.2.1.4.1-3.
- 2. Message contents are defined in clause 5.5.2.1.4.3.
- 3. There are one E-UTRAN carrier and one NR carrier and two cells in the test. Cell 1 is PCell on the E-UTRAN carrier, Cell 2 is PSCell on the NR carrier, Cell 1 is the cell used for connection setup with the power levels set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 5.5.2.1.4.1-3: General test parameters for EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other
		1, 2	is NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Configured PSCell		Cell2	PSCell on NR RF channel number 2.
CP length		Normal	Applicable to cell1 and cell 2
DRX		DRX.4	DRX related parameters are defined in TS 38.133 Table A.3.3.4-1
Measurement gap pattern		OFF	
T1	S	10	

5.5.2.1.4.2 Test procedure

The test consists of two cells: Cell1 and Cell2. Cell1 is LTE PCell and Cell2 is NR PSCell. The test consists of one time period, with duration of T1. During T1, NR PSCell is continuously scheduled in DL while LTE PCell is not scheduled and has DRX configured. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. Prior to start of T1 the DRX inactivity timer for the LTE PCell has already expired. During T1 the UE shall be continuously scheduled on NR PSCell while not scheduled on LTE PCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message to configure PCell (Cell1) and PSCell (Cell2) on the MCG and SCG as per TS 36.508 [7] clause 4.6 with the message content exceptions defined in clause 5.5.2.1.4.3.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS would ensure continuous transmission on PSCell, while not scheduling on PCell at least for 200 ms to ensure inactivity timer is expired on the UE for LTE PCell.
- 5. Set the parameters according to T1 in Table 5.5.2.1.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict. If all events pass, the test passes. If one event fails, the test fails.

5.5.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.2.1.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information					
blocks exceptions					
	Table H.3.7-2 with				
elements contents exceptions	Condition DRX.4				

5.5.2.1.5 Test requirement

Table 5.5.2.1.4.1-1, 5.5.2.1.5-1 and 5.5.2.1.5-2 define the NR cell specific primary level settings including test tolerances for EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC test.

Table 5.5.2.1.5-1: NR cell specific test parameters for EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Parame	ter	Unit	Cell 2
Frequency Range			FR2
Duplex mode	Config 1,2		TDD
TDD configuration Config 1,2			TDDConf.3.1
BW _{channel} Config 1,2		MHz	100: N _{RB,c} = 66
Initial DL BWP Configuration	Config 1,2		DLBWP.0.1
Downlink dedicated BWP Configuration	Config 1,2		DLBWP.1.1
Uplink initial BWP configuration	Config 1,2		ULBWP.0.1
Uplink dedicated BWP configuration	Config 1,2		ULBWP.1.1
TRS configuration	Config 1,2		TRS.2.1 TDD
TCI state	Config 1,2		TCI.State.0
PDSCH Reference measurement channel	Config 1,2		SR.3.1 TDD
RMSI CORESET parameters	Config 1,2		CR.3.1 TDD
PDCCH CORESET parameters Config 1,2			CCR.3.1 TDD
OCNG Patterns	•		OP.1
SSB Configuration			SSB.1 FR2
SMTC Configuration Config 1,2			SMTC.1
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH EPRE ratio of OCNG DMRS to SSS(Note 1) EPRE ratio of OCNG to OCNG DMRS (Note 1)		dB	0
Ê _s /N _{oc}	- (-)	dB	17+TT
Propagation Condition			AWGN
Time offset to cell1 Note 2		μS	3
Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell including time alignment error between the two cells			

slot timing boundary of PSCell including time alignment error between the two cells

Table 5.5.2.1.5-2: NR cell specific OTA related test parameters for EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC

Para	meter	Unit	Cell 2
Angle of arrival configuration			Setup 1 defined in section A.3.15.1
N Note1	NR_TDD_FR2_A	dBm/15kHz	[-84.9]
oc .	NR_TDD_FR2_B		
	NR_TDD_FR2_F		

	NR_TDD_FR2_G		
	NR_TDD_FR2_T		
	NR_TDD_FR2_Y		
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
SS-RSRP ^{Note2}	NR_TDD_FR2_F	dBm/SCS Note3	[0 4 0]
33-K3KP	NR_TDD_FR2_G	ubili/SCS	[-84.9]
	NR_TDD_FR2_T		
	NR_TDD_FR2_Y		
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		dB	0
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
lo ^{Note2}	NR_TDD_FR2_F	dBm/95.04 MHz	[[2 0]
10	NR_TDD_FR2_G	Note4	[-52.9]
	NR_TDD_FR2_T	1	
	NR_TDD_FR2_Y		

- Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone

The UE shall be continuously scheduled in NR PSCell during the entire length of T1. UE shall not be scheduled in LTE PCell during T1. During the time duration T1 the UE shall transmit at least 99% of ACK/NACK on NR PSCell.

Interruption on NR PSCell shall not exceed 0.625ms (5 slots) as defined in section TS 38.133 clause 8.2.1.

The rate of correct events observed during repeated tests shall be at least 90%.

5.5.2.2 EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Editor's note:

- Connection diagram is TBD.
- Test tolerance is missing.

5.5.2.2.1 Test purpose

The purpose of this test is:

- To verify that when LTE PCell is in DRX and NR PSCell is in non-DRX, NR PSCell interruptions due to transitions from active to non-active and from non-active to active during LTE PCell DRX the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for NR PSCell in EN-DC.

5.5.2.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

5.5.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.2.2.

5.5.2.2.4 Test description

5.5.2.2.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 5.5.2.2.4.1-1.

Table 5.5.2.2.4.1-1: Supported test configurations for EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Configuration	Description
5.5.2.2-1	LTE FDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
5.5.2.2-2	LTE TDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode

Configure the test equipment and the DUT according to the parameters in Table 5.5.2.2.4.1-2.

Table 5.5.2.2.4.1-2: Initial conditions for EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.3-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 5.5.2.2.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.1.
conditions			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 5.5.2.2.4.1-3.
- 2. Message contents are defined in clause 5.5.2.2.4.3.
- 3. There are one E-UTRAN carrier and one NR carrier and two cells in the test. Cell 1 is PCell on the E-UTRAN carrier, Cell 2 is PSCell on the NR carrier, Cell 1 is the cell used for connection setup with the power levels set according to Table A.6.1.1-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 5.5.2.2.4.1-3: General test parameters for EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other
		1, 2	is NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Configured PSCell		Cell2	PSCell on NR RF channel number 2.
CP length		Normal	Applicable to cell1 and cell 2
DRX		DRX.4	DRX related parameters are defined in TS
		DRA.4	38.133 Table A.3.3.4-1
Measurement gap pattern		OFF	
Id		OFF	
T1	S	10	

5.5.2.2.4.2 Test procedure

The test consists of two cells: Cell1 and Cell2. Cell1 is LTE PCell and Cell2 is NR PSCell. The test consists of one time period, with duration of T1. During T1, NR PSCell is continuously scheduled in DL while LTE PCell is not scheduled and has DRX configured. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1 and Cell2. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. Prior to start of T1 the DRX

inactivity timer for the LTE PCell has already expired. During T1 the UE shall be continuously scheduled on NR PSCell while not scheduled on LTE PCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message to configure PCell (Cell1) and PSCell (Cell2) on the MCG and SCG as per TS 36.508 [7] clause 4.6 with the message content exceptions defined in clause 5.5.2.2.4.3.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. The SS would ensure continuous transmission on PSCell, while not scheduling on PCell at least for 200 ms to ensure inactivity timer is expired on the UE for LTE PCell.
- 5. Set the parameters according to T1 in Table 5.5.2.2.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict. If all events pass, the test passes. If one event fails, the test fails.

5.5.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.2.2.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information				
blocks exceptions				
	Table H.3.7-2 with			
elements contents exceptions	Condition DRX.4			

5.5.2.2.5 Test requirement

Table 5.5.2.2.4.1-1, 5.5.2.2.5-1 and 5.5.2.2.5-2 define the NR cell specific primary level settings including test tolerances for EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC test.

Table 5.5.2.2.5-1: NR cell specific test parameters for EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

Paramet	ter	Unit	Cell 2
Frequency Range			FR2
Duplex mode	Config 1,2		TDD
TDD configuration	Config 1,2		TDDConf.3.1
BW _{channel}	Config 1,2	MHz	100: N _{RB,c} = 66
Initial DL BWP			
Configuration	Config 1,2		TBD
Dedicated DL BWP	0		DI DIVIDA A
Configuration	Config 1,2		DLBWP.1.1
Initial UL BWP	0		LII DWD 0.4
configuration	Config 1,2		ULBWP.0.1
Dedicated UL BWP	Config 1 0		LII DWD 1 1
configuration	Config 1,2		ULBWP.1.1
TRS configuration	Config 1,2		TRS.2.1 TDD
TCI state	Config 1,2		TCI.State.0
PDSCH Reference	Config 1 2		SR.3.1 TDD
measurement channel	Config 1,2		5R.3.1 TDD
RMSI CORESET	Config 1,2		CR.3.1 TDD
parameters	Coming 1,2		CN.3.1 100
PDCCH CORESET	Config 1,2		CCR.3.1 TDD
parameters	Coming 1,2		
OCNG Patterns			OP.1
SSB Configuration			SSB.1 FR2
SMTC Configuration Config 1,2			SMTC.1
EPRE ratio of PSS to SSS		dB	
EPRE ratio of PBCH DMRS		1	
EPRE ratio of PBCH to PBC		1	
EPRE ratio of PDCCH DMR		-	
EPRE ratio of PDCCH to PE EPRE ratio of PDSCH DMR		-	0
		-	
EPRE ratio of PDSCH to PDSCH EPRE ratio of OCNG DMRS to SSS(Note 1)		1	
EPRE ratio of OCNG to OC		†	
Ê _s /N _{oc}		dB	17
Propagation Condition			AWGN
Time offset to cell1 Note 2		ms	3
	e used such that ho		ully allocated and a constant total transmitted power
	ty is achieved for all		
			ween subframe timing boundary of E-UTRA PCell and
			lianment error between the two cells

slot timing boundary of PSCell including time alignment error between the two cells

Table 5.5.2.2.5-2: NR cell specific OTA related test parameters for EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

	Parameter	Unit	Cell 2
Angle of arrival configuration			Setup 1 defined in section A.3.15.1
Note1	NR_TDD_FR2_A	dBm/15kHz	[-84.9]
oc	NR_TDD_FR2_B		
	NR TDD FR2 F		

	NR_TDD_FR2_G		
	NR_TDD_FR2_T		
	NR_TDD_FR2_Y		
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
SS-RSRP ^{Note2}	NR_TDD_FR2_F	dDm/CCC Note3	[0.4 0]
33-K3KP****	NR_TDD_FR2_G	dBm/SCS Note3	[-84.9]
	NR_TDD_FR2_T		
	NR_TDD_FR2_Y		
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	TBD
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
IO ^{Note2}	NR_TDD_FR2_F	dBm/95.04 MHz	[[[] 0]
	NR_TDD_FR2_G	Note4	[-52.9]
	NR_TDD_FR2_T		
	NR_TDD_FR2_Y		

- Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone

The UE shall be continuously scheduled in NR PSCell during the entire length of T1. UE shall not be scheduled in LTE PCell during T1. During the time duration T1 the UE shall transmit at least 99% of ACK/NACK on NR PSCell.

Interruption on NR PSCell shall not exceed 0.625ms (5 slots) as defined in TS 38.133 section 8.2.1.

The rate of correct events observed during repeated tests shall be at least 90%.

5.5.2.3 EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Editor's note:

- Connection diagram is TBD.
- Test tolerance is missing.

5.5.2.3.1 Test purpose

The purpose of this test is:

- To verify NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for NR PSCell in EN-DC.

5.5.2.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

5.5.2.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.2.3.

5.5.2.3.4 Test description

5.5.2.3.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 5.5.2.3.4.1-1.

Table 5.5.2.3.4.1-1: Supported test configurations for EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Configuration	Description			
5.5.2.3-1	LTE FDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode			
5.5.2.3-2	LTE TDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode			
Note 1: The UE is only required to be tested in one of the supported test configurations				

Configure the test equipment and the DUT according to the parameters in Table 5.5.2.3.4.1-2.

Table 5.5.2.3.4.1-2: Initial conditions for EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies		in Annex E, table E.3-1 and TS 38.		
Channel bandwidth	As specified by the test configuration selected from Table 5.5.2.3.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.1.	
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.TBD		
Exceptions to connection diagram	N/A			

- 1. The general test parameter settings are set up according to Table 5.5.2.3.4.1-3.
- 2. Message contents are defined in clause 5.5.2.3.4.3.
- 3. There are one E-UTRAN carrier and two NR carriers and three cells specified in the test. Cell 1 is the PCell on E-UTRAN carrier, Cell 2 is the PSCell on one NR carrier and Cell 3 is the SCell on the other NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 5.5.2.3.4.1-3: General test parameters for EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Parameter	Unit	Value	Comment	
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other	
		1, 2	two are NR RF channel	
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.	
Configured PSCell		Cell2	PSCell on NR RF channel number 2.	
Configured deactivated		Cell3	Deactivated SCell on NR RF channel	
SCell			number 2.	
CP length		Normal	Applicable to cell1, cell 2 and cell3	
DRX		OFF		
Measurement gap pattern		OFF		
Id		OFF		
SCell measurement cycle	ms	640		
(measCycleSCell)	1115	040		
T1	S	10		

5.5.2.3.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 is E-UTRAN PCell, Cell2 is NR PSCell and Cell3 is deactivated NR SCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as NR deactivated SCell. The point in time at which the RRC message including *measCycleSCell* for the deactivated NR SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCReconfiguration* message including *measCycleSCell* for the deactivated NR SCell.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. Set the parameters according to T1 in Table 5.5.2.3.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

5.5.2.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.2.3.4.3-1: Common Exception messages

	Default Message Contents
Common contents of system information	
blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1;
	Table H.3.1-2 with Condition Deactivated SCell;
	Table H.3.1-3 with Condition Deactivated SCell, SSB.1 FR2 and SMTC.1 for configuration 5.5.2.3-1;
	Table H.3.1-3 with Condition Deactivated SCell, SSB.2 FR2 and SMTC.1 for configuration 5.5.2.3-3;
	Table H.3.1-4 with A3-offset = -6dB;
	Table H.3.1-7 with Condition Deactivated SCell;

5.5.2.3.5 Test requirement

Table 5.5.2.3.5-1 and Table 5.5.2.3.5-2 define the primary level settings including test tolerances for FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC test configurations.

Table 5.5.2.3.5-1: NR cell specific test parameters for EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Paramet	er	Unit	Cell 2	Cell 3
Frequency Range			FR2	FR2
Duplex mode	Config 1		FDD	FDD
	Config 2		TDD	TDD
TDD configuration	Config 1		N.A	N.A
	Config 2		TBD	TBD
BW _{channel}	Config 1,2	MHz	100: N _{RB,c} = 66	100: N _{RB,c} = 66
Initial BWP Configuration	Config 1,2		TBD	TBD
PDSCH Reference measurement channel	Config 1,2		SR.3.1 TDD	-
RMSI CORESET parameters	Config 1,2		CR.3.1 TDD	CR.3.1 TDD
PDCCH CORESET parameters	Contid 1 2		TBD	TBD
OCNG Patterns			OP.1	OP.1
SMTC Configuration Config 1,2			SMTC.1 FR2	SMTC.1 FR2
EPRE ratio of PSS to SSS]		
EPRE ratio of PBCH DMI	EPRE ratio of PBCH DMRS to SSS			
EPRE ratio of PBCH to P]		
EPRE ratio of PDCCH DI				
EPRE ratio of PDCCH to]		
EPRE ratio of PDSCH DN		dB	0	0
EPRE ratio of PDSCH to]		
EPRE ratio of OCNG DMRS to SSS(Note				
1)		1		
	EPRE ratio of OCNG to OCNG DMRS			
(Note 1)				
Ê _s /N _{oc}			TBD	TBD
Propagation Condition		μs	AWGN	AWGN
	Time offset to cell1 Note 2		3	3
Time offset to cell1 Note 3		μs	-	3

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell including time alignment error between the two cells

Note 3: Receive time difference of signals received between slot timing boundary from two NR Cells including time alignment error between the two cells

Table 5.5.2.3.5-2: NR cell specific OTA related test parameters for EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

Pá	arameter	Unit	Cell 2	Cell 3
UE orientation arou	nd TBD axis and TBD axis		TE	3D
Relative difference and cell 3 relative to	in angle of arrival of cell 2 o cell 1	degrees	TI	BD
N_{oc} Note1	NR_TDD_FR2_A NR_TDD_FR2_B NR_TDD_FR2_C NR_TDD_FR2_D NR_TDD_FR2_E NR_TDD_FR2_F NR_TDD_FR2_G	dBm/15kHz ^{Note4}	TBD+TT	TBD+TT
N_{oc} Note1	NR TDD FR2 A NR TDD FR2 B NR TDD FR2 C NR TDD FR2 D NR TDD FR2 E NR TDD FR2 F NR TDD FR2 G	dBm/SCS ^{Note3}	TBD+TT	TBD+TT
SS-RSRP ^{Note2}	NR_TDD_FR2_A NR_TDD_FR2_B NR_TDD_FR2_C NR_TDD_FR2_D NR_TDD_FR2_E NR_TDD_FR2_F NR_TDD_FR2_G	dBm/SCS Note4	TBD+TT	TBD+TT
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		dB	TBD+TT	TBD+TT
Io ^{Note2}	NR_TDD_FR2_A	dBm/95.04 MHz	TBD+TT	TBD+TT
Subcarrie Note 2: SS-RSR not setta	nce from other cells and noisers and time and shall be mo P and lo levels have been doble parameters themselves.	odeled as AWGN of erived from other pa	appropriate power for $\it I$ arameters for information	$N_{oc}^{}$ to be fulfilled. In purposes. They are

Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone

Note 5: As observed with OdBi gain antenna at the centre of the quiet zone

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table 5.5.2.3.5-3 if the NR PSCell is not in the same band as the deactivated SCell or Table 5.5.2.3.5-4 if the NR PSCell is in the same band as the deactivated SCell.

Table 5.5.2.3.5-3: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
3	0.125	4

Table 5.5.2.3.5-4: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
3	0.125	4 + SMTC duration

Each interruption on E-UTRAN PCell shall not exceed 1 subframe for synchronous interband EN-DC. The rate of correct events observed during repeated tests shall be at least 90%.

5.5.2.4 EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Editor's note:

- Connection diagram is TBD.
- Test tolerance is missing.

5.5.2.4.1 Test purpose

The purpose of this test is:

- To verify NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for NR PSCell in EN-DC.

5.5.2.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

5.5.2.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.2.4.

5.5.2.4.4 Test description

5.5.2.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.5.2.4.4.1-1.

Table 5.5.2.4.4.1-1: Supported test configurations for EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Configuration	Description		
5.5.2.4-1	LTE FDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode		
5.5.2.4-2	LTE TDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode		
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 5.5.2.4.4.1-2.

Table 5.5.2.4.4.1-2: Initial conditions for EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.3-1 and TS 38.5	508-1 [14] clause 4.3.1.
Channel	As specified by the test configuration selected from Table 5.5.2.4.4.1-1.		
bandwidth			
Propagation	AWGN		As specified in Annex C.2.1.
conditions			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 5.5.2.4.4.1-3.
- 2. Message contents are defined in clause 5.5.2.4.4.3.
- 3. There are one E-UTRAN carrier and two NR carriers and three cells specified in the test. Cell 1 is the PCell on E-UTRAN carrier, Cell 2 is the PSCell on one NR carrier and Cell 3 is the SCell on the other NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 5.5.2.4.4.1-3: General test parameters for EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other
		1, 2	two are NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Configured PSCell		Cell2	PSCell on NR RF channel number 2.
Configured deactivated		Cell3	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to cell1, cell 2 and cell3
AoA number		1	Applicable to cell2 and cell3
DRX		OFF	
Measurement gap pattern		OFF	
Id		011	
SCell measurement cycle	ms	640	
(measCycleSCell)	1113	U40	
T1	S	10	

5.5.2.4.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 is E-UTRAN PCell, Cell2 is NR PSCell and Cell3 is deactivated NR SCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as NR deactivated SCell. The point in time at which the RRC message including *measCycleSCell* for the deactivated NR SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCReconfiguration* message including *measCycleSCell* for the deactivated NR SCell.
- 4. The UE shall transmit RRCReconfigurationComplete message.

- 5. Set the parameters according to T1 in Table 5.5.2.4.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

5.5.2.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.2.4.4.3-1: Common Exception messages

	Default Message Contents				
Common contents of system information					
blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-1;				
·	Table H.3.1-2 with Condition Deactivated SCell;				
	Table H.3.1-3 with Condition Deactivated SCell, SSB.1 FR2 and SMTC.1 for configuration 5.5.2.4-1;				
	Table H.3.1-3 with Condition Deactivated SCell, SSB.2 FR2 and SMTC.1 for configuration 5.5.2.4-3;				
	Table H.3.1-4 with A3-offset = -6dB;				
	Table H.3.1-7 with Condition Deactivated SCell;				

5.5.2.4.5 Test requirement

Table 5.5.2.4.5-1 and Table 5.5.2.4.5-2 define the primary level settings including test tolerances for FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC test configurations.

Table 5.5.2.4.5-1: NR cell specific test parameters for EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

Paramet	ter	Unit	Cell 2	Cell 3
Frequency Range			FR2	FR2
Duplex mode	Config 1		FDD	FDD
·	Config 2		TDD	TDD
TDD configuration	Config 1		N.A	N.A
	Config 2		TBD	TBD
BW _{channel}	Config 1,2	MHz	100: N _{RB,c} = 66	100: N _{RB,c} = 66
Initial BWP	Config 1 2		TBD	TBD
Configuration	Config 1,2		IBD	ושט
PDSCH Reference	Config 1,2		SR.3.1 TDD	
measurement channel	Corning 1,2		3R.3.1 TDD	-
RMSI CORESET	Config 1,2		CR.3.1 TDD	CR.3.1 TDD
parameters	Coming 1,2		CIN.5.1 100	CIV.S.I IDD
PDCCH CORESET	Config 1,2		TBD	TBD
parameters	Coming 1,2			
OCNG Patterns			OP.1	OP.1
SMTC Configuration	Config 1,2		SMTC.1 FR2	SMTC.1 FR2
EPRE ratio of PSS to SSS				
EPRE ratio of PBCH DMRS		_		
EPRE ratio of PBCH to PBC		-		
EPRE ratio of PDCCH DMR		40	0	0
EPRE ratio of PDCCH to PD EPRE ratio of PDSCH DMR		dB	0	0
		-		
	EPRE ratio of PDSCH to PDSCH EPRE ratio of OCNG DMRS to SSS(Note 1)			
EPRE ratio of OCNG to OCNG DMRS (Note 1)				
Ê _s /N _{oc}		dB	TBD	TBD
Propagation Condition			AWGN	AWGN
Time offset to cell1 Note 2		ms	3	3
Time offset to cell1 Note 3		μs	-	3

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell including time alignment error between the two cells.

Note 3: Receive time difference of signals received between slot timing boundary from two NR Cells including time alignment error between the two cells

Table 5.5.2.4.5-2: NR cell specific OTA related test parameters for EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

P	arameter	Unit	Cell 2	Cell 3
UE orientation arou	and TBD axis and TBD		TE	BD
Relative difference and cell 3 relative to	in angle of arrival of cell 2 o cell 1	degrees	TE	3D
$oldsymbol{N}_{oc}$ Note1	NR TDD FR2 A NR TDD FR2 B NR TDD FR2 C NR TDD FR2 D NR TDD FR2 E NR TDD FR2 F NR TDD FR2 G	dBm/15kHz ^{Note4}	TBD+TT	TBD+TT
N_{oc} Note1	NR_TDD_FR2_A NR_TDD_FR2_B NR_TDD_FR2_C NR_TDD_FR2_D NR_TDD_FR2_E NR_TDD_FR2_F NR_TDD_FR2_G	dBm/SCS ^{Note3}	TBD+TT	TBD+TT
SS-RSRP ^{Note2}	NR_TDD_FR2_A NR_TDD_FR2_B	dBm/SCS Note4	TBD+TT	TBD+TT

		NR_TDD_FR2_C			
		NR_TDD_FR2_D			
		NR_TDD_FR2_E			
		NR_TDD_FR2_F			
		NR_TDD_FR2_G			
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$			dB	TBD+TT	TBD+TT
Io ^{Note2}		NR_TDD_FR2_A	dBm/95.04 MHz	TBD+TT	TBD+TT
Note 1:	.: Interference from other cells and noise sources not specified in the test is assumed to be constant over				
	subcarriers and time and shall be modeled as AWGN of appropriate power for $N_{_{OC}}$ to be fulfilled.				
Note 2:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.				
Note 3:					
Note 4: Note 5:	Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone As observed with 0dBi gain antenna at the centre of the quiet zone				

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table 5.5.2.4.5-3 and Table 5.5.2.4.5-4.

Table 5.5.2.4.5-3: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
3	0.125	4

Table 5.5.2.4.2-4: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
3	0.125	4 + SMTC duration

Each interruption on E-UTRAN PCell shall not exceed 2 subframes for asynchronous interband EN-DC.

The rate of correct events observed during repeated tests shall be at least 90%.

5.5.2.5 EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Editor's note:

- Connection diagram is TBD.
- Test tolerance is missing.

5.5.2.5.1 Test purpose

The purpose of this test is:

- To verify NR PSCell interruptions during the measurement on the deactivated E-UTRAN SCC, the UE missed ACK/NACK does not exceed the limits.
- To verify the missed ACK/NACK rate for NR PSCell in EN-DC.

5.5.2.5.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

5.5.2.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.2.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.2.5.

5.5.2.5.4 Test description

5.5.2.5.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 5.5.2.5.4.1-1.

Table 5.5.2.5.4.1-1: Supported test configurations for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Configuration	Description
5.5.2.5-1	LTE FDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
5.5.2.5-2	LTE TDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode

Configure the test equipment and the DUT according to the parameters in Table 5.5.2.5.4.1-2.

Table 5.5.2.5.4.1-2: Initial conditions for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	I in Annex E, table E.3-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified	l by the test configuration selected fi	rom Table 5.5.2.5.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.1.
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	1
Exceptions to connection diagram	N/A		

- 1. The general test parameter settings are set up according to Table 5.5.2.5.4.1-3.
- 2. Message contents are defined in clause 5.5.2.5.4.3.
- 3. There are two E-UTRAN carriers and one NR carrier and three cells specified in the test. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR2 PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 5.5.2.5.4.1-3: General test parameters for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other
		1, 2	two are NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Configured PSCell		Cell2	PSCell on NR RF channel number 2.
Configured deactivated		Cell3	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to cell1, cell 2 and cell3
DRX		OFF	
Measurement gap pattern		OFF	
Id		OFF	
SCell measurement cycle	ms	640	
(measCycleSCell)	1115	040	
T1	S	10	

5.5.2.5.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR2 PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as E-UTRAN deactivated SCell. The point in time at which the RRC message including *measCycleSCell* or *allowInterruptions* for the E-UTRAN SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message including *measCycleSCell* or *allowInterruptions* for the deactivated E-UTRAN SCell to perform measurements on the deactivated SCC.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. Set the parameters according to T1 in Table 5.5.2.5.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

5.5.2.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.2.5.4.3-1: Common Exception messages

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information			
elements contents exceptions			

Table 5.5.2.5.4.3-2: MeasObjectEUTRA for E-UTRAN deactivated SCell

Derivation Path: 36.508 Table 4.6.6-2			
Information Element	Value/remark	Comment	Condition
MeasObjectEUTRA ::= SEQUENCE {			
carrierFreq	Downlink EARFCN for E-		
	UTRAN SCell		
measCycleSCell-r10	sf640		
}			

5.5.2.5.5 Test requirement

Table 5.5.2.5.5-1 and Table 5.5.2.5.5-2 defines the primary level settings including test tolerances for E-UTRAN – NR FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC test configurations.

Table 5.5.2.5.5-1: NR cell specific test parameters for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Parameter		Unit	Cell 2
Frequency Range			FR2
Duplex mode Config 1,2			TDD
TDD configuration	Config 1,2		TBD
BW _{channel}	Config 1,2	MHz	100: N _{RB,c} = 66
Initial BWP	Config 1.2		TDD
Configuration	Config 1,2		TBD
PDSCH Reference	Config 1 2		SR.3.1 TDD
measurement channel	Config 1,2		SR.3.1 TDD
RMSI CORESET	Config 1 2		CR.3.1 TDD
parameters	Config 1,2		CR.3.1 1DD
PDCCH CORESET Config 1.2			TBD
parameters	(.0000 /		IBU
OCNG Patterns	OCNG Patterns		OP.1
SMTC Configuration	Config 1,2		SMTC.1 FR2
EPRE ratio of PSS to SSS		dB	
EPRE ratio of PBCH DMRS	to SSS]	
EPRE ratio of PBCH to PBC]	
EPRE ratio of PDCCH DMR]	
EPRE ratio of PDCCH to PD			0
EPRE ratio of PDSCH DMR			
EPRE ratio of PDSCH to PDSCH		.	
EPRE ratio of OCNG DMRS to SSS(Note 1)			
EPRE ratio of OCNG to OCNG DMRS (Note 1)			
Ê _s /N _{oc}		dB	TBD+TT
Propagation Condition			AWGN
Time offset to cell1 Note 2	e offset to cell1 Note 2		3

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell including time alignment error between the two cells

Table 5.5.2.5.5-2: NR cell specific OTA related test parameters for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

Pa	arameter	Unit	Cell 2	
UE orientation around TBD axis and TBD axis			TBD	
Relative difference in angle of	arrival of cell 2 relative to cell 1	degrees	TBD	
	NR_TDD_FR2_A			
	NR_TDD_FR2_B			
	NR_TDD_FR2_C			
$N_{oc}^{ m Note1}$	NR_TDD_FR2_D	dBm/15kHz ^{Note4}	TBD+TT	
	NR_TDD_FR2_E			
	NR_TDD_FR2_F			
	NR_TDD_FR2_G			
	NR_TDD_FR2_A		TBD+TT	
	NR_TDD_FR2_B	dBm/SCS ^{Note3}		
	NR_TDD_FR2_C			
$N_{_{OC}}^{}$ Note1	NR_TDD_FR2_D			
	NR_TDD_FR2_E			
	NR_TDD_FR2_F			
	NR_TDD_FR2_G			
	NR_TDD_FR2_A			
	NR_TDD_FR2_B		TBD+TT	
	NR_TDD_FR2_C			
SS-RSRP ^{Note2}	NR_TDD_FR2_D	dBm/SCS Note4		
	NR_TDD_FR2_E			
	NR_TDD_FR2_F			
	NR_TDD_FR2_G			

$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	TBD+TT	
Io ^{Note2}	NR_TDD_FR2_A	dBm/95.04 MHz Note4	TBD+TT	
Note 1:	1: Interference from other cells and noise sources not specified in the test is assumed to be constant over			
	subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.			
Note 2:	2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.			
Note 3:	: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.			
Note 4: Note 5:	Equivalent power received by an antenna with 0dBi gain As observed with 0dBi gain antenna at the centre of the	•	t zone	

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table 5.5.2.5.5-3 and Table 5.5.2.5.5-4.

Table 5.5.2.5.5-3: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
3	0.125	5

Table 5.5.2.5.5-4: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length (slot)
3	0.125	4 + SMTC duration

Each interruption on E-UTRAN PCell shall not exceed 1 subframe if the PCell is not in the same band as the deactivated SCell, or 5 subframes if the PCell is in the same band as the deactivated SCell. The rate of correct events observed during repeated tests shall be at least 90%.

5.5.2.6 EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Editor's note:

- Connection diagram is TBD.
- Test tolerance is missing.

5.5.2.6.1 Test purpose

The purpose of this test is:

- To verify NR PSCell interruptions during the measurement on the deactivated E-UTRAN SCC, the UE missed ACK/NACK does not exceed the limits.
- -To verify the missed ACK/NACK rate for NR PSCell in EN-DC.

5.5.2.6.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward supporting EN-DC.

5.5.2.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.2.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.2.6.

5.5.2.6.4 Test description

5.5.2.6.4.1 Initial conditions

Test 5.5.2.6 can be run in one of the configurations defined in Table 5.5.2.6.4.1-1.

Table 5.5.2.6.4.1-1: Supported test configurations for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Configuration	Description
5.5.2.6-1	LTE FDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
5.5.2.6-2	LTE TDD, NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode

Configure the test equipment and the DUT according to the parameters in Table 5.5.2.6.4.1-2.

Table 5.5.2.6.4.1-2: Initial conditions for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.3-1 and TS 38.5	508-1 [14] clause 4.3.1.
Channel	As specified by the test configuration selected from Table 5.5.2.6.4.1-1.		
bandwidth			
Propagation	AWGN		As specified in Annex C.2.1.
conditions		_	
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to	N/A		
connection			
diagram			

- 2. The general test parameter settings are set up according to Table 5.5.2.6.4.1-3.
- 4. Message contents are defined in clause 5.5.2.6.4.3.
- 5. There are two E-UTRAN carriers and one NR carrier and three cells specified in the test. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR2 PSCell. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1. Cell 2 and Cell 3 shall be configured according to Annex C.1.1 and C.1.2.

Table 5.5.2.6.4.1-3: General test parameters for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	One is E-UTRAN RF channel and the other
		1, 2	two are NR RF channel
Active PCell		Cell1	PCell on E-UTRAN RF channel number 1.
Configured PSCell		Cell2	PSCell on NR RF channel number 2.
Configured deactivated		Cell3	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to cell1, cell 2 and cell3
DRX		OFF	
Measurement gap pattern		OFF	
Id		UFF	
SCell measurement cycle	mc	640	
(measCycleSCell)	ms	040	
T1	S	10	

5.5.2.6.4.2 Test procedure

The test consists of three cells: Cell1, Cell2 and Cell3. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR2 PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell1, Cell2 and Cell3. Cell1 shall be configured as E-UTRAN PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as E-UTRAN deactivated SCell. The point in time at which the RRC message including *measCycleSCell* or *allowInterruptions* for the E-UTRAN SCell is received by the UE, defines the start of time period T1. During T1 the UE shall be continuously scheduled on E-UTRAN PCell and NR PSCell.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Configure MCG according to TS 36.521-3 [26] Annex C.0, C.1 and SCG according to Annex C.1.1 and C.1.2 for all downlink physical channels.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message including *measCycleSCell* or *allowInterruptions* for the deactivated E-UTRAN SCell to perform measurements on the deactivated SCC.
- 4. The UE shall transmit *RRCConnectionReconfigurationComplete* message.
- 5. Set the parameters according to T1 in Table 5.5.2.6.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts.
- 6. SS schedules on PSCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PSCell.
- 7. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 8. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG_and_SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 3-9 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

5.5.2.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.2.6.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information				
elements contents exceptions				

Table 5.5.2.6.4.3-2: MeasObjectEUTRA for EUTRAN deactivated SCell

Derivation Path: 36.508 Table 4.6.6-2			
Information Element	Value/remark	Comment	Condition
MeasObjectEUTRA ::= SEQUENCE {			
carrierFreq	Downlink EARFCN for E-		
	UTRAN SCell		
measCycleSCell-r10	sf640		
}			

5.5.2.6.5 Test requirement

Table 5.5.2.6.5-1 and Table 5.5.2.6.5-2 defines the primary level settings including test tolerances for E-UTRAN – NR FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC test configurations.

Table 5.5.2.6.5-1: NR cell specific test parameters for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

Parameter		Unit	Cell 2
Frequency Range	Frequency Range		FR2
Duplex mode	Config 1,2		TDD
TDD configuration	Config 1,2		TBD
BW _{channel}	Config 1,2	MHz	100: N _{RB,c} = 66
Initial BWP	Config 1,2		TBD
Configuration	Corning 1,2		IDU
PDSCH Reference	Config 1 2		SR.3.1 TDD
measurement channel	Config 1,2		3R.3.1 1DD
RMSI CORESET	Config 1,2		CR.3.1 TDD
parameters	Corning 1,2		CR.3.1 TDD
PDCCH CORESET	Config 1,2		TBD
parameters	Corning 1,2		TBD
OCNG Patterns			OP.1
SMTC Configuration	Config 1,2		SMTC.1 FR2
EPRE ratio of PSS to SSS		dB	
EPRE ratio of PBCH DMRS			
EPRE ratio of PBCH to PBC			
EPRE ratio of PDCCH DMR			
EPRE ratio of PDCCH to PD			0
EPRE ratio of PDSCH DMR			
EPRE ratio of PDSCH to PDSCH			
EPRE ratio of OCNG DMRS to SSS(Note 1)			
EPRE ratio of OCNG to OCNG DMRS (Note 1)			
Ê _s /N _{oc}		dB	TBD
Propagation Condition	Propagation Condition		AWGN
Time offset to cell1 Note 2		ms	3

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell including time alignment error between the two cells

Table 5.5.2.6.5-2: NR cell specific OTA related test parameters for EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

	Parameter	Unit	Cell 2
UE orientation around TE	BD axis and TBD axis		TBD
Relative difference in angle of arrival of cell 2 relative to cell 1		degrees	TBD
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
$N_{_{oC}}$ Note1	NR_TDD_FR2_C		
1 voc	NR_TDD_FR2_D	dBm/15kHz ^{Note4}	TBD
	NR_TDD_FR2_E		
	NR_TDD_FR2_F		
	NR_TDD_FR2_G		
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
$N_{_{OC}}$ Note1	NR_TDD_FR2_C		
TV _{oc}	NR_TDD_FR2_D	dBm/SCS ^{Note3}	TBD
	NR_TDD_FR2_E		
	NR_TDD_FR2_F		
	NR_TDD_FR2_G		
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
	NR_TDD_FR2_C		
SS-RSRP ^{Note2}	NR_TDD_FR2_D	dBm/SCS Note4	TBD
	NR_TDD_FR2_E		
	NR_TDD_FR2_F		
	NR_TDD_FR2_G		
$\hat{\mathbf{E}}_{_{\mathrm{s}}}/\mathbf{I}_{_{\mathrm{ot}}}$		dB	TBD
Io ^{Note2}	NR_TDD_FR2_A	dBm/95.04 MHz Note4	TBD
Note 1: Interference fr	rom other cells and noise sources not spe	ecified in the test is assumed t	o be constant over
subcarriers ar	nd time and shall be modeled as AWGN o	of appropriate power for $N_{lpha c}$	to be fulfilled.

- Note 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 4: Equivalent power received by an antenna with 0dBi gain at the center of the quiet zone
- Note 5: As observed with 0dBi gain antenna at the center of the quiet zone

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table 5.5.2.6.5-3 and Table 5.5.2.6.5-4.

Table 5.5.2.6.5-3: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length
3	0.125	5

Table 5.5.2.6.5-4: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length
3	0.125	5 + SMTC duration

Each interruption on E-UTRAN PCell shall not exceed 1 subframe if the PCell is not in the same band as the deactivated SCell, or 5 subframes if the PCell is in the same band as the deactivated SCell. The rate of correct events observed during repeated tests shall be at least 90%.

5.5.3 SCell activation and deactivation delay

5.5.3.1 EN-DC FR2 SCell activation and deactivation intra-band in non-DRX

Editor's notes: This clause is incomplete, the following items are TBD

- The core requirements in TS 38.133 are between [.] or TBD;
- Test tolerance analysis is missing;
- Test procedure and Message content are TBD;
- Cell mapping and Connection diagram is TBD;
- Test applicability Table in TS38.522 need to be updated.

5.5.3.1.1 Test purpose

This test is to verify that the SCell activation and deactivation times are within the requirements, when the SCell in FR2 intra-band is known by the UE at the time of activation.

5.5.3.1.2 Test applicability

This test applies to all types of NR UE supporting E-UTRA and EN-DC from Release 15 onwards.

5.5.3.1.3 Minimum conformance requirements

Same minimum conformance requirements as described in section 4.5.3.1.3.

The normative reference for this requirement is TS 38.133 [6] clause 8.3 and A.5.5.3.1.

5.5.3.1.4 Test description

5.5.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.5.3.1.4.1-1.

Table 5.5.3.1.4.1-1: Supported test configurations for FR2 SCell activation case with FR2 PSCell

Test Case ID	Description			
5.5.3.1-1	FDD LTE PCell, Cell 2&3 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode			
5.5.3.1-2	TDD LTE PCell, Cell 2&3 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode			
NOTE: The L				

Configure the test equipment and the DUT according to the parameters in Table 5.5.3.1.4.1-2 and Table 5.5.3.1.4.1-3.

Table 5.5.3.1.4.1-2: Initial conditions for known FR2 SCell activation case with FR2 PSCell

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.1-1 and TS 38.	.508-1 [14] sclause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 4.7.1.1.2-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	TBD		
Exceptions to connection diagram	N/A			

Table 5.5.3.1.4.1-3: General test parameters for FR2 SCell activation case with FR2 PSCell

Parameter	Unit	Value	Comment
RF Channel Number		1,2,3	One E-UTRAN radio channel (1) and two NR radio channel (2,3) are used for this test
Active PCell		Cell 1	Primary cell on E-UTRAN RF channel number 1. As specified in section A.3.7.2.2 of TS38.133 [6]
Active PSCell		Cell 2	Primary secondary cell on NR RF channel number 2.
Configured deactivated SCell		Cell 3	Configured deactivated secondary cell on NR RF channel number 3
CP length		Normal	
DRX		OFF	Continuous monitoring of primary cell
CQI/PMI periodicity and offset configuration index		0	CQI reporting for SCell every second subframe
Cell-individual offset for cells on E-UTRA RF channel number	dB	0	Individual offset for cells on primary component carrier.
Cell-individual offset for cells on NR channel number	dB	0	Individual offset for cells on secondary component carrier.
SCell measurement cycle (measCycleSCell)	ms	160	
Cell3 timing offset to cell2	μs	0	
Time alignment error between cell3 and cell2	μs	≤ Time alignment error as specified in 3GPP TS 38.104 [28] clause 6.5.3.1.	The value of time alignment error depends upon the type of carrier aggregation.
T1	S	7	During this time the PSCell shall be known and the SCell configured and detected.
T2	S	1	During this time the UE shall activate the SCell.
Т3	S	1	During this time the UE shall deactivate the SCell.
THARQ	ms	k	k is a number of slots and is indicated by the PDSCH-to-HARQ-timing-indicator field in the DCI format, if present, or provided by dl-DataToUL-ACK, the value of k should be the minimum value defined in TS 38.213 [8]
T _{CSI_Reporting}	ms	2	the delay uncertainty in acquiring the first available CSI reporting resources as specified in 38.331 [13]
k	ms	$k_1 + 3 \cdot N_{\text{slot}}^{\text{subframe}, \mu} + 1$	As specified in section 4.3 of TS38.213 [8]

- 1. Message contents are defined in clause 5.5.3.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR2 cells in the same frequency. Cell 2 is the PSCell and Cell 3 is the deactivated SCell.

5.5.3.1.4.2 Test procedure

The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, E-UTRA has one cell, NR has two cells. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on E-UTRA and Cell 2 (PSCell) on NR, but is not aware of Cell 3 (SCell) on NR. The UE is monitoring the PCell and PSCell. The UE shall be continuously scheduled in the PCell and PSCell throughout the whole test.

During T2 the Test procedure requires the UE to send the first CSI report for SCell1 in a subframe (m+[k]), but also allows a subframe not happen outside the slot ($m+1+[T_{HARQ}]$) to ($m+1+[T_{HARQ}+3ms+T_{SSB_max}+T_{SMTC_duration}]$) if the subframe (m+[k]) was subject to interruption. The SS determines whether the CSI report in subframe (m+[k]) was interrupted or not by monitoring ACK/NACK sent in PSCell in subframe (m+[k]).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG according to TS 38.508-1 [14] clause 4.5.
- 2. TBD.

5.5.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

5.5.3.1.5 Test requirement

Table 5.5.3.1.5-1 and Table 5.5.3.1.5-2 defines the primary level settings including test tolerances for all tests.

Table 5.5.3.1.5-1: Cell specific test parameters for FR2 SCell activation case with FR2 PSCell

Parameter ^{Note 5}	Unit		Cell 2		Cell 3			
Parameter	Unit	T1	T2	T3	T1	T2	T3	
SSB ARFCN			freq2		freq2			
Duplex mode			TDD			TDD		
TDD configuration		-	ΓDDConf.3.	1		TDDConf.3	.1	
BW _{channel}	MHz	1	00: $N_{RB,c} = 0$	66	1	00: $N_{RB,c} =$	66	
PDSCH Reference measurement channel		:	SR.3.1 TDD)	9	SR.3.1 TDE)	
RMSI CORESET Reference Channel			CR.3.1 TDI)		CR.3.1 TD	<u> </u>	
RMC CORESET Reference Channel		(CR.3.1 TD	D	(CR.3.1 TD)D	
OCNG Patterns				Ol	P.1			
SMTC configuration				SM	TC.1			
SSB configuration		SSB.1 FR2						
TCI state		TCI.State.0						
TRS configuration		TRS.2.1 TDD						
EPRE ratio of PSS to SSS								
EPRE ratio of PBCH_DMRS to SSS								
EPRE ratio of PBCH to PBCH_DMRS								
EPRE ratio of PDCCH_DMRS to SSS								
EPRE ratio of PDCCH to PDCCH_DMRS	dB	0						
EPRE ratio of PDSCH_DMRS to SSS								
EPRE ratio of PDSCH to PDSCH_DMRS								
EPRE ratio of OCNG DMRS to SSS note 1								
EPRE ratio of OCNG to OCNG DMRS note 1								
\hat{E}_s/N_{oc}	dB			TBC)+TT			
Propagation conditions				AW	/GN			

- NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- NOTE 5: All parameters apply for configuration 1 and 2.

Table 5.5.3.1.5-2: OTA related test parameters for FR2 SCell activation case with FR2 PSCell

Parameter ^{note 6}		Unit		Cell 2			Cell 3	
Parar	Faranietei		T1	T2	T3	T1	T2	T3
Angle of arriv	al configuration		Accord	According to table A.X.X		According to table A.X.X		e A.X.X
	NR_TDD_FR2_A							
	NR_TDD_FR2_B							
N_{oc} note1	NR_TDD_FR2_F	dBm/15kHz		TBD+TT		TBD+TT		
	NR_TDD_FR2_G	note4		וודטטו			וודעמו	
	NR_TDD_FR2_T							
	NR_TDD_FR2_Y							
	NR_TDD_FR2_A							
	NR_TDD_FR2_B					TBD+TT		
$N_{oc\ {\sf note1}}$	NR_TDD_FR2_F	dBm/SCS		TBD+TT				
	NR_TDD_FR2_G	note3	100111					
	NR_TDD_FR2_T							
	NR_TDD_FR2_Y							
	NR_TDD_FR2_A	_						
	NR_TDD_FR2_B	_						
SS-RSRP note2	NR_TDD_FR2_F	dBm/SCS		TBD+TT			TBD+TT	
JO KOKI	NR_TDD_FR2_G	note4		100.11			100.11	
	NR_TDD_FR2_T	_						
	NR_TDD_FR2_Y							
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		dB		TBD+TT			TBD+TT	
	NR_TDD_FR2_A							
	NR_TDD_FR2_B							
lo ^{note2}	NR_TDD_FR2_F	F dBm/95.04			TBD+TT			
10	NR_TDD_FR2_G	MHz note4	Hz note4 TBD +TT			וו+טסו		
	NR_TDD_FR2_T							
	NR_TDD_FR2_Y							

NOTE 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for $^{N_{oc}}$ to be fulfilled.

NOTE 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

NOTE 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

NOTE 4: Equivalent power received by an antenna with 0dBi gain at the centre of the guiet zone.

NOTE 5: As observed with 0dBi gain antenna at the centre of the quiet zone.

NOTE 6: All parameters apply for configuration 1 and 2.

During T2 the UE shall send the first CSI report for SCell in a slot (m+k), or in a slot (m+1+ $[T_{HARQ}+3ms+T_{SSB_max}+T_{SMTC_duration}]+1$) as defined in TS 38.133 [6] section 8.3 if the slot (m+k) was subject to interruption. Whether CSI report in slot (m+k) was interrupted or not is checked by monitoring ACK/NACK sent in PCell in slot (m+k).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$, $T_{activation_time}=[3ms+TBD]$, as defined in TS 38.133 [6] section 8.3.

During T3 the UE shall stop sending CSI reports for SCell at latest in a slot ($n+[T_{HARQ}+3ms]$), as defined in TS 38.133 [6] section 8.3.

During T2 interruption of PCell / PSCell during SCell activation shall not happen outside the slot (m+1+[T_{HARQ}]) to (m+1+[T_{HARQ} +3ms+ $T_{SSB\ max}$ + $T_{SMTC\ duration}$]), as defined in TS 38.133 [6] section 8.3.

During T3 interruption of PCell / PSCell during SCell deactivation shall not happen outside the slot $(n+1+[T_{HARQ}])$ to $(n+1+[T_{HARQ}+3ms])$, as defined in TS 38.133 [6] section 8.3.

The interruption of PSCell shall not be more than the values specified for EN-DC in TS 38.133 [6] section 8.2.1.2.4.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a slot $(m+T_{HARQ}+T_{activation_time}+T_{CSI_Reporting})$ as defined in TS 38.133 [6] section 8.3 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

5.5.4 UE UL carrier RRC reconfiguration delay

5.5.5 Link recovery procedures

5.5.5.0 Minimum conformance requirements

5.5.5.0.1 Minimum conformance requirements for SSB-based BFD and link recovery procedures

[TS 38.133, clause 8.5.2.1]

The requirements in this section apply for each SSB resource in the set \overline{q}_0 configured for a serving cell, provided that the SSB configured for beam failure detection is actually transmitted within the UE active DL BWP during the entire evaluation period specified in TS 38.133 [6] clause 8.5.2.2.

Table 5.5.5.0.1-1: PDCCH transmission parameters for beam failure instance

Attribute	Value for BLER
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	0dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	0dB
Bandwidth (PRBs)	24
Sub-carrier spacing (kHz)	Same as the SCS of RMSI CORESET
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

[TS 38.133, clause 8.5.2.2]

UE shall be able to evaluate whether the downlink radio link quality on the configured SSB resource in set \overline{q}_0 estimated over the last $T_{\text{Evaluate_BFD_SSB}}$ ms period becomes worse than the threshold $Q_{\text{out_LR_SSB}}$ within $T_{\text{Evaluate_BFD_SSB}}$ ms period.

The value of T_{Evaluate BFD SSB} is defined in Table 5.5.5.0.1-2 for FR2 with scaling factor N=8.

For FR2,

- $P=1/(1-T_{SSB}/T_{SMTCperiod})$, when BFD-RS is not overlapped with measurement gap and the BFD resource is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$).
- $P = P_{\text{sharing factor}}$, when the BFD resource is not overlapped with measurement gap and the BFD resource is fully overlapped with SMTC period ($T_{\text{SSB}} = T_{\text{SMTCperiod}}$).
- $P=1/(1-T_{SSB}/MGRP-T_{SSB}/T_{SMTCperiod})$, when the BFD resource is partially overlapped with measurement gap and the BFD resource is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and

- $T_{SMTCperiod} \neq MGRP$ or
- $T_{SMTCperiod} = MGRP$ and $T_{SSB} < 0.5*T_{SMTCperiod}$
- $P=P_{sharing\ factor}$ /(1- T_{SSB} /MGRP), when the BFD resource is partially overlapped with measurement gap and the BFD resource is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{SSB} = 0.5*T_{SMTCperiod}$
- P=1/(1-T_{SSB}/min(T_{SMTCperiod}, MGRP)), when the BFD resource is partially overlapped with measurement gap (T_{SSB} <MGRP) and the BFD resource is partially overlapped with SMTC occasion (T_{SSB} < T_{SMTCperiod}) and SMTC occasion is partially or fully overlapped with measurement gap.
- $P = P_{sharing factor} / (1-T_{SSB}/MGRP)$, when the BFD resource is partially overlapped with measurement gap and the BFD resource is fully overlapped with SMTC occasion ($T_{SSB} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)
- P_{sharing factor} = 1
 - if all of the reference signals configured for BFD outside measurement gap are not fully overlapped by intrafrequency SMTC occasions, or
 - if all of the reference signal configured for BFD outside measurement gap and fully-overlapped by intrafrequency SMTC occasions are not overlapped by with the SSB symbols indicated by SSB-ToMeasure and 1 symbol before each consecutive SSB symbols indicated by SSB-ToMeasure and 1 symbol after each consecutive SSB symbols indicated by SSB-ToMeasure, given that SSB-ToMeasure is configured;
- $P_{\text{sharing factor}} = 3$, otherwise.

If the high layer in TS 38.331 [2] signalling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

Longer evaluation period would be expected if the combination of BFD resource, SMTC occasion and measurement gap configurations does not meet pervious conditions.

Table 5.5.5.0.1-2: Evaluation period T_{Evaluate BFD SSB} for FR2

Configuration	T _{Evaluate_BFD_SSB} (ms)					
no DRX	Max([50], Cceil(5*P*N)*T _{SSB})					
DRX cycle ≤ 320ms	$Mmax([50], Cceil(7.5*P*N)*Mmax(T_{DRX},T_{SSB}))$					
DRX cycle > 320ms						
Note: T_{SSB} is the periodicity of SSB in the set \overline{q}_0 . T_{DRX} is the DRX cycle length.						

[TS 38.133, clause 8.5.3.3]

The UE is required to be capable of measuring SSB for BFD without measurement gaps. The UE is required to perform the SSB measurements with measurement restrictions as described in the following clauses.

For FR2, when the SSB for BFD measurement is in the same OFDM symbol as CSI-RS for RLM, BFD, CBD or L1-RSRP measurement, UE is required to measure one of but not both SSB for BFD measurement and CSI-RS. Longer measurement period for SSB based BFD measurement is expected, and no requirements are defined.

[TS 38.133, clause 8.5.4]

When the radio link quality on all the RS resources in set \overline{q}_0 is worse than $Q_{\text{out_LR}}$, Layer 1 of the UE shall send a beam failure instance indication to the higher layers. A Layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331.

The beam failure instance evaluation for the RS resources in set \overline{q}_0 shall be performed as specified in clause 6 in TS 38.213. Two successive indications from Layer 1 shall be separated by at least $T_{Indication interval BFD}$.

When DRX is not used, $T_{Indication_interval_BFD}$ is max(2ms, $T_{SSB-RS,M}$) or max(2ms, $T_{CSI-RS,M}$), where $T_{SSB-RS,M}$ and $T_{CSI-RS,M}$ is the shortest periodicity of all RS resources in set \overline{q}_0 for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set \overline{q}_0 or CSI-RS resource in the set \overline{q}_0 .

When DRX is used, $T_{Indication_interval_BFD}$ is max(1.5*DRX_cycle_length, 1.5* $T_{SSB-RS,M}$) if DRX cycle_length is less than or equal to 320ms for SSB based link quality measurement, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms.

[TS 38.133, clause 8.5.6.1]

The requirements in this section apply for each SSB resource in the set \overline{q}_1 configured for a serving cell, provided that the SSBs configured for candidate beam detection are actually transmitted within UE active DL BWP during the entire evaluation period specified in TS 38.133 [6] clause 8.5.5.2.

[TS 38.133, clause 8.5.5.2]

Upon request the UE shall be able to evaluate whether the L1-RSRP measured on the configured SSB resource in set \bar{q}_1 estimated over the last $T_{\text{Evaluate_CBD_SSB}}$ ms period becomes better than the threshold $Q_{\text{in_LR}}$ provided SSB_RP and SSB \hat{E} s/Iot are according to Annex Table B.2.4.1 for a corresponding band.

The UE shall monitor the configured SSB resources using the evaluation period in table 5.5.5.0.1-3 corresponding to the non-DRX mode, if the configured DRX cycle \leq 320ms.

The value of T_{Evaluate CBD_SSB} is defined in Table 5.5.5.0.1-3 for FR2 with scaling factor N=8.

Where,

For FR2,

- $P=1/(1-T_{SSB}/T_{SMTCperiod})$, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$).
- P is $P_{\text{sharing factor}}$, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC period ($T_{\text{SSB}} = T_{\text{SMTCperiod}}$).
- $P=1/(1-T_{SSB}/MGRP-T_{SSB}/T_{SMTCperiod})$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
 - $T_{SMTCperiod} \neq MGRP$ or
 - $T_{SMTCperiod} = MGRP$ and $T_{SSB} < 0.5*T_{SMTCperiod}$
- $P=P_{sharing\ factor}$ /(1- T_{SSB} /MGRP), when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{SSB} = 0.5*T_{SMTCperiod}$
- P=1/(1-T_{SSB}/min(T_{SMTCperiod}, MGRP)), when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion (T_{SSB} < T_{SMTCperiod}) and SMTC occasion is partially or fully overlapped with measurement gap
- $P = P_{sharing factor} / (1-T_{SSB}/MGRP)$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC occasion ($T_{SSB} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)
- $P_{\text{sharing factor}} = 1$
 - if all of the reference signals configured for CBD outside measurement gap are not fully overlapped by intrafrequency SMTC occasions, or
 - if all of the reference signal configured for CBD outside measurement gap and fully-overlapped by intrafrequency SMTC occasions are not overlapped by with the SSB symbols indicated by SSB-ToMeasure and 1 symbol before each consecutive SSB symbols indicated by SSB-ToMeasure and 1 symbol after each consecutive SSB symbols indicated by SSB-ToMeasure, given that SSB-ToMeasure is configured;

- $P_{\text{sharing factor}} = 3$, otherwise.

Table 5.5.5.0.1-3: Evaluation period T_{Evaluate CBD SSB} for FR2

Configuration	T _{Evaluate_CBD_SSB} (ms)			
non-DRX, DRX cycle ≤ 320ms	Ceil([3]*P*N) * T _{SSB}			
DRX cycle > 320ms	Ceil([3]*P*N) * T _{DRX}			
Note: T _{SSB} is the pe length.	riodicity of SSB in the set \overline{q}_1 . T_{DRX} is the DRX cycle			

[TS 38.133, clause 8.5.5.3]

For FR2, when the SSB for CBD measurement is in the same OFDM symbol as CSI-RS for RLM, BFD, CBD or L1-RSRP measurement, UE is required to measure one of but not both SSB for CBD measurement and CSI-RS. Longer measurement period for SSB based CBD measurement is expected, and no requirements are defined.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 8.5.2.1, 8.5.2.2, 8.5.2.3, 8.5.4, 8.5.5.1, 8.5.5.2 and 8.5.5.3.

5.5.5.0.2 Minimum conformance requirements for CSI-RS-based BFD and link recovery procedures

[TS 38.133, clause 8.5.3.1]

The requirements in this section apply for each CSI-RS resource in the set \overline{q}_0 of resource configurations for a serving cell, provided that the CSI-RS resource(s) in set \overline{q}_0 for beam failure detection are actually transmitted within the UE active DL BWP during the entire evaluation period specified in TS 38.133 clause 8.5.3.2. UE is not expected to perform beam failure detection measurements on the CSI-RS configured as BFD-RS if the CSI-RS is not QCL-ed, with QCL-TypeD when applicable, with the RS in the active TCI state of any CORESET configured in the UE active BWP.

Table 5.5.5.0.2-1: PDCCH transmission parameters for beam failure instance

Attribute	Value for BLER			
DCI format	1-0			
Number of control OFDM symbols	2			
Aggregation level (CCE)	8			
Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	0dB			
Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	0dB			
Bandwidth (PRBs)	48			
Sub-carrier spacing (kHz)	SCS of the active DL BWP			
DMRS precoder granularity	REG bundle size			
REG bundle size	6			
CP length	Normal			
Mapping from REG to CCE	Distributed			

[TS 38.133, clause 8.5.3.2]

UE shall be able to evaluate whether the downlink radio link quality on the CSI-RS resource in set \overline{q}_0 estimated over the last $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period becomes worse than the threshold $Q_{\text{out_LR_CSI-RS}}$ within $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period.

The value of $T_{Evaluate_BFD_CSI-RS}$ is defined in Table 5.5.5.0.2-2 for FR2 with N=1. The requirements of $T_{Evaluate_BFD_CSI-RS}$ apply provided that the CSI-RS for BFD is not in a resource set configured with repetition ON.

For FR2,

- P=1, when BFD-RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.
- $P=1/(1-T_{CSI-RS}/MGRP)$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is not overlapped with SMTC occasion ($T_{CSI-RS} < MGRP$)
- $P=1/(1-T_{CSI-RS}/T_{SMTCperiod})$, when BFD-RS is not overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$).
- P is $P_{\text{sharing factor}}$, when BFD-RS is not overlapped with measurement gap and BFD-RS is fully overlapped with SMTC occasion ($T_{\text{CSI-RS}} = T_{\text{SMTCperiod}}$).
- P is $1/(1-T_{CSI-RS}/MGRP-T_{CSI-RS}/T_{SMTCperiod})$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
 - $T_{SMTCperiod} \neq MGRP$ or
 - $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} < 0.5*T_{SMTCperiod}$
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ $P_{sharing\ factor}$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} = 0.5^*T_{SMTCperiod}$
- P is $1/\{1-T_{CSI-RS} / min(T_{SMTCperiod}, MGRP)\}$, when BFD-RS is partially overlapped with measurement gap ($T_{CSI-RS} < MGRP$) and BFD-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap.
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ $P_{sharing\ factor}$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)
- $P_{\text{sharing factor}}$ is 3.

If the high layer in TS 38.331 signalling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

Note: The overlap between CSI-RS for BFD and SMTC means that CSI-RS for BFD is within the SMTC window duration.

Longer evaluation period would be expected if the combination of BFD-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The values of $M_{\mbox{\scriptsize BFD}}$ used in Table 5.5.5.0.2-2 are defined as

- $M_{BFD} = 10$, if the CSI-RS resource(s) in set \overline{q}_0 used for BFD is transmitted with Density = 3.

Table 5.5.5.0.2-2: Evaluation period T_{Evaluate_BFD_CSI-RS} for FR2

Cor	nfiguration	T _{Evaluate_BFD_CSI-RS} (ms)				
ı	no DRX	$max([50], [M_{BFD} *P*N] * T_{CSI-RS})$				
DRX c	cycle ≤ 320ms	$max([50], [1.5 \times M_{BFD} *P*N] * max(T_{DRX}, T_{CSI-RS}))$				
DRX c	DRX cycle > 320ms $[M_{BFD} *P*N] * T_{DRX}$					
Note:	T _{CSI-RS} is the p	the periodicity of CSI-RS resource in the set $\overline{q}_{\scriptscriptstyle 0}$. ${\sf T}_{\scriptscriptstyle \sf DRX}$ is the				

[TS 38.133, clause 8.5.3.3]

The UE is required to be capable of measuring CSI-RS for BFD without measurement gaps. The UE is required to perform the CSI-RS measurements with measurement restrictions as described in the following clauses.

For FR2, when the CSI-RS for BFD measurement is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for BFD measurement in the PRBs that overlap with an SSB.

For FR2, when the CSI-RS for BFD measurement is in the same OFDM symbol as SSB for RLM/BFD/L1-RSRP measurement, or in the same symbol as SSB for CBD when beam failure is detected, UE is required to measure one of but not both CSI-RS for BFD measurement and SSB. Longer measurement period for CSI-RS based BFD measurement is expected, and no requirements are defined.

For FR2, when the CSI-RS for BFD measurement is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement,

- In the following cases, UE is required to measure one of but not both CSI-RS for BFD measurement and the other CSI-RS. Longer measurement period for CSI-RS based BFD measurement is expected, and no requirements are defined.
 - The CSI-RS for BFD measurement or the other CSI-RS in a resource set configured with repetition ON, or
 - The other CSI-RS is configured in q1 and beam failure is detected, or
 - The two CSI-RS-es are not QCL-ed w.r.t. QCL-TypeD, or the QCL information is not known to UE,
- Otherwise, UE shall be able to measure the CSI-RS for BFD measurement without any restriction.

[TS 38.133, clause 8.5.4]

When the radio link quality on all the RS resources in set \overline{q}_0 is worse than $Q_{\text{out_LR}}$, Layer 1 of the UE shall send a beam failure instance indication to the higher layers. A Layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331.

The beam failure instance evaluation for the RS resources in set \overline{q}_0 shall be performed as specified in clause 6 in TS 38.213. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval_BFD}$.

When DRX is not used, $T_{Indication_interval_BFD}$ is max(2ms, $T_{SSB-RS,M}$) or max(2ms, $T_{CSI-RS,M}$), where $T_{SSB-RS,M}$ and $T_{CSI-RS,M}$ is the shortest periodicity of all RS resources in set \overline{q}_0 for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set \overline{q}_0 or CSI-RS resource in the set \overline{q}_0 .

When DRX is used, $T_{Indication_interval_BFD}$ is max(1.5*DRX_cycle_length, 1.5* $T_{SSB-RS,M}$) if DRX cycle_length is less than or equal to 320ms for SSB based link quality measurement, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms.

[TS 38.133, clause 8.5.6.1]

The requirements in this section apply for each CSI-RS resource in the set \bar{q}_1 configured for a serving cell, provided that the CSI-RS resources configured for candidate beam detection are actually transmitted within UE active DL BWP during the entire evaluation period specified in TS 38.133 clause 8.5.6.2.

[TS 38.133, clause 8.5.6.2]

Upon request the UE shall be able to evaluate whether the L1-RSRP measured on the configured CSI-RS resource in set \bar{q}_1 estimated over the last $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period becomes better than the threshold $Q_{\text{in_LR}}$ within $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period provided CSI-RS £s/Iot is according to TS 38.133 Annex Table B.2.4.2 for a corresponding band.

The UE shall monitor the configured CSI-RS resources using the evaluation period in Table 5.5.5.0.2-3 corresponding to the non-DRX mode, if the configured DRX cycle \leq 320ms.

The value of T_{Evaluate CBD CSI-RS} is defined in Table 5.5.5.0.2-3 for FR2 with N=8.

For FR2,

- P=1, when candidate beam detection RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.
- $P=1/(1-T_{CSI-RS}/MGRP)$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is not overlapped with SMTC occasion ($T_{CSI-RS} < MGRP$)
- $P=1/(1-T_{CSI-RS}/T_{SMTCperiod})$, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$).

- P is 3, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$).
- P is $1/(1-T_{CSI-RS}/MGRP-T_{CSI-RS}/T_{SMTCperiod})$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
 - $T_{SMTCperiod} \neq MGRP$ or
 - $T_{\text{SMTCperiod}} = MGRP \text{ and } T_{\text{CSI-RS}} < 0.5*T_{\text{SMTCperiod}}$
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ 3, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} = 0.5*T_{SMTCperiod}$
- P is $1/\{1-T_{CSI-RS} / min (T_{SMTCperiod}, MGRP)\}$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap
- P is $1/(1-T_{CSI-RS}/MGRP)*$ 3, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$) [Longer evaluation period would be expected if the CSI-RS is on the same OFDM symbols with RLM/BFD/BM-RS, or other CBD-RS, according to the measurement restrictions defined in section TBD.]

The values of M_{CBD} used in Table 5.5.5.0.2-3 are defined as

- $M_{CBD} = 3$, if the CSI-RS resource configured in the set \overline{q}_1 is transmitted with Density = 3.

Table 5.5.5.0.2-3: Evaluation period T_{Evaluate_CBD_CSI-RS} for FR2

Con	figuration	T _{Evaluate_CBD_CSI-RS} (ms)			
non-DR	RX, DRX cycle	$max([25], ceil(M_{CBD} *P*N) * T_{CSI-RS})$			
≤	320ms				
DRX c	ycle > 320ms	ceil(M _{CBD} *P*N) *T _{DRX}			
Note:		$\overline{q}_{\text{CSI-RS}}$ is the periodicity of CSI-RS resource in the set \overline{q}_{1} . $\overline{q}_{\text{DRX}}$ is the DRX cycle length.			

[TS 38.133, clause 8.5.6.3]

For FR2, when the CSI-RS for CBD measurement is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for CBD measurement in the PRBs that overlap with an SSB.

For FR2, when the CSI-RS for CBD measurement is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is required to measure one of but not both CSI-RS for CBD measurement and SSB. Longer evaluation period for CSI-RS based CBD measurement is expected, and no requirements are defined.

For FR2, when the CSI-RS for CBD measurement is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement, UE is required to measure one of but not both CSI-RS for CBD measurement and the other CSI-RS. Longer evaluation period for CSI-RS based CBD measurement is expected, and no requirements are defined.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 8.5.3.1, 8.5.3.2, 8.5.3.3, 8.5.4, 8.5.6.1, 8.5.6.2 and 8.5.6.3.

5.5.5.1 EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.

- TT analysis is missing.
- RAN4 dependency: Test parameters have brackets and TBDs.

5.5.5.1.1 Test purpose

The purpose of this test is:

- To verify that the UE properly detects SSB-based beam failure in the set q_0 configured for a serving PSCell and that the UE performs correct SSB-based link recovery based on beam candidate set q_1 .
- To test he downlink monitoring for beam failure detection within the UEs active DL BWP of the PSCell, during the evaluation period, and link recovery, when no DRX is used.
- To partly verify SSB based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

5.5.5.1.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

5.5.5.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.5.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.5.1.

5.5.5.1.4 Test description

There are two cell configured in this test: E-UTRAN PCell and NR PSCell. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 5.5.5.1.4-1 shows the five different time durations and the corresponding variation of the downlink SNR of the PCell and the SNR of the SSB in set q_0 in the active PSCell to emulate SSB based beam failure. Figure 5.5.5.1.4-1 additionally shows the variation of the downlink SNR of the SSB in set q_1 of the candidate beam used for link recovery.

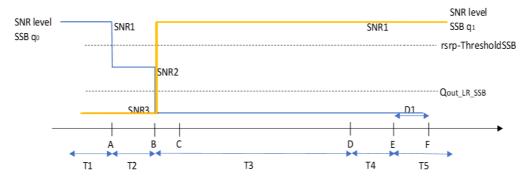


Figure 5.5.5.1.4-1: SNR variation CSI-RS for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

5.5.5.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.5.5.1.4.1-1.

Table 5.5.5.1.4.1-1: Supported test configurations for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

Co	onfiguration	Description		
	5.5.5.1-1	LTE FDD, TDD duplex mode, 120 kHz SSB SCS, 100 MHz bandwidth		
5.5.5.1-2 LTE TDD, TDD duplex mode, 120 kHz SSB SCS, 100 MHz bandwidth				
Note:	The UE is only required to pass in one of the supported test configurations in FR2			

Configure the test equipment and the DUT according to the parameters in Table 5.5.5.1.4.1-2.

Table 5.5.5.1.4.1-2: Initial conditions for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.5-1 and TS 38.5	508-1 [14] clause 4.3.1 and 4.4.2.
Channel	As specified	by the test configuration selected fr	om Table 5.5.5.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 5.5.5.1.4.1-3.
- 2. Message contents are defined in clause 5.5.5.1.4.3.
- 3. There are one E-UTRAN cell and one NR cell specified in the test. E-UTRAN Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 5.5.5.1.4.1-3: General test parameters for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

Parameter		Unit	Value	Comment
			Test 1	
Active E-UTRA PCell	Active E-UTRA PCell		Cell 1	
E-UTRA RF Channel Nu	mber		1	
Active PCell			Cell 2	
RF Channel Number			2	
Duplex mode	Config 1, 2		TDD	
BW _{channel}	Config 1, 2		100: $N_{RB,c} = 66$	
DL initial BWP configuration	Config 1, 2		DLBWP.0.1	
DL dedicated BWP configuration	Config 1, 2		DLBWP.1.1	
UL initial BWP configuration	Config 1, 2		ULBWP.0.1	
UL dedicated BWP configuration	Config 1, 2		ULBWP.1.1	
TDD Configuration	Config 1, 2		TDDConf.3.1	
CORESET Reference Channel	Config 1, 2		CR. 3.1 TDD	
SSB Configuration	Config 1, 2		SSB.1 FR2	
SMTC Configuration	Config 1, 2		SMTC.3	
PDSCH/PDCCH subcarrier spacing	Config 1, 2		120 KHz	

PRACH Confi	iguration	Config 1, 2		Table A.3.8.3.4	
SSB index assigned as BFD RS (q ₀)				0	
SSB index assigned as CBD RS (q ₁)			1		
TCI Configura	ation	Config 1, 2		TBD	
OCNG param	otors			OP.1	
CP length	icicis			Normal	
Correlation M	atrix and Ant	enna		2x2 Low	
Configuration		oma		EAE LOW	
Beam	DCI format	İ		1-0	
failure	Number of	Control OFDM		2	
detection	symbols				
transmissio	Aggregation		CCE	8	
n parameters	Ratio of hy PDCCH RI average C	pothetical E energy to SI-RS RE energy	dB	0	
		pothetical MRS energy to SI-RS RE energy	dB	0	
				REG bundle size	
	DMRS pre	coder granularity		NEO Bariale 3126	
	REG bund	le size		6	
DRX			OFF		
Gap pattern II				gp0	
rlmInSyncOutOfSyncThreshold			absent	When the field is absent, the UE applies the value 0 (Table 8.1.1-1).	
rsrp-ThresholdSSB		dBm	TBD	Threshold used for Qout LR SSB	
powerControlOffsetSS			db0	Used for deriving rsrp-ThresholdCSI RS	
beamFailureIı	nstanceMax(Count		n1	see TS 38.321 [7] section 5.17
beamFailureD	DetectionTime	er		pbfd4	see TS 38.321 [7], section 5.17
CSI-RS confiç	guration for C	CSI Config 1, 2		[CSI-RS.3.1 TDD]	
TCI states		ļ		[TCI.State.0]	
CSI-RS for tracking Config 1, 2				[TRS.2.1 TDD]	
SSB index assigned as RLM RS			0, 1		
T310 Timer		ms	1000		
N310			2		
T1		S	1	During this time th UE shall be fully synchronized to ce	
T2		S	2.61	_	
T3		S	1.64		
T4			S	0	
T5			S	1.01	
D1			S	0.97	
	configuration	ns are assigned to t		the start of time period T1.	
		ns are assigned to t CCH is not transmit			

5.5.5.1.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms) given in table .5.5.5.1.5-2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 5.5.5.1.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.5.1.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.5.1.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 5.5.5.1.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 5.5.5.1.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2
 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 1. When T5 expires the SS shall change the SNR value to T1 as specified in Table 5.5.5.1.5-1.
- 2. Wait [1s] for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within [1s] continue to step 11. Otherwise continue to step 10.
- 3. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 4. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.5.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.5.1.4.3-1: Common Exception messages for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	FFS			
elements contents exceptions				

5.5.5.1.5 Test requirement

Tables 5.5.5.1.4.1-3 and 5.5.5.1.5-1 define the primary level settings including test tolerances for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX.

Table 5.5.5.1.5-1: NR Cell specific test parameters for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

Parameter		Unit			Test 1			
			T1	T2	T3	T4	T5	
EPRE rat	tio of PDCCH DMRS	to SSS	dB				•	
EPRE rat	tio of PDCCH to PDC	CCH DMRS	dB					
EPRE rat	tio of PBCH DMRS to	o SSS	dB					
EPRE rat	tio of PBCH to PBCH	1 DMRS	dB					
EPRE rat	tio of PSS to SSS		dB			0		
EPRE rat	tio of PDSCH DMRS	to SSS	dB					
EPRE rat	tio of PDSCH to PDS	SCH DMRS	dB					
EPRE rat	tio of OCNG DMRS t	to SSS	dB					
EPRE rat	tio of OCNG to OCN	G DMRS	dB					
SNR_SS	$ \begin{array}{c c} SNR_SSB \text{ of set } q_0 & Config 1 \\ \hline Config 2 \end{array} $		- dB	5	-3	-12	-12	-12
			ub ub	5	-3	-12	-12	-12
SNIR SS	B of set q ₁	Config 1	dB ·	-12	-12	5	5	5
51411 <u>_</u> 55		Config 2		-12	-12	5	5	5
N_{oc}		Config 1	dBm/120	TBD				
		Config 2	KHz	TBD				
	ion condition					L-A 30ns 75		
Note 1:		ed such that the reso			allocated an	d a constant	total transm	itted
		sity is achieved for						
Note 2:		es for CSI reporting						
Note 3:	NZP CSI-RS resou period T1.	n for CSI rep	orting are as	ssigned to th	e UE prior to	o the start of	time	
Note 4:	Measurement gap							
Note 5:	The timers and lay					ne period T1.		
Note 6: The signal contains PDCCH for UEs other						rt of OCNG.		
Note 7: SNR levels correspond to the signal to r								
Note 8: The SNR in time periods T1, T2, T3, T4			4 and T5 is c	lenoted as S	SNR1, SNR2	and SNR3	respectively	in figure
	A.5.5.5.1.1-1.							
Note 9:	Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE				j oτ a U Ŀ			

Table 5.5.5.1.5-2: Measurement gap configuration for EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX

which supports 4RX on all bands, the SNR during T3 is modified as specified in section [A.3.6].

Field	Test 1
Field	Value
gapOffset	0

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 = [560+10] ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

5.5.5.2 EN-DC FR2 SSB-based beam failure detection and link recovery in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.
- RAN4 dependency: Test parameters have brackets and TBDs.

5.5.5.2.1 Test purpose

The purpose of this test is:

- To verify that the UE properly detects SSB-based beam failure in the set q_0 configured for a serving PSCell and that the UE performs correct SSB-based link recovery based on beam candidate set q_1 .
- To test the downlink monitoring for beam failure detection within the UEs active DL BWP of the PSCell, during the evaluation period, and link recovery, when DRX is used.
- To partly verify the SSB based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

5.5.5.2.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

5.5.5.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.5.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.5.2.

5.5.5.2.4 Test description

There is one E-UTRAN PCell and one NR PSCell configured in this test. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 5.5.5.2.4-1 shows the variation of the downlink SNR of the PCell and the SNR of the SSB in set q_0 in the active PSCell to emulate SSB based beam failure. Figure 5.5.5.2.4-1 additionally shows the variation of the downlink SNR of the SSB in set q_1 of the candidate beam used for link recovery

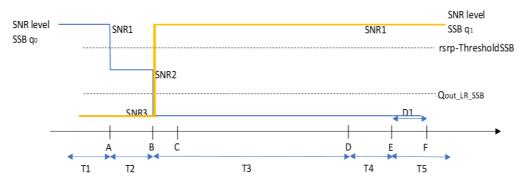


Figure 5.5.5.2.4-1: SNR variation for EN-DC FR2 SSB-based beam failure detection and link recovery in DRX

5.5.5.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.5.5.2.4.1-1.

Table 5.5.5.2.4.1-1: Supported test configurations for EN-DC FR2 SSB-based beam failure detection and link recovery in DRX

Configuration Description				
	5.5.5.2-1	LTE FDD, TDD duplex mode, 120 kHz SSB SCS, 100 MHz bandwidth		
	5.5.5.2-2 LTE TDD, TDD duplex mode, 240 kHz SSB SCS, 100 MHz bandwidth			
Note:	The UE is only required to pass in one of the supported test configurations in FR2			

Configure the test equipment and the DUT according to the parameters in Table 5.5.5.2.4.1-2.

Table 5.5.5.2.4.1-2: Initial conditions for EN-DC FR2 SSB-based beam failure detection and link recovery in DRX

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies		in Annex E, table E.5-1 and TS 38.5	508-1 [14] clause 4.3.1 and 4.4.2.	
Channel	As specified	by the test configuration selected fr	om Table 6.5.5.3.4.1-1.	
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2.	
conditions				
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.TBD		
Exceptions to	N/A			
connection				
diagram				

- 1. The general test parameter settings are set up according to Table 5.5.5.2.4.1-3. The DRX configuration for is according to Table 5.5.5.2.4.1-3. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.
- 2. Message contents are defined in clause 5.5.5.2.4.3.
- 3. There is one E-UTRAN cell and one NR cell specified in the test. E-UTRAN Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 5.5.5.2.4.1-3: General test parameters for EN-DC FR2 SSB-based beam failure detection and link recovery in DRX

Paramet	Parameter		Value	Comment
			Test 1	
Active E-UTRA PCell		+	Cell 1	
E-UTRA RF Channel Nur	mber		1	
Active PCell			Cell 2	
RF Channel Number			2	
Duplex mode	Config 1, 2		TDD	
BW _{channel}	Config 1, 2		100: $N_{RB,c} = 66$	
DL initial BWP	Config 1, 2		DLBWP.0.1	
configuration				
DL dedicated BWP configuration	Config 1, 2		DLBWP.1.1	
UL initial BWP configuration	Config 1, 2		ULBWP.0.1	
UL dedicated BWP configuration	Config 1, 2		ULBWP.1.1	
TDD Configuration	Config 1, 2		TDDConf.3.1	
CORESET Reference Channel	Config 1		CR. 3.1 TDD	
SSB Configuration	Config 1, 2		SSB.3 FR2	
SMTC Configuration	Config 1, 2		SMTC.3	

PDSCH/PDCCH Config 1, 2 subcarrier spacing			120 KHz		
PRACH Configuration Config 1, 2				Table A.3.8.3.4	
SSB index assigned as BFD RS (q ₀)				0	
SSB index ass	signed as CE	BD RS (q ₁)		1	
TCI Configura	tion	Config 1, 2		TBD	
OCNG parame	eters			OP.1	
CP length				Normal	
Correlation Ma Configuration	atrix and Ante	enna		2x2 Low	
Beam failure	DCI format			1-0	
detection transmission	Number of symbols	Control OFDM		2	
parameters	Aggregatio	n level	CCE	8	
·	Ratio of hy	oothetical	dB	0	
		oothetical MRS energy to SI-RS RE energy	dB	0	
	DMRS pred	coder granularity		REG bundle size	
	REG bundl	e size		6	
DRX				DRX.3	A.3.3.3
Gap pattern IE				N.A.	
rlmInSyncOut	OfSyncThres	hold		absent	When the field is absent, the UE applies the value 0. (Table 8.1.1-1).
rsrp-Threshold	ISSB		dBm	TBD	Threshold used for Qout_LR_SSB
powerControlC	OffsetSS			db0	Used for deriving rsrp-ThresholdCSI-RS
beamFailureIn	ıstanceMaxC	Count		n1	see TS 38.321 [7], section 5.17
beamFailureD	etectionTime	er		pbfd4	see TS 38.321 [7], section 5.17
CSI-RS config reporting	CSI-RS configuration for CSI Config 1, 2			[CSI-RS.3.1 TDD]	A.3.14.2
TCI states				[TCI.State.0]	
	CSI-RS for tracking Config 1, 2			[TRS.2.1 TDD]	
	SSB index assigned as RLM RS			0, 1	
T310 Timer			ms	1000	
N310				2	
T1	11		S	1	During this time the UE shall be fully synchronized to cell
T2	T2			3.37	
Т3			S	2.8	
T4			S	0	
T5			S	0.61	
D1			S	0.57	
Note 1: UE-	-specific PD0	CCH is not transmit	ted after 1	1 starts.	

5.5.5.2.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is enabled in PCSell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4
- 2. Set the parameters of NR Cell 1 according to T1 in Table 5.5.5.2.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.5.2.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.5.2.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 5.5.5.2.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 5.5.5.2.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2
 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 1. When T5 expires the SS shall change the SNR value to T1 as specified in Table 5.5.5.2.5-1.
- 2. Wait [1s] for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within [1s] continue to step 11. Otherwise continue to step 10.
- 3. Switch the UE on and off. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 4. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.5.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.5.2.4.3-1: Common Exception messages for EN-DC FR2 SSB-based beam failure detection and link recovery in DRX

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	FFS			
elements contents exceptions				

5.5.5.2.5 Test requirement

Tables 5.5.5.2.4.1-3 and 5.5.5.2.5-1 define the primary level settings including test tolerances for EN-DC FR2 SSB-based beam failure detection and link recovery in DRX.

Table 5.5.5.2.5-1: NR Cell specific test parameters for EN-DC FR2 SSB-based beam failure detection and link recovery in DRX

Parameter			Unit			Test 1		
			T1	T2	Т3	T4	T5	
EPRE ratio of PDCCH DMRS to SSS			dB		•			
EPRE ra	tio of PDCCH to F	DCCH DMRS	dB					
EPRE ra	tio of PBCH DMR	S to SSS	dB					
EPRE ra	tio of PBCH to PB	CH DMRS	dB					
EPRE ra	tio of PSS to SSS		dB			0		
EPRE ra	tio of PDSCH DM	RS to SSS	dB					
EPRE ra	tio of PDSCH to P	DSCH DMRS	dB					
EPRE ra	tio of OCNG DMR	S to SSS	dB					
EPRE ra	tio of OCNG to OC	CNG DMRS	dB					
SNR_SS	B of set q₀	Config 1	dB	5	-3	-12	-12	-12
		Config 2	ub ub	5	-3	-12	-12	-12
CVID CC	B of set q ₁	Config 1	dB	-12	-12	5	5	5
31111_33	D OI Set 41	Config 2		-12	-12	5	5	5
N_{oc}	Nos Config 1		dBm/12			TBD		
		Config 2	0 KHz	TBD				
	tion condition			TDL-A 30ns 75Hz				
Note 1:	transmitted pow	used such that the er spectral density urces for CSI repo	is achieve	ed for all OF	DM symbo	ls.		
Note 3:		source set configu						
Note 4:		ap configuration is						
Note 5:	The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.							
Note 6:	The signal contains PDCCH for UEs other than the device under test as part of OCNG.							
Note 7:	SNR levels corre							
Note 8:	ote 8: The SNR in time periods T1, T2, T3			T5 is denot	ed as SNR:	1, SNR2 an	nd SNR3 re	spectively
	in figure A.5.5.5							
Note 9:		are specified for						
testing of a UE which supports 4RX on all bands, the SNR during T3 is modified as specified in				fied in				
section [A.3.6].								

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 = [560+10] ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

5.5.5.3 EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- RAN4 dependency: Test parameters have brackets and TBDs.

5.5.5.3.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects CSI-RS-based beam failure in the set q_0 configured for a serving cell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when no DRX is used.

To partly verify the CSI-RS based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

5.5.5.3.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

5.5.5.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.5.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.5.3.

5.5.5.3.4 Test description

There are two cell configured in this test: E-UTRAN PCell and NR PSCell. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 5.5.5.3.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate CSI-RS based beam failure.



Figure 5.5.5.3.4-1: SNR variation CSI-RS for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

5.5.5.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.5.5.3.4.1-1.

Table 5.5.5.3.4.1-1: Supported test configurations for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Configuration	Description
5.5.5.3-1	TDD duplex mode, 120 kHz SSB SCS, 100MHz bandwidth

Configure the test equipment and the DUT according to the parameters in Table 5.5.5.3.4.1-2.

Table 5.5.5.3.4.1-2: Initial conditions for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, table E.5-1 and TS 38.9	508-1 [14] clause 4.3.1 and 4.4.2.	
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 5.5.5.3.4.1-1.	
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.TBD		
Exceptions to connection diagram	N/A			

- 1. The general test parameter settings are set up according to Table 5.5.5.3.4.1-3. The NZP-CSI-RS configuration is according to Table 5.5.5.3.4.1-3.
- 2. Message contents are defined in clause 5.5.5.3.4.3.
- 3. There are one E-UTRAN cell and one NR cell specified in the test. E-UTRAN Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 5.5.5.3.4.1-3: General test parameters for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Parameter	Unit	Value	Comment
		Test 1	

Active PCell			Cell 1	
RF Channel Numl	her		1	
Duplex mode	Config 1		TDD	
TDD	Config 1		TDDConf.3.1	
Configuration	Coming 1		15500111.0.1	
CORESET	Config 1		CR.3.1 TDD	A.3.1.2
Reference	Coming 1		GR.6.1 122	71.0.1.2
Channel				
SSB	Config 1		SSB.1 FR2	A.3.10
Configuration	3			
SMTC	Config 1		SMTC.1	A.3.11
Configuration	3			
PDSCH/PDCCH	Config 1		120KHz	
subcarrier	3			
spacing				
	gned as beam failure		[0]	
detection RS in se				
TRS configuration	1		TRS.2.1 TDD	
TCI configuration			CSI-RS.Config.0	
OCNG parameter	S		OP.1	A.3.2.1
CP length			Normal	
Correlation Matrix	Correlation Matrix and Antenna		2x2 Low	
Configuration				
Beam failure	failure DCI format		1-0	
detection	Number of Control		2	
transmission	OFDM symbols			
parameters	Aggregation level	CCE	8	
	Ratio of hypothetical	dB	0	
	PDCCH RE energy to			
	average CSI-RS RE			
	energy			
	Ratio of hypothetical	dB	0	
	PDCCH DMRS			
	energy to average			
	CSI-RS RE energy			
	DMRS precoder		REG bundle size	
	granularity			
	REG bundle size		6	

DRX			OFF	
Gap pattern ID			N.A.	
csi-RS-Index assi beam detection R	igned as candidate ≀S in set q₁		1	
rlmInSyncOutOfS			absent	When the field is absent, the UE applies the value 0. (Table 8.1.1-1).
rsrp-ThresholdSS	SB	dBm	[-94.5]	Threshold used for Q _{in LR SSB}
powerControlOffs	setSS		N.A.	Used for deriving rsrp- ThresholdCSI-RS
beamFailureInsta	beamFailureInstanceMaxCount		[n2]	see clause 5.17 of TS 38.321 [7]
beamFailureDete	ctionTimer		[pbfd4]	see clause 5.17 of TS 38.321 [7]
CSI-RS configuration			CSI-RS.3.2 TDD	A.3.14.2
T1		S	1	During this time the UE shall be fully synchronized to cell 1
T2		S	0.4	
T3		S	[0.6]	
T4		S	[0.4]	
T5		S	[1.4]	
D1		S	[0.24]	
Note 1: UE-sp	ecific PDCCH is not tran	smitted after 1	「1 starts.	

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

5.5.5.3.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is not enabled.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 5.5.5.3.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.5.3.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.5.3.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 5.5.5.3.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 5.5.5.3.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2
 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 1. When T5 expires the SS shall change the SNR value to T1 as specified in Table 5.5.5.3.5-1.
- 2. Wait [1s] for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within [1s] continue to step 11. Otherwise continue to step 10.
- 3. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 4. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.5.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.5.3.4.3-1: Common Exception messages for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Default Message Contents				
Common contents of system information				
blocks exceptions				
Default RRC messages and information	FFS			
elements contents exceptions				

5.5.5.3.5 Test requirement

Tables 5.5.5.3.4.1-3 and 5.5.5.3.5-1 define the primary level settings including test tolerances for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX.

Table 5.5.5.3.5-1: NR Cell specific test parameters for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Parar	neter	Unit	Test 1						Test 1				
			CSI-RS of set q ₀						CSI	-RS of se	et q ₁		
			T1 T2 T3 T4 T5			T1	T2	T3	T4	T5			

EPRE rat	tio of PSS	dB										
to SSS												
EPRE rat	tio of PBCH	dB										
DMRS to	SSS											
EPRE rat	tio of PBCH	dB										
to PBCH	DMRS											
EPRE rat	tio of	dB										
PDCCH I	DMRS to											
SSS												
EPRE rat		dB										
	o PDCCH											
DMRS					0					0		
EPRE rat		dB										
PDSCH I	DMRS to											
	SSS											
EPRE ratio of		dB										
PDSCH to PDSCH												
DMRS												
	EPRE ratio of OCNG											
DMRS to SSS ^(Note 1)												
EPRE ratio of OCNG to OCNG DMRS (Note		dB										
	DINIKS											
SNR C	Config 1	dB	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
SI-RS	Config 2	uБ			[-12]	[-12]	[-12]	[-12]	[-12]	[-12]		[10]
31-13			[5]	[-3]							[-3]	
	Config 3	-ID/	[5] [-3] [-12] [-12] [-12]		[-12]	[-12]	[-12]	[-3]	[10]			
N_{oc}	Config 1	dBm/			[-98]					[-98]		
	Config 2	15K	[]		[-98]							
D	Config 3	Hz		F-1	[-98]	- 1		[-98]				
Propagat				ĮI	DLA30-7	5]			[]	TDLA30-7	5]	
condition												

Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

5.5.5.4 EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- RAN4 dependency: Test parameters have brackets and TBDs.

5.5.5.4.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects CSI-RS-based beam failure in the set q_0 configured for a serving cell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when DRX is used.

To partly verify the CSI-RS based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

5.5.5.4.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

5.5.5.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.5.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.5.4.

5.5.5.4.4 Test description

There is one E-UTRAN PCell and one NR PSCell configured in this test. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 5.5.5.4.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate CSI-RS based beam failure.



Figure 5.5.5.4.4-1: SNR variation CSI-RS for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

5.5.5.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.5.5.4.4.1-1.

Table 5.5.5.4.4.1-1: Supported test configurations for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

Configuration	Description
5.5.5.4-1	TDD duplex mode, 120 kHz SSB SCS, 100MHz bandwidth

Configure the test equipment and the DUT according to the parameters in Table 5.5.5.4.4.1-2.

Table 5.5.5.4.4.1-2: Initial conditions for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

Parameter		Value	Comment						
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.						
Test frequencies	As specified	As specified in Annex E, table E.5-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.							
Channel bandwidth	As specified	As specified by the test configuration selected from Table 6.5.5.3.4.1-1.							
Propagation conditions	AWGN		As specified in Annex C.2.2.						
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.						
Diagram	DUT Part	A.3.TBD							
Exceptions to connection diagram	N/A								

- 1. The general test parameter settings are set up according to Table 5.5.5.4.4.1-3. The measurement gap configuration is according to Table 5.5.5.4.4.1-4. The NZP-CSI-RS configuration is according to Table 5.5.5.4.4.1-3. The DRX configuration for is according to Table 5.5.5.4.4.1-3. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.
- 2. Message contents are defined in clause 5.5.5.4.4.3.
- 3. There is one E-UTRAN cell and one NR cell specified in the test. E-UTRAN Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 5.5.5.4.4.1-3: General test parameters for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

F	Parameter	Unit	Value Test 1	Comment
A - + i DO - II			0-11.1	
Active PCell RF Channel Num	hor		Cell 1	
Duplex mode	Config 1		TDD	
TDD	Config 1		TDDConf.3.1	
Configuration	Coming 1		10000111.0.1	
CORESET	Config 1		CR.3.1 TDD	A.3.1.2
Reference	9 _			1
Channel				
SSB	Config 1		SSB.1 FR2	A.3.10
Configuration				
SMTC	Config 1		SMTC.1	A.3.11
Configuration				
PDSCH/PDCCH	Config 1		120 KHz	
subcarrier				
spacing				
csi-RS-Index assi	gned as beam failure		[0]	
detection RS in se	et q₀			
TRS configuration	1		TRS.2.1 TDD	
TCI configuration			CSI-RS.Config.0	
OCNG parameter	'S		OP.1	A.3.2.1
CP length			Normal	
Correlation Matrix	and Antenna		2x2 Low	
Configuration				
Beam failure	DCI format		1-0	
detection	Number of Control		2	
transmission	OFDM symbols			
parameters	Aggregation level	CCE	8	
	Ratio of hypothetical	dB	0	
	PDCCH RE energy to average CSI-RS RE energy			
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	0	
	DMRS precoder granularity		REG bundle size	
	REG bundle size		6	
DRX			DRX.7	A.3.3.7
Gap pattern ID			*[<i>gp0</i>]	
	gned as candidate beam		1	
detection RS in se				
rlmInSyncOutOfS			absent	When the field is absent, the UE applies the value 0. (Table 8.1.1-1).
rsrp-ThresholdSS	В	dBm	-94.5	Threshold used for Qin_LR_SSB
powerControlOffsetSS			NA	Used for deriving rsrp- ThresholdCSI-RS
beamFailureInstanceMaxCount			[n2]	see clause 5.17 of TS 38.321 [7]
beamFailureDete			[pbfd4]	see clause 5.17 of TS 38.321 [7]
CSI-RS configuration	Config 1		CSI-RS.3.2 TDD	A.3.14.2
T1		S	1	During this time the UE shall be fully synchronized to cell 1

T2	S	0.4			
T3	S	[0.6]			
T4	S	[0.4]			
T5	S	[1.4]			
D1	S	[0.44]			
Note 1: UE-specific PDCCH is not transmitted after T1 starts.					

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

Table 5.5.5.4.4.1-4: Measurement gap configuration for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

Field	Test 1
Field	Value
gapOffset	0

5.5.5.4.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4
- 2. Set the parameters of NR Cell 1 according to T1 in Table 5.5.5.4.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 5.5.5.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 5.5.5.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 5.5.5.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 5.5.5.4.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2
 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-2 [18] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-2 [18] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 1. When T5 expires the SS shall change the SNR value to T1 as specified in Table 5.5.5.4.5-1.
- 2. Wait [1s] for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within [1s] continue to step 11. Otherwise continue to step 10.

- 3. Switch the UE on and off. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *EN-DC*, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.4.
- 4. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.5.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.5.5.4.4.3-1: Common Exception messages for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

Default Message Contents						
Common contents of system information						
blocks exceptions						
Default RRC messages and information	FFS					
elements contents exceptions						

5.5.5.4.5 Test requirement

Tables 5.5.5.4.4.1-3 and 5.5.5.4.5-1 define the primary level settings including test tolerances for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX.

Table 5.5.5.4.5-1: NR Cell specific test parameters for EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX

Parameter		Unit	Unit Test 1							Test 1		
			CSI-RS of set q₀						CSI-	RS of s	et q ₁	
			T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
EPRE ratio SSS	of PSS to	dB										
EPRE ratio DMRS to S		dB										
EPRE ratio PBCH DMF	of PBCH to RS	dB										
EPRE ratio DMRS to S	of PDCCH SS	dB										
	EPRE ratio of PDCCH to PDCCH DMRS				0					0		
EPRE ratio of PDSCH DMRS to SSS		dB										
EPRE ratio of PDSCH to PDSCH DMRS		dB										
EPRE ratio of OCNG DMRS to SSS ^(Note 1)		dB										
EPRE ratio of OCNG to OCNG DMRS (Note 1)		dB										
SNR_CSI	Config 1	dB	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
-RS	Config 2		[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
	Config 3		[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
N_{oc}	Config 1	dBm/15KHz			[-98]					[-98]		
OC.	Config 2				[-98]					[-98]		
	Config 3				[-98]			[-98]				
Propagation	n condition			[T	DLA30-7	75]				DLA30-7	⁷ 5]	
Note 1: (OCNG shall b	e used such th	at the re	sources	in Cell 1	are fully	/ allocate	ed and a	constan	t total tra	ansmitte	d

power spectral density is achieved for all OFDM symbols.

Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

5.5.6 Active BWP switch delay

5561	DCI_hacad	and time-hased	activa	RMD switch

5.5.6.1.0 Minimum conformance requirements

FFS

5.5.6.1.1 EN-DC FR2 DCI-based DL active BWP switch in non-DRX in synchronous EN-DC

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

5.5.6.1.1.1 Test purpose

FFS

5.5.6.1.1.2 Test applicability

FFS

5.5.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.6.1.1.

5.5.6.1.1.4 Test description

5.5.6.1.1.4.1 Initial conditions

FFS

5.5.6.1.1.4.2 Test procedure

FFS

5.5.6.1.1.4.3 Message contents

FFS

5.5.6.1.1.5 Test requirements

FFS

5.5.6.1.2 EN-DC FR2 DCI-based DL active BWP switch with SCell in non-DRX in synchronous EN-DC

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

5.5.6.1.2.1 Test purpose

FFS

5.5.6.1.2.2 Test applicability

FFS

5.5.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.6.1.2.

5.5.6.1.2.4 Test description

5.5.6.1.2.4.1 Initial conditions

FFS

5.5.6.1.2.4.2 Test procedure

FFS

5.5.6.1.2.4.3 Message contents

FFS

5.5.6.1.2.5 Test requirements

FFS

5.5.6.2 RRC-based active BWP switch

The requirements in this section apply for a UE configured with more than one BWP on PSCell or any activated SCell in SCG in EN-DC. UE shall complete the switch of active DL and/or UL BWP within the delay defined in this section.

5.5.6.2.0 Minimum conformance requirements

5.5.6.2.0.1Minimum conformance requirements for RRC-based active BWP switchFor RRC-based BWP switch, after the UE receives BWP switching request, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWP on the serving cell on which BWP switch occurs on the

first DL or UL slot right after the beginning of DL slot $n + \frac{T_{RRCprocessingDelay} + T_{BWPswitchDelayRRC}}{NR \ Slot \ length}$, where

DL slot n is the last slot containing the RRC command, and

*T*_{RRCprocessingDelay} is the length of the RRC procedure delay in millisecond as defined in clause 12 in TS 38.331 [2], and

 $T_{BWPswitchDelayRRC} = [6]ms$ is the time used by the UE to perform BWP switch.

The UE is not required to transmit UL signals or receive DL signals during the time defined by

 $T_{RRCprocessingDelay} + T_{BWPswitchDelayRRC}$ on the cell where RRC-based BWP switch occurs.

5.5.6.2.1 EN-DC FR2 RRC-based DL active BWP switch in non-DRX in synchronous EN-DC

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

5.5.6.2.1.1 Test purpose

The purpose of this test is to verify the DL BWP switch delay requirement for RRC-based BWP switch defined in clause 5.5.6.2.0.1. Supported test configurations are shown in Table 5.5.6.2.1.4.1-1.

5.5.6.2.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.5.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.5.6.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.5.6.2.1.

5.5.6.2.1.4 Test description

5.5.6.2.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table 5.3.5-1 of 38.521-2 [18].

This test shall be tested using any of the test configurations in Table 5.5.6.2.1.4.1-1.

Table 5.5.6.2.1.4.1-1: DL BWP switch supported test configurations

Config	Description	
1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
2	LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
Note 1: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 5.5.6.2.1.4.1-2

Table 5.5.6.2.1.4.1-2: Initial conditions for EN-DC FR2 RRC-based DL active BWP switch in non-DRX in synchronous EN-DC

Parameter	Value		Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As	s specified in Annex E.1.1, Table E.2	2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 5.5.1.1.4.1-1		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.3.1.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.4.1.1	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 5.5.6.2.1.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR2 PSCell. The connection setup is done according to the settings in Annex [C.x], and the downlink signal levels as per Annex [C.x]
- 3. The test parameters are given in Table 5.5.1.1.4.1-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex [C.x].

Table 5.5.6.2.1.4.1-3: General test parameters for DL BWP switch in synchronous EN-DC

Parameter	Unit	Value	Comment
E-UTRA RF Channel		1	One E-UTRA radio channel is used for this
Number		1	test
NR RF Channel Number		2	One NR radio channel is used for this test
Active PCell		Cell 1	PCell on RF channel number 1.
Active PSCell		Cell 2	PSCell on RF channel number 2.
CP length		Normal	
DRX		OFF	
Cell-individual offset for cells	dB	0	Individual offset for cells on PCC.
on RF channel number 1	иь	0	
Cell-individual offset for cells	dB	0	Individual offset for cells on PSCC.
on RF channel number 2	ub	0	
Cell2 timing offset to cell1	μs	3	Synchronous EN-DC
T1	S	[0.2]	

5.5.6.2.1.4.2 Test procedure

The test consists of two cells, a single E-UTRA cell (PCell), and a single NR cell (PSCell). Prior to the start of the test, the UE shall be fully synchronized to PSCell. The UE shall be configured for parameters as mentioned in the Table 5.5.6.2.1.4.1-3.

1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [6] clause 5.5.

- 2. PDCCHs indicating new transmissions shall be sent continuously on PCell (Cell 1) to ensure that the UE will have ACK/NACK sending.
- 3. Before the test starts UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and to Cell 2 (PSCell) on radio channel 2 (PSCC).
- 4. Before the test starts UE has bandwidth part BWP-1 in its RRC-configuration for Cell 2 (PSCell).
- 5. Before the test starts UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWP is BWP-1 in PSCell.
- 6. Ensure all cells have constant signal levels throughout the test.
- 7. The test consists of 1 time period, with duration of T1.
- 8. Time period T1 starts when a *RRCReconfiguration* with bandwidth part configuration BWP-2, sent from the test equipment to the UE, is received at the UE side in PSCell's slot # denoted *i*. The UE shall switch its bandwidth part from BWP-1 to BWP-2.
- 9. The UE shall be able to receive PDSCH at PSCell's slot ($i+T_{RRCprocessingDelay}+T_{BWPswitchDelayRRC}$) as defined in clause 8.6.3 and be ready for the reception of uplink grant for the PSCell no later than at slot ($i+T_{RRCprocessingDelay}+T_{BWPswitchDelayRRC}$). The UE shall be continuously scheduled on PSCell's BWP-2 starting from slot ($i+T_{RRCprocessingDelay}+T_{BWPswitchDelayRRC}$).
- 10. $T_{RRCprocessingDelay}$ and $T_{BWPswitchDelayRRC}$ are defined in section 5.5.6.2.0.1.
- 11. The test equipment verifies the DL BWP switch time in PSCell by counting the time from the time when the RRC Reconfiguration message including BWP switch command is sent till the time when RRC Reconfiguration Complete message is received.
- 12. If the SS:
 - a) confirms that the UE is able to receive PDSCH at PSCell's slot ($i+T_{RRCprocessingDelay}+T_{BWPswitchDelayRRC}$) and also receives uplink grant for the PSCell no later than at slot ($i+T_{RRCprocessingDelay}+T_{BWPswitchDelayRRC}$)

and

- b) receives PUSCH on the new BWP after switch, and receives RRC Reconfiguration Complete message within the stipulated time
- the number of successful tests is increased by one.
- 13. Otherwise the number of failed tests is increased by one and proceed to Step 14.
- 14. If the Reconfiguration fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED with generic procedure parameters *Connectivity* EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5].
- 15. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.5.6.2.1.4.3 Message contents

FFS

5.5.6.2.1.5 Test requirements

During T1, the UE shall be ready for the reception of uplink grant for PSCell in a slot $(i + T_{RRCprocessingDelay} + T_{BWPswitchDelayRRC})$.

All of the above test requirements shall be fulfilled in order for the observed PSCell active BWP switch delay to be counted as correct.

The rate of correct events observed during repeated tests shall be at least 90%.

Table A.5.5.6.2.1.5-1: NR Cell specific test parameters for DL BWP switch in synchronous EN-DC

Parameter	Unit	Cell 2	
Frequency Range		FR2	
Duplex mode		TDD	
TDD configuration		TDDConf.3.1	
BW _{channel}		100 MHz: N _{RB,c} = 66	
Active BWP ID		1, 2	
Initial DL BWP Configuration		DLBWP.0.2	
_			
Active DL BWP-1 Configuration		DLBWP.1.3	
Active DL BWP-2 Configuration		DLBWP.1.1	
Initial UL BWP Configuration		ULBWP.0.2	
Active UL BWP-1 Configuration		ULBWP.1.3	
Active UL BWP-2 Configuration		ULBWP.1.1	
PDSCH Reference measurement channel		SR.3.1 TDD	
RMSI CORESET parameters		CR.3.1 TDD	
Dedicated CORESET parameters		CCR.3.1 TDD	
OCNG Patterns		OP.1	
SSB Configuration		SSB.1 FR2	
SMTC Configuration		SMTC.1	
TCI State		TCI.State.0	
TRS Configuration		TRS.2.1 TDD	
Antenna Configuration		1x2	
Propagation Condition		AWGN	
EPRE ratio of PSS to SSS	dB	0	
EPRE ratio of PBCH DMRS to SSS			
EPRE ratio of PBCH to PBCH DMRS			
EPRE ratio of PDCCH DMRS to SSS			
EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS			
EPRE ratio of PDSCH to PDSCH			
EPRE ratio of OCNG DMRS to SSS(Note 1)			
EPRE ratio of OCNG DMRS (Note 1)			
total transmitted power spectral density is achieved for all OFDM symbols.			
Note 2: Interference from other cells and noise sources not specified in the test is			
assumed to be constant over subcarriers and time and shall be modelled			
as AWGN of appropriate power for N_{oc} to be fulfilled.			
Note 3: SS-RSRP and lo levels have been derived from other parameters for			
information purposes. They are not settable parameters themselves.			

- information purposes. They are not settable parameters themselves. For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is $\,$ Note 4: linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 $\,$ is linked with ULBWP.1.3 defined in clause 12 of TS 38.213 [3].

Table A.5.5.6.2.1.5-2: OTA related test parameters for BWP switching test case

Parameter		Unit	Cell 2
Angle of arrival configuration			According to table A.3.15
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
$N_{_{oc}}^{^{ m Note1}}$	NR_TDD_FR2_F	dBm/15kHz	TBD
	NR_TDD_FR2_G	UDIII/13KHZ	IBD
	NR_TDD_FR2_T		
	NR_TDD_FR2_Y		
	NR_TDD_FR2_A		
	NR_TDD_FR2_B		
$N_{_{oc}}$ Note1	NR_TDD_FR2_F	dBm/SCS	TBD
	NR_TDD_FR2_G	ubiii/3C3	IBD
	NR_TDD_FR2_T		
	NR_TDD_FR2_Y		
SS-RSRP ^{Note2}	NR_TDD_FR2_A	dBm/SCS	TBD
	NR_TDD_FR2_B	Note3	
	NR_TDD_FR2_F		
	NR_TDD_FR2_G		
	NR_TDD_FR2_T		

	NR_TDD_FR2_Y			
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	TBD	
		NR_TDD_FR2_A		
		NR_TDD_FR2_B		
Io ^{Note2}		NR_TDD_FR2_F	dBm/95.04	TBD
10		NR_TDD_FR2_G	MHz Note4	IBD
		NR_TDD_FR2_T		
		NR_TDD_FR2_Y		
Note 1:	ote 1: Interference from other cells and noise sources not specified in the test is			ot specified in the test is
assumed to be constant over subcarriers and time and shall be mode			e and shall be modelled as	
	AWGN of appropriate power for N_{oc} to be fulfilled.			ed.
Note 2:	SS-RSRP and lo levels have been derived from other parameters for			ther parameters for
	information purposes. They are not settable parameters themselves.			neters themselves.
Note 3:	3: SS-RSRP minimum requirements are specified assuming independent			
	interference and noise at each receiver antenna port.			
Note 4:	Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the			Bi gain at the centre of the
	quiet zone			

5.6 Measurement procedures

5.6.1 Intra-frequency measurements

5.6.1.0 Minimum conformance requirements

5.6.1.0.1 Minimum conformance requirements for event-triggered measurement without gap

[TS 38.133, clause 9.2.2]

The requirements in Section 9.2 apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Sections 10.1.2 and 10.1.3 for FR1 and FR2, respectively, for a corresponding Band,
- SS-RSRQ related side conditions given in Sections 10.1.7 and 10.1.8 for FR1 and FR2, respectively, for a corresponding Band,
- SS-SINR related side conditions given in Sections 10.1.12 and 10.1.13 for FR1 and FR2, respectively, for a corresponding Band,
- SSB_RP and SSB £s/Iot according to Annex B.2.2 for a corresponding Band.

[TS 38.133, clause 9.2.4.3]

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 10.1.2.1, 10.1.3.1, 10.1.7.1, 10.1.8.1, 10.1.12.1 and 10.1.13.1, respectively.

The UE shall not send any event triggered measurement reports as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T $_{identify\ intra\ with\ index}$ or T $_{identify\ intra\ without\ index}$ defined in clause 9.2.5.1 or clause 9.2.6.2. When L3 filtering is used an additional delay can be expected.

A cell is detectable only if at least one SSBs measured from the Cell being configured remains detectable during the time period T $_{identify_intra_with_index}$ or T $_{identify_intra_with_index}$ defined in clause 9.2.5.1 or clause 9.2.6.2. If a cell which has been detectable at least for the time period T $_{identify_intra_without_index}$ or T $_{identify_intra_with_index}$ defined in clause 9.2.5.1 or clause 9.2.6.2 becomes undetectable for a period and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than T_{SSB_measurement_period_intra} provided the timing to that cell has not changed more than \pm 3200 Tc while the measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used, an additional delay can be expected.

[TS 38.133-f60, clause 9.2.5.1]

The UE shall be able to identify a new detectable intra frequency cell within T_{identify_intra_without_index} if UE is not indicated to report SSB based RRM measurement result with the associated SSB index(*reportQuantityRsIndexes* or *maxNrofRsIndexesToReport* is not configured), or the UE is indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within T_{identify_intra_with_index}. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within T_{identify_intra_without_index}. It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

$$T_{identify\ intra\ without\ index} = (T_{PSS/SSS\ sync\ intra} + T_{SSB\ measurement\ period\ intra})$$
 ms

Where:

T_{PSS/SSS sync intra}: it is the time period used in PSS/SSS detection given in table 5.6.1.0.1-1

T_{SSB} measurement period intra: equal to a measurement period of SSB based measurement given in table 5.6.1.0.1-2

CSSF_{intra}: it is a carrier specific scaling factor and is determined

- -according to $\text{CSSF}_{\text{outside_gap,i}}$ in section 9.1.5.1 for measurement conducted outside measurement gaps, i.e. when intra frequency SMTC is fully non overlapping or partially overlapping with measurement gaps, or according to $\text{CSSF}_{\text{within_gap,i}}$ in section 9.1.5.2 for measurement conducted within measurement gaps, i.e. when intra frequency SMTC is fully overlapping with measurement gaps.
 - -if the high layer in TS 38.331 [2] signalling of *smtc2* is configured, the assumed periodicity of intra frequency SMTC occasions corresponds to the value of higher layer parameter *smtc2*; Otherwise the assumed periodicity of intra frequency SMTC occasions corresponds to the value of higher layer parameter *smtc1*.

 $M_{pss/sss_sync_w/o_gaps}: For \ a \ UE \ supporting \ FR2 \ power \ class \ 1, \ M_{pss/sss_sync}=40. \ For \ a \ UE \ supporting \ power \ class \ 2, \\ M_{pss/sss_sync_w/o_gaps}=24. \ For \ a \ UE \ supporting \ FR2 \ power \ class \ 3, \ M_{pss/sss_sync_w/o_gaps}=24. \ For \ a \ UE \ supporting \ FR2 \ power \ class \ 4, \ M_{pss/sss_sync_w/o_gaps}=24.$

 $M_{meas_period_w/o_gaps}$: For a UE supporting power class 1, $M_{meas_period_w/o_gaps}$ =40. For a UE supporting FR2 power class 2, $M_{meas_period_w/o_gaps}$ =24. For a UE supporting power class 3, $M_{meas_period_w/o_gaps}$ =24. For a UE supporting power class 4, $M_{meas_period_w/o_gaps}$ =24.

When intra frequency SMTC is fully non overlapping with measurement gaps or intra frequency SMTC is fully overlapping with MGs, Kp=1

When intra frequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1-(SMTC period / MGRP)), where SMTC period < MGRP

If the higher layer signalling in TS38.331 [2] signalling of smtc2 is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, requirements are not specified for $T_{identify_intra_without_index}$ or $T_{identify_intra_without_index}$ or $T_{identify_intra_without_index}$

For FR2, if *SSB-ToMeasure* is configured, when all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap is fully non-overlapping with the SSB symbols indicated by *SSB-ToMeasure* and 1 symbol after each consecutive SSB symbols indicated by *SSB-ToMeasure*, K_{layer1_measurement}= 1, otherwise K_{layer1_measurement}= 1.5. If *SSB-ToMeasure* is not configured, when any of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam

reporting outside measurement gap is fully overlapping with intra-frequency SMTC, Klayer1_measurement = 1.5, otherwise $K_{layer1_measurement}=1$.

If SCG DRX is in use, intra frequency cell identification requirements specified in Table 5.6.1.0.1-1 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 5.6.1.0.1-1: Time period for PSS/SSS detection, (Frequency range FR2)

DRX cycle	T _{PSS/SSS_sync_intra}	
No DRX	max(600ms, ceil(M _{pss/sss_sync_w/o_gaps} x K _p x K _{layer1_measurement})	
	x SMTC period) ^{Note 1} x CSSF _{intra}	
DRX cycle≤ 320ms	max(600ms, ceil(1.5 x M _{pss/sss_sync_w/o_gaps} x K _p x	
	$K_{layer1_measurement}$) x max(SMTC period,DRX cycle)) x	
	CSSF _{intra}	
DRX cycle>320ms	ceil(M _{pss/sss sync w/o gaps} x K _p x K _{layer1 measurement}) x DRX	
	cycle x CSSF _{intra}	
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is		

the one used by the cell being identified

[TS 38.133, clause 9.2.5.2]

The measurement period for intra frequency measurements without gaps is as shown in table 5.6.1.0.1-2. If the higher layer signalling in TS38.331 [2] signalling of *smtc2* is present and *smtc1* is fully overlapping with measurement and smtc2 is partially overlapping with measurement gaps, requirements are not specified for T_{SSB measurement} period intra

If SCG DRX is in use, intra frequency measurement period requirements specified in Table 5.6.1.0.1-2 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 5.6.1.0.1-2: Measurement period for intrafrequency measurements without gaps(Frequency FR2)

DRX cycle	T _{SSB_measurement_period_intra}	
No DRX	max(400ms, ceil(M _{meas_period_w/o_gaps} x K _p x K _{layer1_measurement})	
	x SMTC period) ^{Note 1} x CSSF _{intra}	
DRX cycle≤ 320ms	max(400ms, ceil(1.5x M _{meas_period_w/o_gaps} x K _p x	
	K _{layer1_measurement}) x max(SMTC period,DRX cycle)) x	
	CSSF _{intra}	
DRX cycle>320ms	ceil(M _{meas_period_w/o_gaps} xK _p x K _{layer1_measurement}) x DRX cycle	
	x CSSF _{intra}	
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is		
the one used by the cell being identified		

The normative reference for this requirement is TS 38.133 [6] clause 9.2.2, 9.2.4.3, 9.2.5.1, 9.2.5.2.

5.6.1.0.2 Minimum conformance requirements for event-triggered measurement with gap

[TS 38.133, clause 9.2.2]

The requirements in Section 9.2 apply, provided:

The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Sections 10.1.2 and 10.1.3 for FR1 and FR2, respectively, for a corresponding Band,
- SS-RSRQ related side conditions given in Sections 10.1.7 and 10.1.8 for FR1 and FR2, respectively, for a corresponding Band,
- SS-SINR related side conditions given in Sections 10.1.12 and 10.1.13 for FR1 and FR2, respectively, for a corresponding Band,
- SSB_RP and SSB £s/Iot according to Annex B.2.2 for a corresponding Band.

[TS 38.133, clause 9.2.4.3]

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in sections 10.1.2.1, 10.1.3.1, 10.1.7.1, 10.1.8.1, 10.1.12.1 and 10.1.13.1, respectively.

The UE shall not send any event triggered measurement reports as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T $_{identify\ intra\ with\ index}$ or T $_{identify\ intra\ without\ index}$ defined in clause 9.2.5.1 or clause 9.2.6.2. When L3 filtering is used an additional delay can be expected.

A cell is detectable only if at least one SSBs measured from the Cell being configured remains detectable during the time period $T_{identify_intra_with_index}$ or $T_{identify_intra_with_index}$ defined in clause 9.2.5.1 or clause 9.2.6.2. If a cell which has been detectable at least for the time period $T_{identify_intra_without_index}$ or $T_{identify_intra_with_index}$ defined in clause 9.2.5.1 or clause 9.2.6.2 becomes undetectable for a period and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{SSB_measurement_period_intra}$ provided the timing to that cell has not changed more than \pm 3200 Tc while the measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used, an additional delay can be expected.

[TS 38.133, clause 9.2.6.2]

The UE shall be able to identify a new detectable intra frequency cell within T_{identify_intra_without_index} if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE has been indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within T_{identify_intra_with_index}. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within T_{identify_intra_without_index}. It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

$$T_{identify\ intra\ without\ index} = (T_{PSS/SSS\ sync\ intra} + T_{SSB\ measurement\ period\ intra})$$
 ms

Where:

 T_{PSS/SSS_sync_intra} : it is the time period used in PSS/SSS detection given in table 5.6.1.0.2-1

T SSB_measurement_period_intra: equal to a measurement period of SSB based measurement given in table 5.6.1.0.2-2

 $CSSF_{intra}$: it is a carrier specific scaling factor and is determined according to $CSSF_{within_gap,i}$ in section 9.1.5.2 for measurement conducted within measurement gaps.

 $M_{pss/sss_sync_with_gaps}$: For a UE supporting FR2 power class 1, $M_{pss/sss_sync_with_gaps}$ =40. For a UE supporting FR2 power class 2, $M_{pss/sss_sync_with_gaps}$ =24. For a UE supporting FR2 power class 3, $M_{pss/sss_sync_with_gaps}$ =24. For a UE supporting power class 4, $M_{pss/sss_sync_with_gaps}$ =24.

 $M_{meas_period_with_gaps}$: For a UE supporting power class 1, $M_{meas_period_with_gaps}$ =40. For a UE supporting power class 2, $M_{meas_period_with_gaps}$ =24. For a UE supporting power class 3, $M_{meas_period_with_gaps}$ =24. For a UE supporting power class 4, $M_{meas_period_with_gaps}$ =24.

If the higher layer signalling in TS 38.331 [2] signalling of smtc2 is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, requirements are not specified for $T_{identify_intra_without_index}$ or $T_{identify_intra_without_index}$ or $T_{identify_intra_without_index}$ or $T_{identify_intra_without_index}$.

If SCG DRX is in use, intrafrequency cell identification requirements specified in Table 5.6.1.0.2-1 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 5.6.1.0.2-1: Time period for PSS/SSS detection (Frequency range FR2)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	max(600ms, M _{pss/sss_sync_with_gaps} x max(MGRP, SMTC
	period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(600ms, ceil(1.5x M _{pss/sss_sync_with_gaps}) x max(MGRP,
	SMTC period, DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	M _{pss/sss sync with gaps} x max(MGRP, DRX cycle) x CSSF _{intra}

[TS 38.133, clause 9.2.6.3]

The measurement period for FR2 intra frequency measurements with gaps is as shown in table 5.6.1.0.2-2.

If SCG DRX is in use, intrafrequency measurement period requirements specified in Table 5.6.1.0.2-2 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

Table 5.6.1.0.2-2: Measurement period for intrafrequency measurements with gaps(Frequency Range FR2)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(400ms, M _{meas_period with_gaps} x max(MGRP, SMTC
	period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(400ms, ceil(1.5 x M _{meas_period with_gaps}) x max(MGRP,
-	SMTC period, DRX cycle)) Note 1 x CSSF _{intra}
DRX cycle>320ms	M _{meas_period with_gaps} x max(MGRP, DRX cycle) x CSSF _{intra}

The normative reference for this requirement is TS 38.133 [6] clause 9.2.2, 9.2.4.3, 9.2.6.2, 9.2.6.3.

5.6.1.1 EN-DC FR2 event-triggered reporting without gap in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Test for power class 1, 2 and 4 are not defined.
- Cell Configuration table in Annex E is undefined.
- Test case applicability in 38.522 is TBD
- Message contents are not complete.
- Connection diagram is TBD.
- Test requirements are between brackets (RAN4 Pending).

5.6.1.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search without gap under non-DRX. This test will partly verify the TDD intra-frequency cell search requirements in TS 38.133 [6] clause 9.2.5.1 and 9.2.5.2

5.6.1.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 forward, supporting EN-DC.

5.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.1.1.

5.6.1.1.4 Test description

5.6.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.1.1.4.1-1.

Table 5.6.1.1.4.1-1: Supported test configurations for EN-DC FR2 event-triggered reporting without gap under non-DRX

Configuration	Description	
5.6.1.1-1	LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode	
5.6.1.1-2	LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode	
5.6.1.1-3	LTE FDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode	
5.6.1.4-4	LTE TDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations.		

Configure the test requirement and the DUT according to the parameters in Table 5.6.1.1.4.1-2.

Table 5.6.1.1.4.1-2: Initial conditions for EN-DC FR2 event-triggered reporting without gap under non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.3-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 5.6.1.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2
conditions			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to	TBD		
connection			
diagram			

- 1. The test parameters for PSCell and neighbour cell are given in Table 5.6.1.1.4.1-3 below.
- 2. Message contents are defined in clause 5.6.1.1.4.3.
- 3. There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex C.1.1 and C.1.2.

Table 5.6.1.1.4.1-3: General test parameters for EN-DC FR2 intra-frequency event triggered reporting tests without gap under non-DRX

Parameter	Unit	Config	Value	Comment
Active cell			E-UTRAN PCell (Cell	
		1~4	1)	
			PSCell (Cell 2)	
Neighbour cell		1~4	Cell 3	Cell to be identified.
RF Channel Number			1: Cell 1	One TDD carrier frequency is used for the NR
		1~4	2: Cell 2 and Cell 3	cells and one TDD or FDD carrier frequency is
				used for E-UTRAN cell.
SMTC configuration		1~4	SMTC.1	
A3-Offset	dB	1~4	-6	
CP length		1~4	Normal	
Hysteresis	dB	1~4	0	
Time To Trigger	S	1~4	0	
Filter coefficient		1~4	0	L3 filtering is not used
DRX		1~4	OFF	
Time offset between		1 1	3 μs	Synchronous EN-DC
Cell 1 and Cell 2		1~4	·	
Time offset between		1~4	3 μs	Synchronous cells
Cell 2 and Cell 3		1~4		
T1	S	1~4	5	
T2	S	1~4	5	

5.6.1.1.4.2 Test procedure

There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.1.1.5-1.
- 3. SS shall transmit an *RRCConnectionReconfiguration* message with event A3 configured.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.1.1.5-1. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delays measured from the beginning of time period T2 is less than 1442 ms, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters

Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

Ωľ

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.6.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.6.1.1.4.3-1: Common Exception messages EN-DC FR2 intra frequency event triggered reporting tests without gap under non-DRX

Default Message Contents			
Common contents of system information blocks	FFS		
exceptions			
Default RRC messages and information	FFS		
elements contents exceptions			

5.6.1.1.5 Test requirement

Tables 5.6.1.1.4.1-3, 5.6.1.1.5-1 and 5.6.1.1.5-2 define the primary level settings including test tolerances for EN-DC FR2 event triggered reporting test without gap under non-DRX.

Table 5.6.1.1.5-1: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 without gap under non-DRX

Parameter	Unit	Config	Ce	Cell 2		II 3
			T1 T2		T1	T2
TDD configuration		1~4	TDDC	DDConf.3.1 TDDConf.3		onf.3.1
Initial BWP		1~4	DLBWP.0.1		DLBWP.0.1	
configuration			ULBV	/P.0.1	ULBV	VP.0.1
Active DL BWP		1~4	DLBV	/P.1.1	DLBV	VP.1.1
configuration						
Active UL BWP		1~4	ULBV	/P.1.1	ULBV	VP.1.1
configuration						
RLM-RS		1~4	S	SB	SS	SB
PDSCH RMC		1~4	SR.3.2	SR.3.1 TDD		/A
configuration						
RMSI CORESET		1~4	CR.3.	CR.3.1 TDD		1 TDD
RMC						
configuration						
Dedicated		1~4	CCR.3	.1 TDD	CCR.3.	.1 TDD
CORESET RMC						
configuration						
OCNG Patterns		1~4	OI	P.1	OF	P.1
TRS configuration		1~4	TRS.2	1 TDD	N.	/A
PDSCH/PDCCH		1~4	TCI.S	tate.2	N.	/A
TCI state						
SSB configuration		1, 2	SSB.	SSB.1 FR2		1 FR2
		3, 4	SSB.	2 FR2	SSB.2	2 FR2
Propagation		1~4		A۱	WGN	
Condition						

Table 5.6.1.1.5-2: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 without gap under non-DRX

Parameter	Unit	Config	Ce	Cell 2		II 3
			T1	T2	T1	T2

Note 3:

AoA setup)		1~4	Setup 3 defined in A.3.15.3				
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		dB	1~4	TBD TBD TBD TBD				
N_{oc} Note 2		dBm/15 KHz	1~4		Т	BD		
N_{oc} Note 2		dBm/SCS	1, 2		Т	BD		
1 oc			3, 4		Т	BD		
SS-RSRP		dBm/SCS	Bm/SCS 1, 2 TBD TBD				TBD	
			3, 4	TBD	TBD	TBD	TBD	
\hat{E}_s/N_{oc}		dB	1~4	TBD	TBD	TBD	TBD	
Io		dBm/95.04MHz	1~4	TBD TBD				
Note 1:	The reso	e resources for uplink transmission are assigned to the UE prior to the start of time period .						
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for							
	N_{oc} to be	e fulfilled.						

In the test, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1440 ms from the beginning of time period T2.

SS-RSRP levels have been derived from other parameters for information purposes. They are

The UE is not required to read the neighbour cell SSB index in this test.

not settable parameters themselves

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured shall be less than a total of 1442 ms in this test case (note: this gives a total measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.6.1.2 EN-DC FR2 event-triggered reporting without gap in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Test for power class 1, 2 and 4 are not defined.
- Test case applicability in 38.522 is TBD
- Message contents are not complete.
- Connection diagram is TBD.
- Test requirements are between brackets (RAN4 Pending).

5.6.1.2.1 Test purpose

To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search without gap in DRX. This test will partly verify the TDD intra-frequency cell search requirements in TS 38.133 [6] clause 9.2.5.1 and 9.2.5.2

5.6.1.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 forward, supporting EN-DC.

5.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.1.2.

5.6.1.2.4 Test description

5.6.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.1.2.4.1-1.

Table 5.6.1.2.4.1-1: Supported test configurations for EN-DC FR2 event-triggered reporting without gap in DRX

Configuration	Description					
5.6.1.2-1	LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.1.2-2	LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.1.2-3	LTE FDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.1.4-4	LTE TDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
Note: The UE is only re						

Configure the test requirement and the DUT according to the parameters in Table 5.6.1.2.4.1-2.

Table 5.6.1.2.4.1-2: Initial conditions for EN-DC FR2 event-triggered reporting without gap in DRX

Parameter		Value	Comment				
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified	As specified in Annex E, Table E.3-1 and TS 38.508-1 [14] clause 4.3.1.					
Channel	As specified	by the test configuration selected fr	om Table 5.6.1.2.4.1-1.				
bandwidth							
Propagation	AWGN		As specified in Annex C.2.2				
conditions							
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.TBD					
Exceptions to	TBD						
connection							
diagram							

- 1. The test parameters for PSCell and neighbour cell are given in Table 5.6.1.2.4.1-3 below.
- 2. Message contents are defined in clause 5.6.1.2.4.3.
- 3. There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex C.1.1 and C.1.2.

Table 5.6.1.2.4.1-3: General test parameters for EN-DC FR2 intra-frequency event triggered reporting tests without gap in DRX

Parameter	Unit	Config	Va	lue	Comment
			Test 1	Test 2	

Active cell		1~4	E-UTRAN F PSCell (Ce	PCell (Cell 1) Il 2)			
Neighbour cell		1~4	Cell 3		Cell to be identified.		
RF Channel Number		1~4	1: Cell 1 2: Cell 2 and Cell 3				One TDD carrier frequency is used for the NR cells and one TDD or FDD carrier frequency is used for E-UTRAN cell.
SMTC configuration		1~4	SMTC.1				
A3-Offset	dB	1~4	-6				
CP length		1~4	Normal				
Hysteresis	dB	1~4	0				
Time To Trigger	S	1~4	0				
Filter coefficient		1~4	0		L3 filtering is not used		
DRX		1~4	DRX.1 DRX.2		DRX related parameters are defined in Table 5.6.1.2.5-2		
Time offset between Cell 1 and Cell 2		1~4	3 μs		Synchronous EN-DC		
Time offset between Cell 2 and Cell 3		1~4	3 μs		Synchronous cells		
T1	S	1~4	5				
T2	S	1~4	10	52			

5.6.1.2.4.2 Test procedure

There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.1.2.5-1.
- 3. SS shall transmit an *RRCConnectionReconfiguration* message with event A3 configured.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.1.2.5-1. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delays measured from the beginning of time period T2 is less than 4322 ms for Test 1 and 30722 ms for Test 2, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.1.2.4.1-3 as appropriate.

5.6.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.6.1.2.4.3-1: Common Exception messages EN-DC FR2 intra frequency event triggered reporting tests without gap in DRX

Default Message Contents				
Common contents of system information blocks	FFS			
exceptions				
Default RRC messages and information	FFS			
elements contents exceptions				

5.6.1.2.5 Test requirement

Tables 5.6.1.2.4.1-3, 5.6.1.2.5-1 and 5.6.1.2.5-2 define the primary level settings including test tolerances for EN-DC FR2 event triggered reporting test without gap in DRX.

Table 5.6.1.2.5-1: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 without gap in DRX

Parameter	Unit	Config	Cell 2	Cell 3	
			T1 T2	T1 T2	
TDD configuration		1~4	TDDConf.3.1	TDDConf.3.1	
Initial BWP		1~4	DLBWP.0.1	DLBWP.0.1	
configuration			ULBWP.0.1	ULBWP.0.1	
Active DL BWP		1~4	DLBWP.1.1	DLBWP.1.1	
configuration					
Active UL BWP		1~4	ULBWP.1.1	ULBWP.1.1	
configuration					
RLM-RS		1~4	SSB	SSB	
PDSCH RMC		1~4	SR.3.1 TDD	N/A	
configuration					
RMSI CORESET		1~4	CR.3.1 TDD	CR.3.1 TDD	
RMC					
configuration					
Dedicated		1~4	CCR.3.1 TDD	CCR.3.1 TDD	
CORESET RMC					
configuration					
OCNG Patterns		1~4	OP.1	OP.1	
PDSCH/PDCCH		1~4	TCI.State.2	N/A	
TCI state					
TCI state		1~4	CSI-RS.Config.0	N/A	
SSB configuration		1, 2	SSB.1 FR2	SSB.1 FR2	
		3, 4	SSB.2 FR2	SSB.2 FR2	
Propagation		1~4	AW	/GN	
Condition					

Table 5.6.1.2.5-2: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 without gap in DRX

Parameter	Unit	Config	Ce	Cell 2		II 3
			T1	T2	T1	T2

AoA setup		1~4	S	etup 1 defii	ned in A.3.1	5.1			
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	1~4	4	-1.46	-Infinity	-1.46			
N_{oc} Note 2	dBm/15 KHz	1~4	-98						
N_{oc} Note 2	dBm/SCS	1, 2	-89						
1 voc		3, 4			-86				
SS-RSRP	dBm/SCS	1, 2	-85	-85	-Infinity	-85			
		3, 4	-82	-82	-Infinity	-82			
\hat{E}_s/N_{oc}	dB	1~4	4	4	-Infinity	4			
Io	dBm/95.04MHz	1, 2	-54.56	-52.21	-54.56	-52.21			
Note 1: The reso	Note 1: The resources for unlink transmission are assigned to the LIE prior to the start of time period								

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 4.32s from the beginning of time period T2.

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 30.72s from the beginning of time period T2.

The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured shall be less than a total of 4322 ms for Test 1 and 30722 ms for Test 2 in this test case (note: this gives a total measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.6.1.3 EN-DC FR2 event-triggered reporting with gap in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Test for power class 1, 2 and 4 are not defined.
- Test case applicability in 38.522 is TBD
- Message contents are not complete.
- Connection diagram is TBD.
- Test requirements are between brackets (RAN4 Pending).

5.6.1.3.1 Test purpose

To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search with gap in non-DRX. This test will partly verify the TDD intra-frequency cell search requirements in TS 38.133 [6] clause 9.2.5.1 and 9.2.5.2

5.6.1.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 forward, supporting EN-DC.

5.6.1.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.1.3.

5.6.1.3.4 Test description

5.6.1.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.1.3.4.1-1.

Table 5.6.1.3.4.1-1: Supported test configurations for EN-DC FR2 event-triggered reporting with gap in non-DRX

Configuration	Description				
5.6.1.3-1	LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode				
5.6.1.3-2	LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode				
5.6.1.3-3	LTE FDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode				
5.6.1.4-4	LTE TDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode				
Note: The UE is only required to be tested in one of the supported test configurations.					

Configure the test requirement and the DUT according to the parameters in Table 5.6.1.3.4.1-2.

Table 5.6.1.3.4.1-2: Initial conditions for EN-DC FR2 event-triggered reporting with gap in non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.3-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 5.6.1.3.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2
conditions			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to	TBD		
connection			
diagram			

- 1. The test parameters for PSCell and neighbour cell are given in Table 5.6.1.3.4.1-3 below.
- 2. Message contents are defined in clause 5.6.1.3.4.3.
- 3. There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex C.1.1 and C.1.2.

Table 5.6.1.3.4.1-3: General test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps without DRX

Parameter	Unit	Config	Value	Comment
Active cell			E-UTRAN	
		1~4	PCell (Cell 1)	
			PSCell (Cell 2)	
Neighbour cell		1~4	Cell 3	Cell to be identified.
RF Channel Number			1: Cell 1	One TDD carrier frequency is used for the NR cells and
		1~4	2: Cell 2 and	one TDD or FDD carrier frequency is used for E-UTRAN
			Cell 3	cell.
Gap type		1~4	Per-UE gaps	
Measurement gap	ms	1~4	40	
repetition periodicity				
Measurement gap	ms	1~4	6	
length				
Measurement gap offset	ms	1~4	39	
SMTC configuration		1~4	SMTC.1	
CSI-RS parameters		1~4	CSI-RS.3.2	
			TDD	
A3-Offset	dB	1~4	-6	
CP length		1~4	Normal	
Hysteresis	dB	1~4	0	
Time To Trigger	S	1~4	0	
Filter coefficient		1~4	0	L3 filtering is not used
DRX		1~4	OFF	
Time offset between Cell		1~4	3 μs	Synchronous EN-DC
1 and Cell 2		1'-4		
Time offset between Cell		1~4	3 μs	Synchronous cells
2 and Cell 3				
T1	S	1~4	5	
T2	S	1~4	5	

5.6.1.3.4.2 Test procedure

There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.1.3.5-1.
- 3. SS shall transmit an RRCConnectionReconfiguration message with event A3 configured.
- ${\it 4. The UE shall transmit } \textit{RRCConnectionReconfigurationComplete} \ \textit{message}.$
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.1.3.5-1. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delays measured from the beginning of time period T2 is less than 1922 ms, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

5.6.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.6.1.3.4.3-1: Common Exception messages EN-DC FR2 intra frequency event triggered reporting tests with gap in non-DRX

Default Message Contents					
Common contents of system information blocks FFS					
exceptions					
Default RRC messages and information	FFS				
elements contents exceptions					

5.6.1.3.5 Test requirement

Tables 5.6.1.3.4.1-3, 5.6.1.3.5-1 and 5.6.1.3.5-2 define the primary level settings including test tolerances for EN-DC FR2 event triggered reporting test with gap under non-DRX.

Table 5.6.1.3.5-1: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps without DRX

Parameter	Unit	Config	Cel	Cell 2		II 3
			T1	T1 T2		T2
TDD configuration		1~4	TDDCo	nf.3.1	TDDC	onf.3.1
Initial BWP		1~4	DLBW	P.0.1	DLBW	/P.0.1
configuration			ULBW	P.0.1	ULBV	/P.0.1
Active DL BWP		1~4	DLBW	P.1.2	DLBW	/P.1.1
configuration						
Active UL BWP		1~4	ULBW	P.1.2	ULBW	/P.1.1
configuration						
RLM-RS		1~4	CSI-	RS	SS	SB
PDSCH RMC		1~4	SR.3.1	SR.3.1 TDD		/A
configuration						
RMSI CORESET		1~4	CR.3.1	TDD	CR.3.1 TDD	
RMC						
configuration						
Dedicated		1~4	CCR.3.	1 TDD	CCR.3.	1 TDD
CORESET RMC						
configuration						
TRS configuration		1~4	TRS.2.	1 TDD	N.	/A
PDSCH/PDCCH		1~4	TCI.State.2		N.	/A
TCI state						
OCNG Patterns		1~4	OP	OP.1		P.1
SSB		1, 2	SSB.1	FR2	SSB.	1 FR2
		3, 4	SSB.2	FR2	SSB.2	2 FR2

Propagation	1~4	AWGN
Condition		

Table 5.6.1.3.5-2: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps without DRX

Parameter	Unit	Config	Ce	Cell 2		II 3	
			T1	T2	T1	T2	
AoA setup		1~4	S	etup 3 defii	ned in A.3.1	5.3	
$\mathbf{\hat{E}}_{s}/\mathrm{I}_{ot}$	dB	1~4	TBD	TBD	TBD	TBD	
$N_{oc}^{$	dBm/15 KHz	1~4	TBD				
Note 2	dBm/SCS	1, 2	TBD				
oc oc		3, 4	TBD				
SS-RSRP	dBm/SCS	1, 2	TBD	TBD	TBD	TBD	
		<u>3, 4</u>	TBD	TBD	TBD	TBD	
\hat{E}_s/N_{oc}	dB	3, 4	TBD	TBD	TBD	TBD	
Io	dBm/95.04MHz 1~4 TBD TBD						
Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.							

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

SS-RSRP levels have been derived from other parameters for information purposes. They are Note 3: not settable parameters themselves.

In the test, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1.92s from the beginning of time period T2

The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured shall be less than a total of 1922 ms in this test case (note: this gives a total measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.6.1.4 EN-DC FR2 event-triggered reporting with gap in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Test for power class 1, 2 and 4 are not defined.
- Test case applicability in 38.522 is TBD
- Message contents are not complete.
- Connection diagram is TBD.
- Test requirements are between brackets (RAN4 Pending).

5.6.1.4.1 Test purpose

To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search with gap in DRX. This test will partly verify the TDD intra-frequency cell search requirements in TS 38.133 [6] clause 9.2.5.1 and 9.2.5.2

5.6.1.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 forward, supporting EN-DC.

5.6.1.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.1.4.

5.6.1.4.4 Test description

5.6.1.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.1.4.4.1-1.

Table 5.6.1.4.4.1-1: Supported test configurations for EN-DC FR2 event-triggered reporting with gap in DRX

Configuration	Description					
5.6.1.4-1	LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.1.4-2	LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.1.4-3	LTE FDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.1.4-4	LTE TDD, 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
Note: The UE is only required to be tested in one of the supported test configurations.						

Configure the test requirement and the DUT according to the parameters in Table 5.6.1.4.4.1-2.

Table 5.6.1.4.4.1-2: Initial conditions for EN-DC FR2 event-triggered reporting with gap in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.3-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified	by the test configuration selected fr	om Table 5.6.1.4.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to connection diagram	TBD		

- 1. The test parameters for PSCell and neighbour cell are given in Table 5.6.1.4.4.1-3 below.
- 2. Message contents are defined in clause 5.6.1.4.4.3.
- 3. There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex C.1.1 and C.1.2.

Table 5.6.1.4.4.1-3: General test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps with DRX

Parameter	Unit	Config	Value		Comment
			Test 1	Test 2	

Active cell		1~4	E-UTRAN PCell (Cell 1) PSCell (Cell 2)		
Neighbour cell		1~4	Cell 3		Cell to be identified.
RF Channel Number		1~4	1: Cell 1 2: Cell 2 and Cell 3		One TDD carrier frequency is used for the NR cells and one TDD or FDD carrier frequency is used for E-UTRAN cell.
Gap type		1~4	Per-UE gap	os	
Measurement gap repetition periodicity	ms	1~4	40		
Measurement gap length	ms	1~4	6		
Measurement gap offset	ms	1~4	39		
SMTC configuration		1~4	SMTC.1		
CSI-RS parameters		1~4	CSI-RS.3.2	? TDD	
A3-Offset	dB	1~4	-6		
CP length		1~4	Normal		
Hysteresis	dB	1~4	0		
Time To Trigger	S	1~4	0		
Filter coefficient		1~4	0		L3 filtering is not used
DRX		1~4	DRX.1	DRX.2	DRX related parameters are defined in Table 5.6.1.4.5-2
Time offset between Cell 1 and Cell 2		1~4	3 🛮 s		Synchronous EN-DC
Time offset between Cell 2 and Cell 3		1~4	3 lls		Synchronous cells
T1	S	1~4	5		
T2	S	1~4	10	52	

5.6.1.4.4.2 Test procedure

There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell.

In the measurement control information a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.1.4.5-1.
- 3. SS shall transmit an *RRCConnectionReconfiguration* message with event A3 configured.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.1.4.5-1. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delays measured from the beginning of time period T2 is less than 4322 ms for Test 1 and 30722 ms for Test 2, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.1.2.4.1-3 as appropriate.

5.6.1.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.6.1.4.4.3-1: Common Exception messages EN-DC FR2 intra frequency event triggered reporting tests with gap in DRX

Default Message Contents			
Common contents of system information blocks FFS			
exceptions			
Default RRC messages and information FFS			
elements contents exceptions			

5.6.1.4.5 Test requirement

Tables 5.6.1.4.4.1-3, 5.6.1.4.5-1 and 5.6.1.4.5-2 define the primary level settings including test tolerances for EN-DC FR2 event triggered reporting test with gap in DRX.

Table 5.6.1.4.5-1: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps with DRX

Parameter	Unit	Config	Cell 2	Cell 3
			T1 T2	T1 T2
TDD configuration		1~4	TDDConf.3.1	TDDConf.3.1
Initial BWP		1~4	DLBWP.0.1	DLBWP.0.1
configuration			ULBWP.0.1	ULBWP.0.1
Active DL BWP		1~4	DLBWP.1.2	DLBWP.1.1
configuration				
Active UL BWP		1~4	ULBWP.1.2	ULBWP.1.1
configuration				
RLM-RS		1~4	CSI-RS	SSB
PDSCH RMC		1~4	SR.3.1 TDD N/A	
configuration				
RMSI CORESET		1~4	CR.3.1 TDD CR.3.1 TDD	
RMC				
configuration				
Dedicated		1~4	CCR.3.1 TDD	CCR.3.1 TDD
CORESET RMC				
configuration				
TRS configuration		1~4	TRS.2.1 TDD	N/A
PDSCH/PDCCH		1~4	TCI.State.2 N/A	
TCI state				
OCNG Patterns		1~4	OP.1	OP.1
SSB		1, 2	SSB.1 FR2 SSB.1 FR2	
		3, 4	SSB.2 FR2	SSB.2 FR2

Propagation	1~4	AWGN
Condition		

Table 5.6.1.4.5-2: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps with DRX

Parameter	Unit	Config	Cell 2		Ce	Cell 3	
			T1	T2	T1	T2	
AoA setup		1~4	S	etup 1 defiı	ned in A.3.1	5.1	
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1~4	4	-1.46	-Infinity	-1.46	
N_{oc} Note 2	dBm/15 KHz	1~4		-	-98		
Note 2	dBm/SCS	1, 2	-89				
oc oc		3, 4		-	-86		
SS-RSRP	dBm/SCS	1, 2	-85	-85	-Infinity	-85	
		3, 4	-82	-82	-Infinity	-82	
\hat{E}_s/N_{oc}	dB	1~4	4	4	-Infinity	4	
Io	dBm/95.04MHz	1, 2	-54.56	-52.21	-54.56	-52.21	

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be

constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 4.32s from the beginning of time period T2

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 30.72s from the beginning of time period T2.

The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured shall be less than a total of 4322 ms for Test 1 and 30722 ms for Test 2 in this test case (note: this gives a total measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

5.6.2 Inter-frequency measurements

5.6.2.0 Minimum conformance requirements for Inter-frequency measurements

The requirements in Section 9.3 apply, provided:

- The cell being identified or measured is detectable.

An inter-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Sections 10.1.4 and 10.1.5 for FR1 and FR2, respectively, for a corresponding Band,

- SS-RSRQ related side conditions given in Sections 10.1.9 and 10.1.10 for FR1 and FR2, respectively, for a corresponding Band,
- SS-SINR related side conditions given in Sections 10.1.14 and 10.1.15 for FR1 and FR2, respectively, for a corresponding Band,
- SSB_RP and SSB £s/Iot according to Annex B.2.3 for a corresponding Band.

When measurement gaps are provided, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable inter frequency cell within $T_{identify_inter_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (reportQuantityRsIndexes or maxNrofRSIndexesToReport is not configured). Otherwise UE shall be able to identify a new detectable inter frequency cell within $T_{identify_inter_with_index}$. The UE shall be able to identify a new detectable inter frequency SS block of an already detected cell within $T_{identify_inter_without_index}$.

$$T_{identify_inter_without_index} = \left(T_{PSS/SSS_sync_inter} + T_{SSB_measurement_period_inter}\right) ms$$

$$T_{identify_inter_with_index} = \left(T_{PSS/SSS_sync_inter} + T_{SSB_measurement_period_inter} + T_{SSB_time_index_inter}\right) ms$$

Where:

 T_{PSS/SSS_sync_inter} : it is the time period used in PSS/SSS detection given in table 9.3.4-1 and table 9.3.4-2.

 $T_{SSB_time_index_inter}$: it is the time period used to acquire the index of the SSB being measured given in table 9.3.4-3 and table 9.3.4-4.

 $T_{SSB_measurement_period_inter}$: equal to a measurement period of SSB based measurement given in table 9.3.5-1 and table 9.3.5-2.

 M_{pss/sss_sync_inter} : For a UE supporting FR2 power class 1, M_{pss/sss_sync_inter} = 64 samples. For a UE supporting FR2 power class 2, M_{pss/sss_sync_inter} = 40 samples. For a UE supporting FR2 power class 3, M_{pss/sss_sync_inter} = 40 samples. For a UE supporting FR2 power class 4, M_{pss/sss_sync_inter} = 40 samples.

 $M_{SSB_index_inter}$: For a UE supporting power FR2 class 1, $M_{SSB_index_inter}$ = 40 samples. For a vehicle mounted UE supporting power class 2, $M_{SSB_index_inter}$ = 24 samples. For a UE supporting power class 3, $M_{SSB_index_inter}$ = 24 samples. For a UE supporting power class 4, $M_{meas_period_inter}$ = 24 samples.

 $M_{meas_period_inter}$: For a UE supporting FR2 power class 1, $M_{meas_period_inter}$ =64 samples. For a UE supporting FR2 power class 2, $M_{meas_period_inter}$ =40 samples. For a UE supporting FR2 power class 3, $M_{meas_period_inter}$ =40 samples. For a UE supporting FR2 power class 4, $M_{meas_period_inter}$ = 40 samples.

 $CSSF_{inter}$: it is a carrier specific scaling factor and is determined according to $CSSF_{within_gap,i}$ in section 9.1.5.2 for measurement conducted within measurement gaps.

Table 9.3.4-2: Time period for PSS/SSS detection, (Frequency range FR2)

Condition NOTE1,2	T _{PSS/SSS_sync_inter}		
No DRX	Max(600ms, M _{pss/sss_sync_inter} × Max(MGRP, SMTC period)) × CSSF _{inter}		
DRX cycle ≤ 320ms	$Max(600ms, (1.5 \times M_{pss/sss_sync_inter}) \times Max(MGRP, SMTC period, DRX cycle)) \times CSSF_{inter}$		
DRX cycle > 320ms	$M_{pss/sss_sync_inter} \times DRX \ cycle \times CSSF_{inter}$		
NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1			
NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for			
the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.			

Table 9.3.4-4: Time period for time index detection (Frequency range FR2)

Condition NOTE1,2	T _{SSB_time_index_inter}	
No DRX	Max(200ms, M _{SSB_index_inter} × Max(MGRP, SMTC period)) × CSSF _{inter}	
DRX cycle ≤ 320ms	$Max(200ms, (1.5 \times M_{SSB_index_inter}) \times Max(MGRP, SMTC period, DRX cycle)) \times CSSF_{inter}$	
DRX cycle > 320ms	$M_{SSB_index_inter} \times DRX \ cycle \times CSSF_{inter}$	
	RX requirements apply according to the conditions described in clause 3.6.1	
NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for		

the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.

When measurement gaps are provided for inter frequency measurements, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting SS-RSRP, SS-RSRQ and SS-SINR measurements to higher layers with measurement accuracy as specified in sub-clauses 10.1.4, 10.1.5, 10.1.9, 10.1.10, 10.1.14 and 10.1.15, respectively, as shown in table 9.3.5-1 and 9.3.5-2:

Table 9.3.5-2: Measurement period for inter-frequency measurements with gaps (Frequency FR2)

Condition NOTE1,2	T _{SSB_measurement_period_inter}	
No DRX	Max(400ms, M _{meas_period_inter} × Max(MGRP, SMTC period)) × CSSF _{inter}	
DRX cycle ≤ 320ms	$Max(400ms, (1.5 \times M_{meas_period_inter}) \times Max(MGRP, SMTC period, DRX cycle)) \times CSSF_{inter}$	
DRX cycle > 320ms		
NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1		
NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for		
the secondary	cell group. The DRX cycle is the DRX cycle of the secondary cell group.	

Reported SS-RSRP, SS-RSRQ, and SS-SINR measurements contained in event triggered measurement reports shall meet the requirements in sections 10.1.4.1, 10.1.5.1, 10.1.9.1, 10.1.10.1, 10.1.14.1 and 10.1.15.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be within $T_{identify_inter_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index. Otherwise UE shall be able to identify a new detectable inter frequency cell within $T_{identify_inter_with_index}$. Both $T_{identify_inter_with_index}$ and $T_{identify_inter_with_index}$ are defined in clause 9.3.4. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify_inter_without_index}$ or $T_{identify_inter_with_index}$ defined in clause 9.3.4 and then triggers the measurement report as per TS 38.331 [2], the event triggered measurement reporting delay shall be less than $T_{SSB_measurement_period_inter}$ defined in clause 9.3.5 provided the timing to that cell has not changed more than \pm 3200 Tc while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clause 9.3.2, 9.3.4, 9.3.5, 9.3.6.3.

5.6.2.1 EN-DC FR2-FR2 event-triggered reporting in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD
- Initial conditions contain square brackets (RAN4 Pending)

5.6.2.1.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

5.6.2.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.1.

5.6.2.1.4 Test description

5.6.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.1.4.1-1.

Table 5.6.2.1.4.1-1: EN-DC FR2-FR2 event triggered reporting tests in non-DRX supported test configurations

Test Case ID	Description	
5.6.2.1-1	LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode	
5.6.2.1-2	LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode	
Note 1: The UE is only required to be tested in one of the supported test configurations		
Note 2: target N	R cell has the same SCS, BW and duplex mode as NR serving cell	

Table 5.6.2.1.4-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
E-UTRA RF Channel		Config 1,2	1		One E-UTRAN TDD carrier
Number					frequencies is used.
NR RF Channel Number		Config 1,2	1, 2		Two FR1 NR carrier frequencies is used.
Active cell		Config 1,2	LTE Cell 1 (PCell) and NR cell 2 (PScell)		LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config 1,2	NR cell 3		NR cell 3 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2	0	13	As specified in TS 38.133 [6] clause 9.1.2-1.
Measurement gap offset		Config 1,2	39	39	
SMTC-SSB parameters		Config 1,2	SSB.1 FR2		As specified in clause A.3.2
A3-Offset	dB	Config 1,2	[-30]		
Hysteresis	dB	Config 1,2	0		
CP length		Config 1,2	Normal		
TimeToTrigger	S	Config 1,2	0		
Filter coefficient		Config 1,2	0		L3 filtering is not used
DRX		Config 1,2	OFF		DRX is not used
AoA setup		Config 1,2	Setup 3		As specified in clause A.9
Time offset between PCell and PSCell		Config 1,2	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells		Config 1,2	3μs		Synchronous cells.
T1	S	Config 1,2	5		
T2	S	Config 1,2	5.2 for PC1; 3.5 for other PC	5.2 for PC1; 3.5 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 5.6.2.1.4.1-3: Test Environment test parameters for EN-DC inter-frequency event triggered
reporting with SSB time index detection in non-DRX

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.	
Channel bandwidth	As specified by the test configuration selected from Table 5.6.2.1.4.1-1.		rom Table 5.6.2.1.4.1-1.	
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	TBD		
Exceptions to connection diagram	TBD			

- 1. Message contents are defined in clause 5.6.2.1.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 are set according to Annex C.1.2 and Annex C.1.3. Cell 3 is switched off during the initial connection setup.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

5.6.2.1.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR2 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 5.6.2.1.4.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 5.6.2.1.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.1.4.1-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.1.4.1-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 5120 ms for UE supporting power class 1, or 3200 ms for UE supporting other power class for Test 1 and Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]

- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.2.1.4.1-2 as appropriate.

5.6.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 5.6.2.1.4.3-1: Common Exception messages for Additional EN-DC FR2-FR2 event triggered reporting tests in non-DRX test requirement

De	efault Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR2 and Synchronous cells Table H.3.1-4 with A3-offset = -6dB Table H.3.1-6 with Conditions gapFR2 and Pattern #13 for Test 2 Table H.3.4-4 with Condition gapUE Test 1 Table H.3.4-5 with Condition Pattern #0 for Test 1 Table H.3.1-7 with Condition INTER-FREQ
	Table H.3.4-1 Table H.3.4-2 Table H.3.4-3

5.6.2.1.5 Test requirement

Table 5.6.2.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.2.1.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

Parameter	Unit	Test	Ce	II 2	Cell 3		
		configuratio n	T1	T2	T1	T2	
NR RF Channel Number		Config 1,2	1			2	
Duplex mode		Config 1,2	TDD		TDD		
BW _{channel}	MHz	Config 1,2	100: N _{RB,c} = 66		100: N _{RB,c} = 66		
BWP BW	MHz	Config 1,2	100: N	_{RB,c} = 66	100:	N _{RB,c} = 66	
TDD configuration		Config 1,2	TDDC	onf.3.1	TDDConf.3.1		
Initial DL BWP		Config 1,2	DLBV	VP.0.1	NA		
Initial UL BWP		Config 1,2	ULBV	VP.0.1	NA		
Dedicated DL BWP		Config 1,2	DLBV	VP.1.1		NA	
Dedicated UL BWP		Config 1,2	ULBV	VP.1.1		NA	
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2	OI	P.1	(OP.1	
TRS configuration		Config 1,2	TRS.2	.1 TDD		NA	
TCI configuration		Config 1,2	CSI-RS.	Config.0		NA	
PDSCH Reference measurement channel		Config 1,2	SR.3.	1 TDD	-		
CORESET Reference Channel		Config 1,2	CR.3.1 TDD		-		
SMTC configuration defined in A.3.11.1		Config 1,2	SMTC.1		SMTC.1		
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2	120		120		
EPRE ratio of PSS to SSS							
EPRE ratio of PBCH DMRS to SSS							
EPRE ratio of PBCH to PBCH DMRS							
EPRE ratio of PDCCH DMRS to SSS							
EPRE ratio of PDCCH to PDCCH DMRS		Config 1,2	0		0		
EPRE ratio of PDSCH DMRS to SSS							
EPRE ratio of PDSCH to PDSCH							
EPRE ratio of OCNG DMRS to SSS(Note 1)							
EPRE ratio of OCNG to OCNG DMRS (Note 1)							
N_{oc} Note2	dBm/15 kHz Note5		NA		NA		
$oldsymbol{N}_{oc}$ Note2	dBm/S CS	Config 1,2	NA		NA		
SS-RSRP Note 3	Note4 dBm/S CS Note5	Config 1,2	-87	-87	-Infinity	-87	
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	Config 1,2	NA	NA	-Infinity	NA	
\hat{E}_s/N_{oc}	dB	Config 1,2	NA	NA	-Infinity	NA	

Io ^{Note3}		dBm/95	Config 1,2	-87	-87	-Infinity	-87			
		.04								
		MHz								
		Note5								
Propagat	ion Condition		Config 1,2	Config 1,2 AWGN						
Note 1:	OCNG shall be used	such that h	at both cells are fully allocated and a constant total transmitted power							
	spectral density is achieved for all OFDM symbols.									
Note 2:	te 2: Interference from other cells and noise sources not specified in the test is assumed to be consta						be constant			
	over subcarriers and	time and s	hall be modelled	as AWGN o	f appropriate	e power for	N_{oc} to be			
	fulfilled.									
Note 3:	SS-RSRP and lo leve	els have be	en derived from	other param	eters for info	rmation pur	ooses. They			
	are not settable parameters themselves.									
Note 4:	ste 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at						nd noise at			
	each receiver antenna port.									
Note 5:										
Note 6:	As observed with 0dBi gain antenna at the centre of the quiet zone									

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

5120 for UE supporting power class 1, or

3200 for UE supporting other power class.

In test 1 and 2 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.2.2 EN-DC FR2-FR2 event-triggered reporting in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD

5.6.2.2.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

5.6.2.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.2.

5.6.2.2.4 Test description

5.6.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.2.4.1-1.

Table 5.6.2.2.4.1-1: EN-DC FR2-FR2 event triggered reporting tests in DRX supported test configurations

Test Case ID	Description				
5.6.2.2-1	5.6.2.2-1 LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode				
5.6.2.2-2	5.6.2.2-2 LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode				
Note 1: The UE is only required to be tested in one of the supported test configurations					
Note 2: target N	R cell has the same SCS, BW and duplex mode as NR serving cell				

Table 5.6.2.2.4-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

Parameter	Unit	Test	Value				Comment		
		configurati	Test	Test	Test	Test			
		on	1	2	3	4			
E-UTRA RF Channel Number		Config 1,2			1		One E-UTRAN TDD carrier frequencies is used.		
NR RF Channel Number		Config 1,2		1,	2		Two FR1 NR carrier frequencies is used.		
Active cell		Config 1,2		ell 1 (PC (PScell)	Cell) and	INR	LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.		
Neighbour cell		Config 1,2	NR ce	II 3			NR cell 3 is on NR RF channel number 2.		
Gap Pattern Id		Config 1,2	0		13		As specified in TS 38.133 clause 9.1.2-1.		
Measurement gap offset		Config 1,2	39		39				
SMTC-SSB parameters		Config 1,2	SSB.1	FR2			As specified in clause A.3		
A3-Offset	dB	Config 1,2	-6						
Hysteresis	dB	Config 1,2	0						
CP length		Config 1,2	Normal						
TimeToTrigger	S	Config 1,2	0						
Filter coefficient		Config 1,2	0				L3 filtering is not used		
DRX		Config 1,2	DRX DRX DRX DRX .1 .2 .1 .2		.2	As specified in clause A.5			
AoA setup		Config 1,2	Setu p 1			Setu p 1	As specified in clause A.3.15		
Time offset between PCell and PSCell		Config 1,2	3 μs				Synchronous EN-DC		
Time offset between serving and neighbour cells		Config 1,2	3μs				Synchronous cells.		
T1	S	Config 1,2	5						
T2	S	Config 1,2	8 for PC1; 5 for othe r PC	82 for PC1; 52 for othe r PC	8 for PC1; 5 for othe r PC	82 for PC1; 52 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0		

Table 5.6.2.2.4.1-3: Test Environment test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in non-DRX

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.			
Channel	As specified by the test configuration selected from Table 5.6.2.2.4.1-1.					
bandwidth						
Propagation	AWGN		As specified in Annex C.2.2.			
conditions						
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	TBD				
Exceptions to	TBD					
connection						
diagram						

- 1. Message contents are defined in clause 5.6.2.2.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

5.6.2.2.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR2 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 5.6.2.2.4.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 5.6.2.2.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.2.4.1-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.2.4.1-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 7680 ms for UE supporting power class 1, or 4800 ms for UE supporting other power class for Test 1 and Test 3 and 81920 ms for UE supporting power class 1, or 51200 ms for UE supporting other power class for Test 2 and Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.2.2.4.1-2 as appropriate.

5.6.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 5.6.2.2.4.3-1: Common Exception messages for Additional EN-DC FR2-FR2 event triggered reporting tests without SSB time index detection in DRX test requirement

Default Message Contents					
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR2 and Synchronous cells Table H.3.1-4 with A3-offset = -6dB Table H.3.1-6 with Conditions gapFR2 and Pattern #13 for Test 3 and Test 4 Table H.3.4-4 with Condition gapUE Test 1 and Test 2 Table H.3.4-5 with Condition Pattern #0 for Test 1 and Test 2 Table H.3.1-7 with Condition INTER-FREQ Table H.3.7-1 with Condition DRX.1 for Test 1 and Test 3 Table H.3.7-1 with Condition DRX.2 for Test 2 and Test 4 Table H.3.4-1 Table H.3.4-2 Table H.3.4-3				

5.6.2.2.5 Test requirement

Table 5.6.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Table A.5.6.2.2.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

Parameter	Unit	Test	Ce	II 2	Cell 3		
		configuratio n	T1	T2	T1	T2	
NR RF Channel Number		Config 1,2	1		2		
Duplex mode		Config 1,2	TDD		TDD		
BW _{channel}	MHz	Config 1,2	100: N _{RB,c} = 66		100: N _{RB,c} = 66		
BWP BW	MHz	Config 1,2		RB,c = 66		I _{RB,c} = 66	
TDD configuration		Config 1,2	TDDC	onf.3.1	TDDConf.3.1		
Initial DL BWP		Config 1,2	DLBV	/P.0.1	NA		
Initial UL BWP		Config 1,2	ULBV	/P.0.1	NA		
Dedicated DL BWP		Config 1,2	DLBV	/P.1.1		NA	
Dedicated UL BWP		Config 1,2	ULBV	/P.1.1		NA	
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2	OF	P.1	C)P.1	
TRS configuration		Config 1,2	TRS.2.	1 TDD	ı	NA	
TRS configuration		Config 1,2	TRS.2	1 TDD		NA	
PDSCH Reference		Config 1,2	SR.3.:	1 TDD	-		
measurement channel CORESET Reference Channel		Config 1,2	CR.3.:		-		
SMTC configuration defined in A.3.11.1		Config 1,2	SMTC.1		SMTC.1		
PDSCH/PDCCH subcarrier	kHz	Config 1,2	120		<u> </u>	120	
spacing EPRE ratio of PSS to SSS			120		-	120	
EPRE ratio of PBCH DMRS to SSS							
EPRE ratio of PBCH to PBCH DMRS							
EPRE ratio of PDCCH DMRS to SSS							
EPRE ratio of PDCCH to			0		0		
PDCCH DMRS		Config 1,2					
EPRE ratio of PDSCH DMRS to SSS							
EPRE ratio of PDSCH to PDSCH							
EPRE ratio of OCNG DMRS to SSS(Note 1)							
EPRE ratio of OCNG to OCNG DMRS (Note 1)							
N_{oc} Note2	dBm/15 kHz		-104.7		-104.7		
$N_{oc}^{$	Note5 dBm/S	Config 1,2	-95.7		-95.7		
	CS Note4						
SS-RSRP Note 3	dBm/S	Config 1,2	-89.7	-89.7	-Infinity	-86.7	
JJ-KJKF	CS Note5	Coming 1,2	-03.1	-03.1	-inility	-00.1	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	Config 1,2	6	6	-Infinity	9	
\hat{E}_s/N_{oc}	dB	Config 1,2	6	6	-Infinity	9	

Io ^{Note3}		dBm/95	Config 1,2	-59.7	-59.7	-66.7	-57.2
		.04					
		MHz					
		Note5					
Propagat	ion Condition		Config 1,2		Α'	WGN	
Note 1:	OCNG shall be used	such that b	ooth cells are ful	y allocated a	ınd a consta	nt total trans	mitted power
	spectral density is ac	hieved for	all OFDM symbo	ols.			
Note 2:	Interference from oth	er cells and	d noise sources	not specified	in the test is	s assumed to	be constant
	over subcarriers and	time and s	hall be modelled	as AWGN o	f appropriate	e power for	N_{oc} to be
	fulfilled.						
Note 3:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They						
	are not settable parameters themselves.						
Note 4:	SS-RSRP minimum requirements are specified assuming independent interference and noise at						
	each receiver antenna port.						
Note 5:							
Note 6:	As observed with 0dBi gain antenna at the centre of the quiet zone						

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

7680 for UE supporting power class 1, or

4800 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

81920 for UE supporting power class 1, or

51200 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%. In test 1, 2, 3 and 4 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.2.3 EN-DC FR2-FR2 event-triggered reporting in non-DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD
- Minimum conformance requirements contain [] and TBDs (RAN4 Pending)
- Initial conditions contain square brackets (RAN4 Pending)

5.6.2.3.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

5.6.2.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.3.

5.6.2.3.4 Test description

5.6.2.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.3.4.1-1.

Table 5.6.2.3.4.1-1: EN-DC FR2-FR2 event triggered reporting tests in non-DRX with SSB time index detection supported test configurations

Test Case ID	Description					
5.6.2.3-1	LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.2.3-2	LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
Note 1: The UE is only required to be tested in one of the supported test configurations						
Note 2: target NI	R cell has the same SCS, BW and duplex mode as NR serving cell					

Table 5.6.2.3.4.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
E-UTRA RF Channel		Config 1,2	1		One E-UTRAN TDD carrier
Number					frequencies is used.
NR RF Channel Number		Config 1,2	1, 2		Two FR1 NR carrier frequencies is used.
Active cell		Config 1,2	LTE Cell 1 (PCell) and NR cell 2 (PScell)		LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config 1,2	NR cell 3		NR cell 3 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2	0 13		As specified in TS 38.133 clause 9.1.2-1.
Measurement gap offset		Config 1,2	39 39		
SMTC-SSB parameters		Config 1,2	SSB.1 FR2		As specified in clause A.3
A3-Offset	dB	Config 1,2	[-30]		
Hysteresis	dB	Config 1,2	0		
CP length		Config 1,2	Normal		
TimeToTrigger	S	Config 1,2	0		
Filter coefficient		Config 1,2	0		L3 filtering is not used
DRX		Config 1,2	OFF		DRX is not used
AoA setup		Config 1,2	Setup 3		As specified in clause A.3.15
Time offset between PCell and PSCell		Config 1,2	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells Config 1,2 3μs		Synchronous cells.			
T1	S	Config 1,2	5		
T2	S	Config 1,2	7 for PC1; 7 for PC1; 4.5 for other PC PC		PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 5.6.2.3.4.1-3: Test Environment test parameters for EN-DC inter-frequency event triggered
reporting with SSB time index detection in non-DRX

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	508-1 [14] clause 4.3.1 and 4.4.2.				
Channel	As specified by the test configuration selected from Table 5.6.2.3.4.1-1.					
bandwidth						
Propagation	AWGN		As specified in Annex C.2.2.			
conditions						
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	TBD				
Exceptions to	TBD					
connection						
diagram						

- 1. Message contents are defined in clause 5.6.2.3.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and are set according to Annex C.1.2 and Annex C.1.3. Cell 3 is switched off during the initial connection setup.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

5.6.2.3.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR2 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 5.6.2.3.4.1-1 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 5.6.2.3.4.1-1 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.3.4.1-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.3.4.1-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 6720 ms for UE supporting power class 1, or 4160 ms for UE supporting other power class for Test 1 and Test 2, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:

- transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.2.3.4.1-2 as appropriate.

5.6.2.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 5.6.2.3.4.3-1: Common Exception messages for Additional EN-DC FR2-FR2 event triggered reporting tests without SSB time index detection in non-DRX test requirement

Default Message Contents							
Common contents of system information blocks exceptions							
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 with conditions GAP NEEDED and INTER-FREQ Table H.3.1-3 with conditions INTER-FREQ MO and SSB.1 FR2 and Synchronous cells Table H.3.1-4 with condition SSB Index and A3-offset = -6dB Table H.3.1-6 with conditions gapFR2 and Pattern #13 for Test 2 Table H.3.4-4 with condition gapUE for Test 1 Table H.3.4-5 with condition Pattern #0 for Test 1 Table H.3.1-7 with condition SSB Index and INTER-FREQ Table H.3.4-1 Table H.3.4-2 Table H.3.4-3						

5.6.2.3.5 Test requirement

Table 5.6.2.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.2.3.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test	Cell 2		Cell 3		
		configuratio n	T1	T2	T1	T2	
NR RF Channel Number		Config 1,2	1		2		
Duplex mode		Config 1,2	TDD		TDD		
BW _{channel}	MHz	Config 1,2	100: N _{RB,c} = 66		100: N _{RB,c} = 66		
BWP BW	MHz	Config 1,2	100: N _{RB,c} = 66		100: N _{RB,c} = 66		
TDD configuration		Config 1,2	TDDC	onf.3.1	TDD	Conf.3.1	
Initial DL BWP		Config 1,2	DLBW	VP.0.1		NA	
Dedicated DL BWP		Config 1,2	DLBW	/P.1.1		NA	
Initial UL BWP		Config 1,2	DLBW	VP.0.1		NA	
Dedicated UL BWP		Config 1,2	ULBW	VP.1.1		NA	
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2	OF	2.1		OP.1	
PDSCH Reference measurement channel		Config 1,2	SR.3.	1 TDD		-	
CORESET Reference Channel		Config 1,2	CR.3.	1 TDD		-	
TRS configuration		Config 1,2	TRS.2.	1 TDD		NA	
TCI configuration		Config 1,2	CSI-RS.	Config.0		NA	
SMTC configuration defined in A.3.11.1		Config 1,2	SMTC.1		SMTC.1		
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2	120		120		
EPRE ratio of PSS to SSS							
EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS							
to SSS EPRE ratio of PDCCH to PDCCH DMRS		Config 1,2	()	0		
EPRE ratio of PDSCH DMRS to SSS			·				
EPRE ratio of PDSCH to PDSCH							
EPRE ratio of OCNG DMRS to SSS(Note 1)							
EPRE ratio of OCNG to OCNG DMRS (Note 1)							
$oldsymbol{N}_{oc}$ Note2	dBm/15 kHz Note5		NA		NA		
N_{oc} Note2	dBm/S CS Note4	Config 1,2	NA		NA		
SS-RSRP Note 3	dBm/S CS Note5	Config 1,2	-87	-87	-87	-87	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	Config 1,2	NA	NA	NA	NA	
\hat{E}_s/N_{oc}	dB	Config 1,2	NA	NA	NA	NA	
Io ^{Note3}	dBm/95 .04 MHz Note5	Config 1,2	-87	-87	-87	-87	

Propagat	Propagation Condition		Config 1,2	AWGN					
Note 1:		OCNG shall be used such that both cells are fully allocated and a constant total transmitted power							
	spectral density is ac								
Note 2:	Interference from oth	er cells and	noise sources	not specified in the test is assumed to be constant					
	over subcarriers and	time and sh	all be modelled	as AWGN of appropriate power for N_{oc} to be					
	fulfilled.								
Note 3:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.								
Note 4:	SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.								
Note 5:	Equivalent power rec	Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone							
Note 6:	As observed with 0dE	Bi gain anter	nna at the centr	e of the quiet zone					

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

6720 for UE supporting power class 1, or

4160 for UE supporting other power class.

In test 1 and 2 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%. In test 1 and 2 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.2.4 EN-DC FR2-FR2 event-triggered reporting in DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD

5.6.2.4.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

5.6.2.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.4.

5.6.2.4.4 Test description

5.6.2.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.4.4.1-1.

Table 5.6.2.4.4.1-1: EN-DC FR2-FR2 event triggered reporting tests in DRX with SSB time index detection supported test configurations

Test Case ID	Description					
5.6.2.4-1	LTE FDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
5.6.2.4-2	LTE TDD, 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode					
Note 1: The UE is only required to be tested in one of the supported test configurations						
Note 2: target N	R cell has the same SCS, BW and duplex mode as NR serving cell					

Table 5.6.2.4.4.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test		Value			Comment
		configurati	Test	Test	Test	Test	
		on	1	2	3	4	
E-UTRA RF Channel Number		Config 1,2			1		One E-UTRAN TDD carrier frequencies is used.
NR RF Channel Number		Config 1,2		1	2		Two FR1 NR carrier frequencies is used.
Active cell		Config 1,2		ell 1 (P0 (PScell)	Cell) and	INR	LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config 1,2	NR ce	II 3			NR cell 3 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2	0		13		As specified in TS 38.133 clause 9.1.2-1.
Measurement gap offset		Config 1,2	39		39		
SMTC-SSB parameters		Config 1,2	SSB.1 FR2				As specified in clause A.3
A3-Offset	dB	Config 1,2	-6				
Hysteresis	dB	Config 1,2	0				
CP length		Config 1,2	Normal				
TimeToTrigger	S	Config 1,2	0				
Filter coefficient		Config 1,2	0				L3 filtering is not used
DRX		Config 1,2	DRX .1	DRX .2	DRX .1	DRX .2	As specified in caluse A.5
AoA setup		Config 1,2	Setu p 1	Setu p 1	Setu p 1	Setu p 1	As specified in clause A.3.15
Time offset between PCell and PSCell		Config 1,2	3 μs			Synchronous EN-DC	
Time offset between serving and neighbour cells		Config 1,2	3μs			Synchronous cells.	
T1	S	Config 1,2	5				
T2	S	Config 1,2	for PC1; 6.5 for othe r PC	for PC1; 67 for othe r PC	for PC1; 6.5 for othe r PC	for PC1; 67 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 5.6.2.4.4.1-3: Test Environment test parameters for EN-DC inter-frequency event triggered
reporting with SSB time index detection in DRX

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.					
Channel	As specified by the test configuration selected from Table 5.6.2.4.4.1-1.					
bandwidth						
Propagation	AWGN		As specified in Annex C.2.2.			
conditions						
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	TBD				
Exceptions to	TBD					
connection						
diagram						

- 1. Message contents are defined in clause 5.6.2.4.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR1 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and are set according to Annex C.1.2 and Annex C.1.3. Cell 3 is switched off during the initial connection setup.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

5.6.2.4.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR2 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 5.6.2.4.4.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 5.6.2.4.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.4.4.1-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.4.4.1-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 10080 ms for UE supporting power class 1, or 6240 ms for UE supporting other power class for Test 1 and Test 3 and 107520 ms for UE supporting power class 1, or 66560 ms for UE supporting other power class for Test 2 and Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.2.4.4.1-2 as appropriate.

5.6.2.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 5.6.2.4.4.3-1: Common Exception messages for Additional EN-DC FR2-FR2 event triggered reporting tests with SSB time index detection in DRX test requirement

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 with conditions GAP NEEDED and INTER-FREQ Table H.3.1-3 with conditions INTER-FREQ MO and SSB.1 FR2 and Synchronous cells Table H.3.1-4 with condition SSB Index and A3-offset = -6dB Table H.3.1-6 with conditions gapFR2 and Pattern #13 for Test 3 and Test 4 Table H.3.4-4 with condition gapUE for Test 1 and Test 2 Table H.3.4-5 with condition Pattern #0 for Test 1 and Test 2 Table H.3.1-7 with condition SSB Index and INTER-FREQ Table H.3.7-1 with condition DRX.1 for Test 1 and Test 3 Table H.3.7-1 with condition DRX.2 for Test 2 and Test 4 Table H.3.4-1 Table H.3.4-2 Table H.3.4-3

5.6.2.4.5 Test requirement

Table 5.6.2.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.2.4.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test	Ce	II 2	Cell 3			
		configuratio n	T1	T2	T1	T2		
NR RF Channel Number		Config 1,2	1		2			
Duplex mode		Config 1,2	TDD		TDD TDD			
BW _{channel}	MHz	Config 1,2	100: N _F	100: N _{RB,c} = 66		N _{RB,c} = 66		
BWP BW	MHz	Config 1,2	100: N _F	_{RB,c} = 66	100: 1	N _{RB,c} = 66		
TDD configuration		Config 1,2	TDDC	onf.3.1	TDD	Conf.3.1		
Initial DL BWP		Config 1,2	DLBW	VP.0.1		NA		
Dedicated DL BWP		Config 1,2	DLBW	VP.1.1		NA		
Initial UL BWP		Config 1,2	ULBW	VP.0.1		NA		
Dedicated UL BWP		Config 1,2	ULBW	VP.1.1		NA		
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2	OF	2.1	(OP.1		
PDSCH Reference measurement channel		Config 1,2	SR.3.2	1 TDD		-		
CORESET Reference Channel		Config 1,2	CR.3.2	1 TDD		-		
TRS configuration		Config 1,2	TRS.2.	.1 TDD		NA		
TCI configuration		Config 1,2		Config.0		NA		
SMTC configuration defined in A.3.11.1		Config 1,2		SMTC.1		MTC.1		
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2	12	20	120			
EPRE ratio of PSS to SSS								
EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS								
to SSS EPRE ratio of PDCCH to								
PDCCH DMRS EPRE ratio of PDSCH DMRS		Config 1,2	()	0			
to SSS EPRE ratio of PDSCH to								
PDSCH								
EPRE ratio of OCNG DMRS to SSS(Note 1)								
EPRE ratio of OCNG to OCNG DMRS (Note 1)								
$oldsymbol{N}_{oc}$ Note2	dBm/15 kHz Note5		-10	4.7	-104.7			
N_{oc} Note2	dBm/S CS Note4	Config 1,2	-95	5.7	-	95.7		
SS-RSRP Note 3	dBm/S CS Note5	Config 1,2	-89.7	-89.7	-89.7	-89.7		
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	Config 1,2	6	6	6	6		
\hat{E}_s/N_{oc}	dB	Config 1,2	6	6	6	6		
IO ^{Note3}	dBm/95 .04 MHz Note5	Config 1,2	-59.7	-59.7	-59.7	-59.7		

Propagat	ion Condition		Config 1,2	AWGN		
Note 1:	OCNG shall be used	such that b	ooth cells are full	y allocated and a constant total transmitted power		
	spectral density is ac	hieved for	all OFDM symbo	ols.		
Note 2:	Interference from oth	er cells and	d noise sources	not specified in the test is assumed to be constant		
	over subcarriers and	time and s	hall be modelled	as AWGN of appropriate power for N_{oc} to be		
	fulfilled.					
Note 3:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They					
Note 4:	are not settable parameters themselves.					
Note 4.	SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.					
Note 5:	Equivalent power rec	eived by a	n antenna with 0	dBi gain at the centre of the quiet zone		
Note 6:	As observed with 0dE	Bi gain ante	enna at the centr	e of the quiet zone		

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

10080 for UE supporting power class 1, or

6240 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

107520 for UE supporting power class 1, or

66560 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%. In test 1, 2, 3 and 4 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.2.5 EN-DC FR1-FR2 event-triggered reporting in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD
- Initial conditions contain square brackets (RAN4 Pending)

5.6.2.5.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

5.6.2.5.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.5.

5.6.2.5.4 Test description

5.6.2.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.5.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 5.6.2.5.4.1-2. Test environment parameters are given in Table 5.6.2.5.4.1-3.

Table 5.6.2.5.4.1-1 EN-DC FR1-FR2 event triggered reporting tests in non-DRX supported test configurations

Test Case ID	Description of serving cell	Description of target cell				
5.6.2.5-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS,				
5.6.2.5-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	100MHz bandwidth, TDD				
5.6.2.5-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	duplex mode				
5.6.2.5-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode					
5.6.2.5-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode					
5.6.2.5-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode					
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations					
Note 2: The targ	et NR cell3 has the same SCS, BW and duplex mode as NR serving cell2					

Table 5.6.2.5.4-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
E-UTRA RF Channel Number		Config 1,2,3,4,5,6	1		One E-UTRAN TDD carrier frequencies is used.
NR RF Channel Number		Config 1,2,3,4,5,6	1	, 2	Two FR1 NR carrier frequencies is used.
Active cell		Config 1,2,3,4,5,6	LTE Cell 1 (PC cell 2 (PScell)		LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config 1,2,3,4,5,6	NR cell 3		NR cell 3 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3,4,5,6	0	13	As specified in TS 38.133 clause 9.1.2-1.
Measurement gap offset		Config 1,2,3,4,5,6	39	39	
SMTC-SSB parameters on NR RF Channel 1		Config 1,4	SSB.1 FR1		As specified in clause A.3
		Config 2,5	SSB.1 FR1		As specified in clause A.3
		Config 3,6	SSB.2 FR1		As specified in clause A.3
SMTC-SSB parameters on NR RF Channel 2		Config 1,2,3,4,5,6	SSB.1 FR2		As specified in clause A.3
offsetMO	dB	Config 1,2,3,4,5,6	6		
Hysteresis	dB	Config 1,2,3,4,5,6	0		
a4-Threshold	dBm	Config 1,2,3,4,5,6	[-120]		
CP length		Config 1,2,3,4,5,6	Normal		
TimeToTrigger	S	Config 1,2,3,4,5,6	0		
Filter coefficient		Config 1,2,3,4,5,6	0		L3 filtering is not used
DRX		Config 1,2,3,4,5,6	OFF		DRX is not used
AoA setup		Config 1,2	Setup 3		As specified in clause A.3.15
Time offset between PCell and PSCell		Config 1,2,3,4,5,6	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells		Config 1,4	3ms		Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		Config 2,3,5,6	3μs		Synchronous cells.
T1	S	Config 1,2,3,4,5,6	5		
T2	S	Config 1,2,3,4,5,6	5.2 for PC1; 3.5 for other PC	5.2 for PC1; 3.5 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 4.6.2.4.4-3: Test Environment test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies		in Annex E, Table TBD and TS 38.5			
Channel	As specified	by the test configuration selected fr	om Table 5.6.2.5.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to	TBD				
connection					
diagram					

- 1. Message contents are defined in clause 5.6.2.5.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR2 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex TBD
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

5.6.2.5.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 5.6.2.5.4.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 5.6.2.5.4.1-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.5.4.1-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.5.4.1-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 5120 ms for UE supporting power class 1, or 3200 ms for UE supporting other power class for Test 1 and Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:

- transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 4.6.2.1.4.1-2 as appropriate.

5.6.2.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 5.6.2.5.4.3-1: Common Exception messages for Additional EN-DC FR1-FR2 event triggered reporting tests without SSB time index detection in non-DRX test requirement

Default Message Contents						
Common contents of system information						
blocks exceptions						
Default RRC messages and information	Table H.3.1-1					
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ					
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR2 and					
	Synchronous cells					
	Table H.3.1-4 with A4-threshold = TBD					
	Table H.3.1-6 with Conditions gapFR2 and Pattern #13 for Test 2					
	Table H.3.4-4 with Condition gapUE Test 1					
	Table H.3.4-5 with Condition Pattern #0 for Test 1					
	Table H.3.1-7 with Condition INTER-FREQ					
	Table H.3.4-1					
	Table H.3.4-2					
	Table H.3.4-3					

Table 5.6.2.5.4.3-2: MeasObjectNR-DEFAULT: EN-DC FR1-FR2 measurement object configuration

Derivation Path: Table H.3.1-3			
Information Element	Value/remark	Comment	Condition
MeasObjectNR::= SEQUENCE {			
offsetMO SEQUENCE {			
rsrpOffsetSSB	6 dB		
}			

5.6.2.5.5 Test requirement

Table 5.6.2.5.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.2.5.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Unit	Test	Cell 2	Cell 3
		configuratio n	T1 T	2 T1 T2
NR RF Channel Number		Config 1,2,3,4,5,6	1	2
Duplex mode		Config 1,4	FDD	TDD
		Config 2,3,5,6	TDD	TDD
BW _{channel}	MHz	Config 1,4	10: N _{RB,c} = 52	100: N _{RB,c} = 66
		Config 2,5	10: N _{RB,c} = 52	
2000		Config 3,6	40: N _{RB,c} = 106	100: N _{RB,c} = 66
BWP BW	MHz	Config 1,4	10: N _{RB,c} = 52	
		Config 2,5 Config 3,6	10: N _{RB,c} = 52 40: N _{RB,c} = 106	
TDD configuration		Config 2,5	TDDConf.1.1	
		Config 3,6	TDDConf.2.1	TDDConf.3.1
Initial DL BWP		Config 1,2,3,4,5,6	DLBWP.0.1	NA
Initial UL BWP		Config 1,2,3,4,5,6	ULBWP.0.1	NA
Dedicated DL BWP		Config 1,2,3,4,5,6	DLBWP.1.1	NA
Dedicated UL BWP		Config 1,2,3,4,5,6	ULBWP.1.1	NA
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2,3,4,5,6	OP.1	OP.1
PDSCH Reference		Config 1,4	SR.1.1 FDD	-
measurement channel		Config 2,5	SR.1.1 TDD	
		Config 3,6	SR2.1 TDD	
CORESET Reference Channel		Config 1,4 Config 2,5	CR.1.1 FDD CR.1.1 TDD	-
Chamer		Config 3,6	CR2.1 TDD	
SMTC configuration defined in A.3.11.1		Config 1,4	SMTC.2	SMTC.2
		Config 2,3,5,6	SMTC.1	SMTC.1
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2,4,5	15	120
		Config 3,6	30	120
EPRE ratio of PSS to SSS				
EPRE ratio of PBCH DMRS to SSS				
EPRE ratio of PBCH to PBCH DMRS				
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS		Config 1,2,3,4,5,6	0	0
EPRE ratio of PDSCH DMRS to SSS		1,2,0,7,0,0		
EPRE ratio of PDSCH to PDSCH				
EPRE ratio of OCNG DMRS to SSS(Note 1)				
EPRE ratio of OCNG to OCNG DMRS (Note 1)				
$oldsymbol{N}_{oc}$ Note2	dBm/15 kHz Note5		NA	NA

N_{oc} Note2	dBm/S	Config	NA		N	IA
oc .	CS	1,2,4,5				
	Note4 Config 3,6		N	IA	l N	IA.
SS-RSRP Note 3	dBm/S	Config	NA	NA	-Infinity	-87
	CS	1,2,4,5				
	Note5	Config 3,6	NA	NA	-Infinity	-87
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	Config	NA	NA	-Infinity	NA
s / Tot		1,2,3,4,5,6				
$\hat{E}_{\rm s}/N_{oc}$	dB	Config	NA	NA	-Infinity	NA
Σ_s / 1 · oc		1,2,3,4,5,6				
Io ^{Note3}	dBm/9.	Config	NA	NA	-	-
	36MHz	1,2,4,5				
	dBm/38	Config 3,6	NA	NA	-	-
	.16MHz	_				
	dBm/95	Config	-	-	-Infinity	-87
	.04	1,2,3,4,5,6				
	MHz					
	Note5					
Propagation Condition		Config	AWGN			
		1,2,3,4,5,6				

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with 0dBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

5120 for UE supporting power class 1, or

3200 for UE supporting other power class.

In test 1 and 2 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%. In test 1 and 2 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.2.6 EN-DC FR1-FR2 event-triggered reporting in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD
- Initial conditions contain square brackets (RAN4 Pending)

5.6.2.6.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX within inter-frequency cell search requirements.

5.6.2.6.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.6.

5.6.2.6.4 Test description

5.6.2.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.6.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 5.6.2.6.4.1-2. Test environment parameters are given in Table 5.6.2.6.4.1-3.

Table 5.6.2.6.4.1-1: EN-DC FR1-FR2 event triggered reporting tests in DRX supported test configurations

Test Case ID	Description of serving cell	Description of target cell					
5.6.2.6-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS,					
5.6.2.6-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	100MHz bandwidth, TDD					
5.6.2.6-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	duplex mode					
5.6.2.6-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode						
5.6.2.6-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode						
5.6.2.6-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode						
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations						
Note 2: The targ	et NR cell3 has the same SCS, BW and duplex mode as NR serving cell2						

Table 5.6.2.6.4-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

Parameter	Unit	Test		Va	lue		Comment
		configurati on	Test	Test	Test	Test	
E-UTRA RF Channel		Config	1	2	3 1	4	One E-UTRAN TDD carrier
Number		1,2,3,4,5,6				frequencies is used.	
NR RF Channel		Config		1,	, 2		Two FR1 NR carrier frequencies is
Number		1,2,3,4,5,6					used.
Active cell		Config			Cell) and	l NR	LTE Cell 1 is on E-UTRA RF
		1,2,3,4,5,6	cell 2 ((PScell)			channel number 1. NR Cell 2 is on NR RF channel
							number 1.
Neighbour cell		Config	NR ce	II 3			NR cell 3 is on NR RF channel
0 5		1,2,3,4,5,6			1.0		number 2.
Gap Pattern Id		Config 1,2,3,4,5,6	0		13		As specified in TS 38.133 clause 9.1.2-1.
Measurement gap		Config	39		39		clause 5.1.2-1.
offset		1,2,3,4,5,6					
SMTC-SSB parameters		Config 1,4	SSB.1	FR1	-		As specified in clause A.3
on NR RF Channel 1		Config 2 F	SSB.1	ED1			As specified in clause A.3
		Config 2,5	33B.1	LKI			As specified in clause A.3
		Config 3,6	SSB.2	FR1			As specified in clause A.3
SMTC-SSB parameters		Config	SSB.1	FR2			As specified in clause A.3
on NR RF Channel 2		1,2,3,4,5,6	005.1	1112			7 to specified in diadee 7 to
offsetMO	dB	Config	6				
I bustons sis	-ID	1,2,3,4,5,6					
Hysteresis	dB	Config 1,2,3,4,5,6	0				
a4-Threshold	dBm	Config	[-120]				
051 11		1,2,3,4,5,6					
CP length		Config 1,2,3,4,5,6	Norma	l l			
TimeToTrigger	S	Config	0				
		1,2,3,4,5,6					
Filter coefficient		Config 1,2,3,4,5,6	0				L3 filtering is not used
DRX		Config	DRX	DRX	DRX	DRX	As specified in clause A.5
		1,2,3,4,5,6	.1	.2	.1	.2	
AoA setup		Config 1,2	Setu p 1	Setu p 1	Setu p 1	Setu p 1	As specified in clause A.3.15
Time offset between		Config	3 μs	рт	рт	Ιрт	Synchronous EN-DC
PCell and PSCell		1,2,3,4,5,6					
Time offset between		Config 1,4	3ms				Asynchronous cells.
serving and neighbour cells							The timing of Cell 3 is 3ms later than the timing of Cell 2.
Celis		Config	3µs				Synchronous cells.
		2,3,5,6	σμο				
T1	S	Config	5				
		1,2,3,4,5,6					
T2	S	Config 1,2,3,4,5,6	8 for PC1;	82 for	8 for PC1;	82 for	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0
		1,2,3,4,3,0	5 for	PC1;	5 for	PC1;	10 30.101-2 [3] Table 0.2.1.0
			othe	52	othe	52	
			r PC	for	r PC	for	
				othe r PC		other PC	
				110			

Table 5.6.2.6.4-3: Test Environment test parameters for EN-DC inter-frequency event triggered
reporting without SSB time index detection in non-DRX

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table TBD and TS 38.5	508-1 [14] clause TBD
Channel bandwidth	As specified	by the test configuration selected fr	om Table 4.6.2.3.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to connection diagram	TBD		

- 1. Message contents are defined in clause 4.6.2.3.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR2 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex TBD
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

5.6.2.6.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 5.6.2.6.4-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 5.6.2.6.4-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.6.4-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.6.4-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 7680 ms for UE supporting power class 1, or 4800 ms for UE supporting other power class for Test 1 and Test 3 and 81920 ms for UE supporting power class 1, or 51200 ms for UE supporting other power class for Test 2 and Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.2.6.4-2 as appropriate.

5.6.2.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 5.6.2.6.4.3-1: Common Exception messages for Additional EN-DC FR1-FR2 event triggered reporting tests without SSB time index detection in DRX test requirement

	Default Message Contents
Common contents of system information	
blocks exceptions	
Default RRC messages and information	Table H.3.1-1
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR2 and
	Synchronous cells
	Table H.3.1-4 with A4-threshold = TBD
	Table H.3.1-6 with Conditions gapFR2 and Pattern #13 for Test 3 and Test 4
	Table H.3.4-4 with Condition gapUE Test 1 and Test 2
	Table H.3.4-5 with Condition Pattern #0 for Test 1 and Test 2
	Table H.3.1-7 with Condition INTER-FREQ
	Table H.3.7-1 with Condition DRX.1 for Test 1 and Test 3
	Table H.3.7-1 with Condition DRX.2 for Test 2 and Test 4
	Table H.3.4-1
	Table H.3.4-2
	Table H.3.4-3

Table 5.6.2.6.4.3-2: MeasObjectNR-DEFAULT: EN-DC FR1-FR2 measurement object configuration

Derivation Path: Table H.3.1-3			
Information Element	Value/remark	Comment	Condition
MeasObjectNR::= SEQUENCE {			
offsetMO SEQUENCE {			
rsrpOffsetSSB	6 dB		
}			

5.6.2.6.5 Test requirement

Table 5.6.2.6.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.2.6.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

Parameter	Parameter Unit Test Cell 2		Cell 3	
		configuratio n	T1 T2	T1 T2
NR RF Channel Number		Config 1,2,3,4,5,6	1	2
Duplex mode		Config 1,4	FDD	TDD
		Config 2,3,5,6	TDD	TDD
BW _{channel}	MHz	Config 1,4	10: N _{RB,c} = 52	100: N _{RB,c} = 66
		Config 2,5	10: $N_{RB,c} = 52$	100: N _{RB,c} = 66
DIAID DIAI		Config 3,6	40: N _{RB,c} = 106	100: N _{RB,c} = 66
BWP BW	MHz	Config 1,4	10: N _{RB,c} = 52 10: N _{RB,c} = 52	100: N _{RB,c} = 66
		Config 2,5 Config 3,6	40: N _{RB,c} = 106	100: N _{RB,c} = 66 100: N _{RB,c} = 66
TDD configuration		Config 2,5	TDDConf.1.1	TDDConf.3.1
		Config 3,6	TDDConf.2.1	TDDConf.3.1
Initial DL BWP		Config 1,2,3,4,5,6	DLBWP.0.1	NA
Initial UL BWP		Config 1,2,3,4,5,6	ULBWP.0.1	NA
Dedicated DL BWP		Config 1,2,3,4,5,6	DLBWP.1.1	NA
Dedicated UL BWP		Config 1,2,3,4,5,6	ULBWP.1.1	NA
OCNG Patterns defined in A.3.2.1.1 (OP.1)		Config 1,2,3,4,5,6	OP.1	OP.1
PDSCH Reference		Config 1,4	SR.1.1 FDD	-
measurement channel		Config 2,5	SR.1.1 TDD	
		Config 3,6	SR2.1 TDD	
CORESET Reference		Config 1,4	CR.1.1 FDD	-
Channel		Config 2,5	CR.1.1 TDD	
SMTC configuration defined in A.3.11.1 and A.3.11.2		Config 3,6 Config 1,4	CR2.1 TDD SMTC.2	SMTC.2
117 (O.11.1 dild / (O.11.2		Config 2,3,5,6	SMTC.1	SMTC.1
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2,4,5	15	120
Spaceg		Config 3,6	30	120
EPRE ratio of PSS to SSS				
EPRE ratio of PBCH DMRS to SSS				
EPRE ratio of PBCH to PBCH DMRS				
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS		Config 1,2,3,4,5,6	0	0
EPRE ratio of PDSCH DMRS to SSS				
EPRE ratio of PDSCH to PDSCH				
to SSS(Note 1)				
EPRE ratio of OCNG to OCNG DMRS (Note 1)				
N_{oc} Note2	dBm/15 kHz Note5		NA	-104.7

$N_{oc}^{ m Note2}$	dBm/S CS	Config 1,2,4,5	NA		-95.7	
	Note4	Config 3,6	NA		-95.7	
SS-RSRP Note 3	dBm/S CS	Config 1,2,4,5	NA	NA	-Infinity	-86.7
	Note5	Config 3,6	NA	NA	-Infinity	-86.7
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	Config 1,2,3,4,5,6	NA	NA	-Infinity	9
\hat{E}_s/N_{oc}	dB	Config 1,2,3,4,5,6	NA	NA	-Infinity	9
IO ^{Note3}	dBm/9. 36MHz	Config 1,2,4,5	NA	NA	-	-
	dBm/38 .16MHz	Config 3,6	NA	NA	-	-
	dBm/95 .04 MHz Note5	Config 1,2,3,4,5,6	-	-	-66.7	-57.2
Propagation Condition		Config 1,2,3,4,5,6	AWGN			

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with 0dBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

7680 for UE supporting power class 1, or

4800 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

81920 for UE supporting power class 1, or

51200 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with the confidence level of 95%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.2.7 EN-DC FR1-FR2 event-triggered reporting in non-DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD

Initial conditions contain square brackets (RAN4 Pending)

5.6.2.7.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements with SSB time index detection.

5.6.2.7.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.7.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.7.

5.6.2.7.4 Test description

5.6.2.7.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.7.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 5.6.2.7.4.1-2. Test environment parameters are given in Table 5.6.2.7.4.1-3.

Table 5.6.2.7.4.1-1: EN-DC FR1-FR2 event triggered reporting tests in non-DRX with SSB time index detection supported test configurations

Test Case ID	Description of serving cell	Description of target cell
5.6.2.7-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS,
5.6.2.7-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	100MHz bandwidth, TDD
5.6.2.7-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	duplex mode
5.6.2.7-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
5.6.2.7-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
5.6.2.7-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note 1: The UE	is only required to be tested in one of the supported test configurations	
Note 2: The tard	et NR cell3 has the same SCS. BW and duplex mode as NR serving cell2	

Table 5.6.2.7.4-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
E-UTRA RF Channel Number		Config 1,2,3,4,5,6		1	One E-UTRAN TDD carrier frequencies is used.
NR RF Channel Number		Config 1,2,3,4,5,6	1.	, 2	Two FR1 NR carrier frequencies is used.
Active cell		Config 1,2,3,4,5,6	LTE Cell 1 (PC cell 2 (PScell)		LTE Cell 1 is on E-UTRA RF channel number 1. NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config 1,2,3,4,5,6	NR cell 3		NR cell 3 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3,4,5,6	0	13	As specified in TS 38.133 clause 9.1.2-1.
Measurement gap offset		Config 1,2,3,4,5,6	39	39	
SMTC-SSB parameters on NR RF Channel 1		Config 1,4	SSB.1 FR1		As specified in clause A.3
		Config 2,5	SSB.1 FR1		As specified in clause A.3
		Config 3,6	SSB.2 FR1		As specified in clause A.3
SMTC-SSB parameters on NR RF Channel 2		Config 1,2,3,4,5,6	SSB.1 FR2		As specified in clause A.3
offsetMO	dB	Config 1,2,3,4,5,6	6		
Hysteresis	dB	Config 1,2,3,4,5,6	0		
a4-Threshold	dBm	Config 1,2,3,4,5,6	[-120]		
CP length		Config 1,2,3,4,5,6	Normal		
TimeToTrigger	S	Config 1,2,3,4,5,6	0		
Filter coefficient		Config 1,2,3,4,5,6	0		L3 filtering is not used
DRX		Config 1,2,3,4,5,6	OFF		DRX is not used
AoA setup		Config 1,2	Setup 3		As specified in clause A.3.15
Time offset between PCell and PSCell		Config 1,2,3,4,5,6	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells		Config 1,4	3ms		Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		Config 2,3,5,6	Зµѕ		Synchronous cells.
T1	S	Config 1,2,3,4,5,6	5		
T2	S	Config 1,2,3,4,5,6	7 for PC1; 4.5 for other PC	7 for PC1; 4.5 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 5.6.2.7.4-3: Test Environment test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Value	Comment

Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	As specified in Annex E, Table TBD and TS 38.508-1 [14] clause TBD				
Channel bandwidth	As specified	As specified by the test configuration selected from Table 4.6.2.3.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	TBD				
Exceptions to connection diagram	TBD					

- 1. Message contents are defined in clause 5.6.2.7.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR2 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex TBD
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

5.6.2.7.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 5.6.2.7.4.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 5.6.2.7.4.1-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.7.4-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.7.4.1-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 6720 ms for UE supporting power class 1, or 4160 ms for UE supporting other power class for Test 1 and Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters

Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.2.7.41.-2 as appropriate.

5.6.2.7.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 5.6.2.7.4.3-1: Common Exception messages for Additional EN-DC FR1-FR2 event triggered reporting tests with SSB time index detection in non-DRX test requirement

	Default Message Contents					
Common contents of system information						
blocks exceptions						
Default RRC messages and information	Table H.3.1-1					
elements contents exceptions	Table H.3.1-2 with conditions GAP NEEDED and INTER-FREQ					
	Table H.3.1-3 with conditions INTER-FREQ MO and SSB.1 FR2 and					
	Synchronous cells					
	Table H.3.1-4 with condition SSB Index and A4-threshold = TBD					
	Table H.3.1-6 with conditions gapFR2 and Pattern #13 for Test 2					
	Table H.3.4-4 with condition gapUE for Test 1					
	Table H.3.4-5 with condition Pattern #0 for Test 1					
	Table H.3.1-7 with condition SSB Index and INTER-FREQ					
	Table H.3.4-1					
	Table H.3.4-2					
	Table H.3.4-3					
	Table H.3.1-4 a4 threshold = TBD					

Table 5.6.2.7.4.3-2: MeasObjectNR-DEFAULT: EN-DC FR1-FR2 measurement object configuration

Derivation Path: Table H.3.1-3			
Information Element	Value/remark	Comment	Condition
MeasObjectNR::= SEQUENCE {			
offsetMO SEQUENCE {			
rsrpOffsetSSB	6 dB		
}			

5.6.2.7.5 Test requirement

Table 5.6.2.7.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.2.7.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

Parameter	Unit	Test	Cell 2	Cell 3
	configuratio n		T1 T2	T1 T2
NR RF Channel Number		Config 1,2,3,4,5,6	1	2
Duplex mode		Config 1,4	FDD	TDD
		Config 2,3,5,6	TDD	TDD
BW _{channel}	MHz	Config 1,4	10: $N_{RB,c} = 52$	100: N _{RB,c} = 66
		Config 2,5	10: N _{RB,c} = 52	100: N _{RB,c} = 66
BWP BW	MHz	Config 3,6	40: N _{RB,c} = 106 10: N _{RB,c} = 52	100: N _{RB,c} = 66 100: N _{RB,c} = 66
DVVP DVV	IVITZ	Config 1,4 Config 2,5	10: N _{RB,c} = 52	100: N _{RB,c} = 66
		Config 3,6	40: N _{RB,c} = 106	100: N _{RB,c} = 66
OCNG Patterns defined in		Config	TOTAL TRUJE	
A.3.2.1.1 (OP.1)		1,2,3,4,5,6	OP.1	OP.1
PDSCH Reference		Config 1,4	SR.1.1 FDD	-
measurement channel		Config 2,5	SR.1.1 TDD	
		Config 3,6	SR2.1 TDD	
CORESET Reference		Config 1,4	CR.1.1 FDD	-
Channel		Config 2,5	CR.1.1 TDD	
TDD configuration		Config 3,6	CR2.1 TDD	TDDConf.3.1
TDD conliguration		Config 2,5	TDDConf.1.1	
		Config 3,6	TDDConf.2.1	TDDConf.3.1
Initial DL BWP		Config 1,2,3,4,5,6	DLBWP.0.1	NA
Initial UL BWP		Config 1,2,3,4,5,6	ULBWP.0.1	NA
Dedicated DL BWP		Config 1,2,3,4,5,6	DLBWP.1.1	NA
Dedicated UL BWP		Config 1,2,3,4,5,6	ULBWP.1.1	NA
SMTC configuration defined in A.3.11.1 and A.3.11.2		Config 1,4	SMTC.2	SMTC.2
		Config 2,3,5,6	SMTC.1	SMTC.1
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2,4,5	15	120
		Config 3,6	30	120
EPRE ratio of PSS to SSS				
EPRE ratio of PBCH DMRS to SSS				
EPRE ratio of PBCH to PBCH DMRS				
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS		Config 1,2,3,4,5,6	0	0
EPRE ratio of PDSCH DMRS to SSS				
EPRE ratio of PDSCH to PDSCH				
EPRE ratio of OCNG DMRS to SSS(Note 1)				
EPRE ratio of OCNG to OCNG DMRS (Note 1)				
$N_{oc}^{$	dBm/15 kHz Note5		NA	NA

N_{oc} Note2	dBm/S CS	Config 1,2,4,5	NA NA		NA	
	Note4	Config 3,6			1	NA
SS-RSRP Note 3	dBm/S CS	Config 1,2,4,5	NA NA		-Infinity	NA
	Note5	Config 3,6	NA	NA	-Infinity	NA
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	Config 1,2,3,4,5,6	NA	NA	-Infinity	-87
\hat{E}_s/N_{oc}	dB	Config 1,2,3,4,5,6	NA	NA	-Infinity	TBD
IO ^{Note3}	dBm/9. 36MHz	Config 1,2,4,5	NA	NA	-	-
	dBm/38 .16MHz	Config 3,6	NA	NA	-	-
	dBm/95 .04 MHz Note5	Config 1,2,3,4,5,6	-	-	-Infinity	-87
Propagation Condition		Config 1,2,3,4,5,6	AWGN			

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

6720 for UE supporting power class 1, or

4160 for UE supporting other power class.

In test 1 and 2 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1 and 2 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.2.8 EN-DC FR1-FR2 event-triggered reporting in DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- AoA setup is missing in the test procedure
- Antenna diagram is TBD
- Initial conditions contain square brackets (RAN4 Pending)

5.6.2.8.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event in DRX within inter-frequency cell search requirements with SSB time index detection.

5.6.2.8.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.2.8.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.2.8.5.6.2.8.4 Test description

5.6.2.8.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.2.8.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 5.6.2.8.4.1-2. Test environment parameters are given in Table 5.6.2.8.4.1-3.

Table 5.6.2.8.4.1-1: EN-DC FR1-FR2 event triggered reporting tests in DRX with SSB time index detection supported test configurations

Test Case ID	Description of serving cell	Description of target cell				
5.6.2.8-1	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS,				
5.6.2.8-2	LTE FDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	100MHz bandwidth, TDD				
5.6.2.8-3	LTE FDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	duplex mode				
5.6.2.8-4	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode					
5.6.2.8-5	LTE TDD, NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode					
5.6.2.8-6	LTE TDD, NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode					
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations					
Note 2: The targ	et NR cell3 has the same SCS, BW and duplex mode as NR serving cell2					

Table A.5.6.2.8.4.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test	Value			Comment	
		configurati	Test	Test	Test	Test	
E-UTRA RF Channel		on Config	1	2	3	4	One E-UTRAN TDD carrier
Number		1,2,3,4,5,6			_		frequencies is used.
NR RF Channel		Config		1	, 2		Two FR1 NR carrier frequencies is
Number		1,2,3,4,5,6					used.
Active cell		Config			Cell) and	l NR	LTE Cell 1 is on E-UTRA RF
		1,2,3,4,5,6	cell 2 ((PScell)			channel number 1.
							NR Cell 2 is on NR RF channel number 1.
Neighbour cell		Config	NR ce	II 3			NR cell 3 is on NR RF channel
0 0		1,2,3,4,5,6			10		number 2.
Gap Pattern Id		Config 1,2,3,4,5,6	0		13		As specified in TS 38.133 clause 9.1.2-1.
Measurement gap		Config	39		39		cidase s.i.z i.
offset		1,2,3,4,5,6					
SMTC-SSB parameters on NR RF Channel 1		Config 1,4	SSB.1	FR1			As specified in clause A.3
OII NK KF Channel 1		Config 2,5	SSB.1	FR1			As specified in clause A.3
		Config 3,6	SSB.2	FR1			As specified in clause A.3
SMTC-SSB parameters		Config	SSB.1	FR2			As specified in clause A.3
on NR RF Channel 2		1,2,3,4,5,6					
offsetMO	dB	Config 1,2,3,4,5,6	6				
Hysteresis	dB	Config	0				
		1,2,3,4,5,6					
a4-Threshold	dBm	Config 1,2,3,4,5,6	[-120]				
CP length		Config 1,2,3,4,5,6	Norma	al			
TimeToTrigger	S	Config	0				
Filter coefficient		1,2,3,4,5,6 Config	0				L3 filtering is not used
Filler coefficient		1,2,3,4,5,6	0				L3 liltering is not used
DRX		Config	DRX	DRX	DRX	DRX	As specified in clause A.5
A o A gotup		1,2,3,4,5,6 Config 1,2	.1 Setu	.2 Setu	.1 Setu	.2 Setu	As specified in clause A.3.15
AoA setup			p 1	p 1	p 1	p 1	As specified in clause A.S.15
Time offset between		Config	3 μs		`		Synchronous EN-DC
PCell and PSCell Time offset between		1,2,3,4,5,6 Config 1,4	3ms				Asynchronous cells.
serving and neighbour		2011119 <u>1</u> , 1	Onio				The timing of Cell 3 is 3ms later
cells							than the timing of Cell 2.
		Config 2,3,5,6	3μs				Synchronous cells.
T1	S	Config 1,2,3,4,5,6	5				
T2	S	Config	11	108	11	108	PC1 - power class 1 as specified in
		1,2,3,4,5,6	for	for	for	for	TS 38.101-2 [3] Table 6.2.1.0
			PC1; 6.5	PC1; 67	PC1; 6.5	PC1; 67	
			for	for	for	for	
			othe	othe	othe	other	
			r PC	r PC	r PC	PC	

Table 5.6.2.8.4-3: Test Environment test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Value		Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	pecified in Annex E, Table TBD and TS 38.508-1 [14] clause TBD			
Channel bandwidth	As specified	pecified by the test configuration selected from Table 4.6.2.3.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection Diagram	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to connection diagram	TBD	1			

- 1. Message contents are defined in clause 5.6.2.8.4.3.
- 2. Cell 1 is the E-UTRA serving cell (PCell) for the EN-DC setup. The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 and Cell 3 are NR FR2 cells in different frequencies. Cell 2 is the PSCell and Cell 3 is the target cell. The power levels and settings for Cell 2 and Cell 3 are set according to Annex TBD.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

5.6.2.8.4.2 Test procedure

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 5.6.2.8.4.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 5.6.2.8.4.1-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 5.6.2.8.4-2.
- 3. The SS shall transmit an RRCConnectionReconfiguration message on Cell 1.
- 4. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 5.6.2.8.4.1-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3 embedded in E-UTRA RRC message *ULInformationTransferMRDC*. If the overall delay measured from the beginning of time period T2 is less than 10080 ms for UE supporting power class 1, or 6240 ms for UE supporting other power class for Test 1 and Test 3 and 107520 ms for UE supporting power class 1, or 66560 ms for UE supporting other power class for Test 2 and Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

- 7. After the SS receives the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity EN-DC, DC bearer MCG and SCG, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 5.6.2.8.4.1-2 as appropriate.

TBD5.6.2.8.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 5.6.2.8.4.3-1: Common Exception messages for Additional EN-DC FR1-FR2 event triggered reporting tests with SSB time index detection in DRX test requirement

	Default Message Contents					
Common contents of system information blocks exceptions						
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 with conditions GAP NEEDED and INTER-FREQ Table H.3.1-3 with conditions INTER-FREQ MO and SSB.1 FR2 and Synchronous cells Table H.3.1-4 with condition SSB Index and A4-threshold = TBD Table H.3.1-6 with conditions gapFR2 and Pattern #13 for Test 3 and Test 4 Table H.3.4-4 with condition gapUE for Test 1 and Test 2 Table H.3.4-5 with condition Pattern #0 for Test 1 and Test 2 Table H.3.1-7 with condition SSB Index and INTER-FREQ Table H.3.7-1 with condition DRX.1 for Test 1 and Test 3 Table H.3.7-1 with condition DRX.2 for Test 2 and Test 4 Table H.3.4-1 Table H.3.4-2 Table H.3.4-3					

Table 5.6.2.5.8.3-2: MeasObjectNR-DEFAULT: EN-DC FR1-FR2 measurement object configuration

Derivation Path: Table H.3.1-3			
Information Element	Value/remark	Comment	Condition
MeasObjectNR::= SEQUENCE {			
offsetMO SEQUENCE {			
rsrpOffsetSSB	6 dB		
}			

5.6.2.8.5 Test requirement

Table 5.6.2.8.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.2.8.5-1: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test	Cell 2		Cell 3	
		configuratio n	T1 T2		T1	T2
NR RF Channel Number		Config 1,2,3,4,5,6	1		2	
Duplex mode		Config 1,4	FD	D	TDD	
		Config 2,3,5,6	TDD		TDD	
BW _{channel}	MHz	Config 1,4	10: N _{RB}	_{.c} = 52	100: 1	N _{RB,c} = 66
		Config 2,5	10: N _{RB}			N _{RB,c} = 66
		Config 3,6	40: N _{RB,C}			
BWP BW	MHz	Config 1,4	10: N _{RB}		100: 1	$N_{RB,c} = 66$
		Config 2,5 Config 3,6	10: N _{RB} 40: N _{RB,0}		100.1	$N_{RB,c} = 66$ $N_{RB,c} = 66$
OCNG Patterns defined in		Config	40. INRB,C	_ 100	100.1	NRB,c − 00
A.3.2.1.1 (OP.1)		1,2,3,4,5,6	OP.	.1)P.1
PDSCH Reference		Config 1,4	SR.1.1	FDD		-
measurement channel		Config 2,5	SR.1.1			
		Config 3,6	SR2.1			
CORESET Reference		Config 1,4	CR.1.1	FDD		-
Channel		Config 2,5	CR.1.1			
		Config 3,6	CR2.1			
TDD configuration		Config 2,5	TDDCo			Conf.3.1
		Config 3,6	TDDCc	onf.2.1	TDDConf.3.1	
Initial DL BWP		Config 1,2,3,4,5,6	DLBWP.0.1		NA	
Initial UL BWP		Config 1,2,3,4,5,6	ULBWP.0.1			NA
Dedicated DL BWP		Config 1,2,3,4,5,6	DLBWP.1.1			NA
Dedicated UL BWP		Config 1,2,3,4,5,6	ULBW	P.1.1		NA
SMTC configuration defined in A.3.11.1		Config 1,4	SMT	C.2	SMTC.2	
1171.0.11.1		Config 2,3,5,6	SMT	C.1	SMTC.1	
PDSCH/PDCCH subcarrier spacing	kHz	Config 1,2,4,5	15	5		120
Spacing .		Config 3,6	30)		120
EPRE ratio of PSS to SSS						
EPRE ratio of PBCH DMRS to SSS						
EPRE ratio of PBCH to PBCH DMRS						
EPRE ratio of PDCCH DMRS to SSS						
EPRE ratio of PDCCH to PDCCH DMRS		Config 1,2,3,4,5,6	0	ı		0
EPRE ratio of PDSCH DMRS to SSS						
EPRE ratio of PDSCH to PDSCH						
EPRE ratio of OCNG DMRS to SSS(Note 1)						
EPRE ratio of OCNG to OCNG DMRS (Note 1)						
$oldsymbol{N}_{oc}$ Note2	dBm/15 kHz Note5		N	4	-1	.04.7

$N_{_{OC}}^{}$ Note2	dBm/S	Config	NA		-95.7		
	CS	1,2,4,5					
	Note4	Config 3,6	NA NA		-95.7		
SS-RSRP Note 3	dBm/S	Config	NA	NA	-Infinity	-86.7	
	CS	1,2,4,5					
	Note5	Config 3,6	NA	NA	-Infinity	-86.7	
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	Config	NA	NA	-Infinity	9	
-s/-ot		1,2,3,4,5,6					
\hat{E}_s/N_{oc}	dB	Config	NA	NA	-Infinity	9	
=s/1.oc		1,2,3,4,5,6					
Io ^{Note3}	dBm/9.	Config	NA	NA	-	-	
	36MHz	1,2,4,5					
	dBm/38	Config 3,6	NA	NA	-	-	
	.16MHz						
	dBm/95	Config	-	-	-66.7	-57.2	
	.04	1,2,3,4,5,6					
	MHz						
	Note5						
Propagation Condition		Config	AWGN				
		1,2,3,4,5,6					

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with 0dBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

10080 for UE supporting power class 1, or

6240 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

107520 for UE supporting power class 1, or

66560 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.3 L1-RSRP measurement for beam reporting

5.6.3.0 Minimum conformance requirements

5.6.3.0.1 Minimum conformance requirements for SSB-based L1-RSRP measurement for beam reporting

The UE shall be capable of performing L1-RSRP measurements based on the configured SSB resource for L1-RSRP computation, and the UE physical layer shall be capable of reporting L1-RSRP measured over the measurement period of $T_{\text{L1-RSRP_Measurement_Period_SSB}}$.

The value of T_{L1-RSRP} Measurement Period SSB is defined in Table 9.5.4.1-2 for FR2, where

- M=1 if higher layer parameter timeRestrictionForChannelMeasurement is configured, and M=3 otherwise
- N=8.

For FR2,

- $P=1/(1-T_{SSB}/T_{SMTCperiod})$, when SSB is not overlapped with measurement gap and SSB is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$).
- P is $P_{\text{sharing factor}}$, when SSB is not overlapped with measurement gap and SSB is fully overlapped with SMTC period ($T_{\text{SSB}} = T_{\text{SMTCperiod}}$).
- P is $1/(1-T_{SSB}/MGRP-T_{SSB}/T_{SMTCperiod})$, when SSB is partially overlapped with measurement gap and SSB is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
 - $T_{SMTCperiod} \neq MGRP$ or
 - $T_{SMTCperiod} = MGRP \text{ and } T_{SSB} < 0.5*T_{SMTCperiod}$
- P is $1/(1-T_{SSB}/MGRP)^*$ $P_{sharing\ factor}$, when SSB is partially overlapped with measurement gap and SSB is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{SSB} = 0.5*T_{SMTCperiod}$
- P is $1/\{1-T_{SSB}/min(T_{SMTCperiod},MGRP)\}$, when SSB is partially overlapped with measurement gap (T_{SSB} <MGRP) and SSB is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap.
- P is $1/(1-T_{SSB}/MGRP)^*$ $P_{sharing factor}$, when SSB is partially overlapped with measurement gap and SSB is fully overlapped with SMTC occasion ($T_{SSB} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)
- P_{sharing factor} = 3.

Where:

 $T_{SSB} = ssb$ -periodicityServingCell

 $T_{SMTCperiod}$ = the configured SMTC1 period or SMTC2 period if configured

If the high layer in TS 38.331 [2] signaling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

Longer evaluation period would be expected if the combination of SSB, SMTC occasion and measurement gap configurations does not meet pervious conditions.

Editor's Note: FFS what evaluation period would be expected if SSB are in the same OFDM symbols with RLM/BFD/CBD-RS, or other SSB.

Table 9.5.4.1-2: Measurement period T_{L1-RSRP_Measurement_Period_SSB} for FR2

Configuration		T _{L1-RSRP_Measurement_Period_SSB} (ms)		
non-DRX		$max(T_{Report}, ceil(M*P*N)*T_{SSB})$		
DRX cycle ≤ 320ms		$max(T_{Report}, ceil(1.5*M*P*N)*max(T_{DRX},T_{SSB}))$		
DRX cycle > 320ms		ceil(M*P*N)*T _{DRX}		
Note: T _{SSB} = ssb-periodicityServingCell is the periodicity of the SSB-Inde				
configured for L1-RSRP measurement. T_{DRX} is the DRX cycle length.				
T _{Report} is configured periodicity for reporting.				

Reported L1-RSRP measurements contained in periodic L1-RSRP measurement reports shall meet the requirements in clauses 10.1.19 for FR1 and 10.1.20 for FR2, respectively.

The UE shall only send periodic L1-RSRP measurement reports for an active BWP.

The UE shall transmit the periodic L1-RSRP reporting on PUCCH over the air interface according to the periodicity defined in clause 5.2.1.4 in TS 36.300 [24].

For FR2, when the SSB for L1-RSRP measurement is in the same OFDM symbol as CSI-RS for RLM/BFD/CBD/L1-RSRP measurement, UE is required to measure one of but not both SSB for L1-RSRP measurement and CSI-RS. Longer measurement period for SSB based L1-RSRP measurement is expected, and no requirements are defined.

The normative reference for this requirement is TS 38.133 [6] clause 9.5.3.1, 9.5.4.1 and 9.5.5.1.

5.6.3.0.2 Minimum conformance requirements for CSI-RS-based L1-RSRP measurement for beam reporting

The UE shall be capable of performing L1-RSRP measurements based on the configured CSI-RS resource for L1-RSRP computation, and the UE physical layer shall be capable of reporting L1-RSRP measured over the measurement period of $T_{L1-RSRP_Measurement_Period_CSI-RS}$.

The value of T_{L1-RSRP_Measurement_Period_CSI-RS} is defined in Table 9.5.4.2-2 for FR2, where

- For periodic and semi-persistent CSI-RS resources, M=1 if higher layer parameter timeRestrictionForChannelMeasurement is configured, and M=3 otherwise
- For aperiodic CSI-RS resources M=1
- For periodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply if *qcl-InfoPeriodicCSI-RS* is configured for all the resources in the resource set and for each resource one RS has QCL-TypeD with
 - SSB for L1-RSRP measurement, or
 - another CSI-RS in resource set configured with repetition ON.
- For periodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / N_{res_per_set}), where N_{res_per_set} is number of resources in the resource set. The requirements apply provided *qcl-InfoPeriodicCSI-RS* is configured for all resources in the resource set.
- For semi-persistent CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set and for each resource one RS has QCL-TypeD with
 - SSB for L1-RSRP measurement, or
 - another CSI-RS in resource set configured with repetition ON.
- For semi-persistent CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / N_{res_per_set}), where N_{res_per_set} is number of resources in the resource set. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set.

- For aperiodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided *qcl-info* is configured for all resources in the resource set and for each resource one RS has QCL-TypeD with
 - SSB for L1-RSRP measurement, or
 - another CSI-RS in resource set configured with repetition ON.
- For aperiodic CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to ON, N=1. UE is not required to meet the accuracy requirements in clause 10.1.19.2 and 10.1.20.2 if number of resources in the resource set is smaller than *maxNumberRxBeam*. The requirements apply provided *qcl-info* is configured for all resources in the resource set.

For FR2,

- P=1, when CSI-RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.
- $P=1/(1-T_{CSI-RS}/MGRP)$, when CSI-RS is partially overlapped with measurement gap and CSI-RS is not overlapped with SMTC occasion ($T_{CSI-RS} < MGRP$)
- $P=1/(1-T_{CSI-RS}/T_{SMTCperiod})$, when CSI-RS is not overlapped with measurement gap and CSI-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$).
- P is $P_{\text{sharing factor}}$, when CSI-RS is not overlapped with measurement gap and CSI-RS is fully overlapped with SMTC occasion ($T_{\text{CSI-RS}} = T_{\text{SMTCperiod}}$).
- P is $1/(1-T_{CSI-RS}/MGRP-T_{CSI-RS}/T_{SMTCperiod})$, when CSI-RS is partially overlapped with measurement gap and CSI-RS is partially overlapped with SMTC occasion (TCSI-RS $< T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
- $T_{SMTCperiod} \neq MGRP$ or
- $T_{SMTCperiod} = MGRP \text{ and } T_{CSI-RS} < 0.5*T_{SMTCperiod}$
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ $P_{sharing\ factor}$, when CSI-RS is partially overlapped with measurement gap and CSI-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} = 0.5^*T_{SMTCperiod}$
- P is 1/{1- T_{CSI-RS} /min (T_{SMTCperiod} ,MGRP)}, when CSI-RS is partially overlapped with measurement gap (T_{CSI-RS} < MGRP) and CSI-RS is partially overlapped with SMTC occasion (T_{CSI-RS} < T_{SMTCperiod}) and SMTC occasion is partially or fully overlapped with measurement gap.
- P is $1/(1-T_{CSI-RS}/MGRP)*P_{sharing\ factor}$, when CSI-RS is partially overlapped with measurement gap and CSI-RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)
- P_{sharing factor} is 3.

Where:

 $T_{SMTCperiod}$ = the configured SMTC1 period or SMTC2 period if configured.

T_{CSI-RS} = the periodicity of CSI-RS configured for L1-RSRP measurement

If the high layer in TS 38.331 [2] signaling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

Note: The overlap between CSI-RS for L1-RSRP measurement and SMTC means that CSI-RS for L1-RSRP measurement is within the SMTC window duration.

Longer evaluation period would be expected if the combination of CSI-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

Editor's Note: FFS what evaluation period would be expected if CSI-RS are in the same OFDM symbols with RLM/BFD/CBD-RS, or other CSI-RS.

Table 9.5.4.2-2: Measurement period T_{L1-RSRP_Measurement_Period_CSI-RS} for FR2

Configuration		T _{L1-RSRP_Measurement_Period_CSI-RS} (ms)	
no	n-DRX	$max(T_{Report}, ceil(M*P*N)*T_{CSI-RS})$	
DRX cy	cle ≤ 320ms	$max(T_{Report}, ceil(1.5*M*P*N)*max(T_{DRX},T_{CSI-RS}))$	
DRX cy	cle > 320ms	ceil(M*P*N)*T _{DRX}	
Note 1:	T _{CSI-RS} is the p	periodicity of CSI-RS configured for L1-RSRP	
	measurement. T _{DRX} is the DRX cycle length. T _{Report} is configured		
periodicity for reporting.			
Note 2:	the requirements are applicable provided that the CSI-RS resource		
	configured for	r L1-RSRP measurement is transmitted with Density $= 3$.	

Reported L1-RSRP measurements contained in aperiodic triggered, aperiodic triggered periodic and aperiodic triggered semi-persistent L1-RSRP reports shall meet the requirements in clauses 10.1.19 for FR1 and 10.1.20 for FR2, respectively.

The UE shall only send aperiodic L1-RSRP measurement reports, if a DCI trigger has been received.

After the UE receives CSI request in DCI, the UE shall transmit the aperiodic L1-RSRP reporting on PUSCH over the air interface at the time specified according to clause 6.2.1.2 in TS 36.300 [24].

For both FR1 and FR2, when the CSI-RS for L1-RSRP measurement is in the same OFDM symbol as SSB for RLM/BFD/CBD/L1-RSRP measurement, UE is not required to receive CSI-RS for L1-RSRP measurement in the PRBs that overlap with an SSB.

For FR2, when the CSI-RS for L1-RSRP measurement is in the same OFDM symbol as SSB for RLM/BFD/L1-RSRP measurement, or in the same symbol as SSB for CBD when beam failure is detected, UE is required to measure one of but not both CSI-RS for L1-RSRP measurement and SSB. Longer measurement period for CSI-RS based L1-RSRP measurement is expected, and no requirements are defined.

For FR2, when the CSI-RS for L1-RSRP measurement is in the same OFDM symbol as another CSI-RS for RLM/BFD/CBD/L1-RSRP measurement,

- In the following cases, UE is required to measure one of but not both CSI-RS for L1-RSRP measurement and the other CSI-RS. Longer measurement period for CSI-RS based L1-RSRP measurement is expected, and no requirements are defined.
 - The CSI-RS for L1-RSRP measurement or the other CSI-RS in a resource set configured with repetition ON, or
 - The other CSI-RS is configured in q1 and beam failure is detected, or
 - The two CSI-RS-es are not QCL-ed w.r.t. QCL-TypeD, or the QCL information is not known to UE,
- Otherwise, UE shall be able to measure the CSI-RS for L1-RSRP measurement without any restriction.

The normative reference for this requirement is TS 38.133 [6] clauses 9.5.3.1, 9.5.4.2 and 9.5.5.2.

5.6.3.1 EN-DC FR2 SSB-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in is undefined.
- Antenna diagram is TBD
- Message content is TBD
- Test procedure is TBD
- Initial conditions are TBD

5.6.3.1.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

5.6.3.1.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.3.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 5.6.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.3.1.

5.6.3.1.4 Test description

5.6.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.3.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 5.6.3.1.4.1-2. Test environment parameters are given in Table 5.6.3.1.4.1-3.

Table 5.6.3.1.4.1-1: EN-DC SSB based L1-RSRP measurement supported test configurations

	Config	Description	
1		LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
2		LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
3		LTE FDD, NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
4		LTE TDD, NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
Note:	Note: The UE is only required to be tested in one of the supported test configurations		

Table 5.6.3.1.4.1-2: General test parameters for EN-DC SSB based L1-RSRP measurement

Parameter	Config	Unit	Value
SSB GSCN	1~4		freq1
Duplex mode	1~4		TDD
TDD Configuration	1~4		TDDConf.3.1
BW _{channel}	1~4	MHz	100: N _{RB,c} = 66
PDSCH Reference measurement channel	1~4		SR.3.1 TDD
RMSI CORESET Reference Channel	1~4		CR.3.1 TDD
Dedicated CORESET Reference Channel	1~4		CCR.3.1 TDD
SSB configuration	1,2		SSB.1 FR2
	3,4		SSB.2 FR2
OCNG Patterns	1~4		OP.1
Initial BWP Configuration	1~4		DLBWP.0.1 ULBWP.0.1
Dedicated BWP configuration	1~4		DLBWP.1.3 ULBWP.1.3
SMTC configuration	1~4		SMTC.1
TRS Configuration	1~4		TRS.2.1 TDD
PDCCH/PDSCH TCI Configuration	1~4		TCI.State.2
DRX configuration	1~4		Off
reportConfigType	1~4		periodic
reportQuantity	1~4		ssb-Index-RSRP
Number of reported RS	1~4		2
L1-RSRP reporting period	1~4	slot	640
T1	1~4	S	5
T2	1~4	S	1
Propagation condition	1~4		AWGN
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS		dD.	0
EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSSNote 1 EPRE ratio of OCNG to OCNG DMRS Note 1	1~4	dB	0
Propagation condition	1~4		AWGN

Table 5.6.3.1.4.1-3: Test Environment parameters for EN-DC SSB based L1-RSRP measurement

Parameter	Value		Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.				
Channel	As specified by the test configuration selected from Table 5.6.3.1.4.1-1.				
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to connection diagram					

1. Message contents are defined in clause 5.6.3.1.4.3.

2. TBD

5.6.3.1.4.2 Test procedure

TBD

5.6.3.1.4.3 Message contents

TBD

5.6.3.1.5 Test requirement

Table 5.6.3.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.3.1.5-1: SSB specific test parameters for EN-DC SSB based L1-RSRP measurement

Parameter	Config	Unit	SSB#0		SSB#1	
Parameter	Config	Unit	T1	T2	T1	T2
$N_{oc}^{$	1~4	dBm/15kHz	TBD			
$N_{oc}^{$	1,2	dBm/SSB SCS	TBD			
	3,4	UBIII/SSB SCS	TBD			
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	1~4	dB	TBD	TBD	-Infinity	TBD
SSB RSRP Note3	1,2	dBm/SSB SCS	TBD	TBD	-Infinity	TBD
	3,4		TBD	TBD	-Infinity	TBD
Io Note3	1,2	-ID (OF O 4 M I I -	TBD	TBD	TBD	TBD
	3,4	dBm/95.04MHz	TBD	TBD	TBD	TBD
\hat{E}_{s}/N_{oc}	1~4	dB	TBD	TBD	-Infinity	TBD

The UE shall send L1-RSRP report every 640 slots. After 480ms plus 640 slots from the beginning of time period T2, UE shall send L1-RSRP report including the results for both SSB#0 and SSB#1 while meeting the accuracy requirements defined in clause 10.1.20.1. The reported L1-RSRP value shall include the Rx antenna gain in the range of [0-17] dB.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.3.2 EN-DC FR2 SSB-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

The test case is pending RAN4 definition

5.6.3.2.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause TBD.

5.6.3.2.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.3.2.3 Minimum conformance requirements

TBD

5.6.3.2.4 Test description

5.6.3.2.4.1 Initial conditions

TBD

5.6.3.2.4.2 Test procedure

TBD

5.6.3.2.4.3 Message contents

TBD

5.6.3.2.5 Test requirement

TBD

5.6.3.3 EN-DC FR2 CSI-RS-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in is undefined.
- Antenna diagram is TBD
- Message content is TBD
- Test procedure is TBD
- Initial conditions are TBD
- Initial conditions contain FFS (RAN4 pending)
- Test requirements contain TBD (RAN4 pending)

5.6.3.3.1 Test purpose

To verify that the UE makes correct reporting of CSI-RS-based L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.2.

5.6.3.3.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.3.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.6.3.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.5.6.3.3.

5.6.3.3.4 Test description

5.6.3.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 5.6.3.3.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 5.6.3.3.4.1-2. Test environment parameters are given in Table 5.6.3.3.4.1-3.

Table 5.6.3.3.4.1-1: EN-DC FR2 CSI-RS based L1-RSRP measurement supported test configurations

	Config	Description
1		LTE FDD, NR 120 kHz CSI-RS SCS, 100 MHz bandwidth, TDD duplex mode
2		LTE TDD, NR 120 kHz CSI-RS SCS, 100 MHz bandwidth, TDD duplex mode
Note:	The UE is only re-	quired to be tested in one of the supported test configurations

Table 5.6.3.3.4.1-2: General test parameters for EN-D FR2 C CSI-RS based L1-RSRP measurement

Parameter	Config	Unit	Value
SSB GSCN	1~2		freq1
Duplex mode	1~2		TDD
TDD Configuration	1~2		TDDConf.3.1
BW _{channel}	1~2	MHz	100: N _{RB,c} = 66
PDSCH Reference measurement channel	1~2		SR.3.1 TDD
RMSI CORESET Reference Channel	1~2		CR.3.1 TDD
Dedicated CORESET Reference Channel	1~2		CCR.3.1 TDD
SSB configuration	1~2		SSB.1 FR2
CSI-RS configuration	1~2		CSI-RS.3.3 TDD
OCNG Patterns	1~2		OP.1
Initial BWP Configuration	1~2		DLBWP.0.1 ULBWP.0.1
Dedicated BWP configuration	1~2		DLBWP.1.3 ULBWP.1.3
SMTC configuration	1~2		SMTC.1
TRS Configuration	1~2		TRS.2.1 TDD
PDCCH/PDSCH TCI Configuration	1~2		TCI.State.2
DRX configuration	1~2		Off
reportConfigType	1~2		aperiodic
reportQuantity	1~2		cri-RSRP
Number of reported RS	1~2		2
qcl-Info	1~2		SSB#0 for resource#0 SSB#1 for resource#1
reportSlotOffsetList	1~2		TBD
Propagation condition	1~2		AWGN
T1	1~2	S	5
T2	1~2	S	1
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH			
DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSS ^{Note 1} EPRE ratio of OCNG to OCNG DMRS Note 1	1~2	dB	0

Table 5.6.3.3.4.1-3: Test Environment parameters for EN-DC FR2 CSI-RS L1-RSRP measurement

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.	
Channel bandwidth	As specified by the test configuration selected from Table 5.6.3.3.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	TBD		
Exceptions to connection diagram				

1. Message contents are defined in clause 5.6.3.3.4.3.

2. TBD

5.6.3.3.4.2 Test procedure

TBD

5.6.3.3.4.3 Message contents

TBD

5.6.3.3.5 Test requirement

Table 5.6.3.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 5.6.3.3.5-1: CSI-RS specific test parameters for EN-DC FR2 CSI-RS L1-RSRP measurement

Parameter	Config	Limit	SSB#0		SSB#1	
Parameter	Config	Unit	T1	T2	T1	T2
$N_{oc}^{$	1~2	dBm/15kHz	TBD			
$N_{oc}^{$	1~2	dBm/SSB SCS	TBD			
$\hat{\mathbf{E}}_{\scriptscriptstyle \mathrm{s}}/\mathrm{I}_{\scriptscriptstyle \mathrm{ot}}$	1~2	dB	TBD	TBD	-Infinity	TBD
CSI-RS RSRP Note3	1~2	dBm/SSB SCS	TBD	TBD	-Infinity	TBD
Io Note3	1~2	dBm/95.04MHz	TBD	TBD	TBD	TBD
\hat{E}_s/N_{oc}	1~2	dB	TBD	TBD	-Infinity	TBD

The UE shall send L1-RSRP report at slot [TBD] from the beginning of T2. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in clause 10.1.20.1. The reported L1-RSRP value shall include the Rx antenna gain in the range of [0-17] dB.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

5.6.3.4 EN-DC FR2 CSI-RS-based L1-RSRP measurement in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The test case is pending RAN4 definition

5.6.3.4.1 Test purpose

To verify that the UE makes correct reporting of CSI-RS-based L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause TBD.

5.6.3.4.2 Test applicability

This test applies to all types of E-UTRA UE release 15 and forward, supporting EN-DC.

5.6.3.4.3 Minimum conformance requirements

TBD

5.6.3.4.4 Test description

5.6.3.4.4.1 Initial conditions

TBD

5.6.3.4.4.2 Test procedure

TBD

5.6.3.4.4.3 Message contents

TBD

5.6.3.4.5 Test requirement

TBD

5.7 Measurement performance requirements

5.7.1 SS-RSRP

- 5.7.1.1 Intra-frequency measurements
- 5.7.1.2 Inter-frequency measurements
- 5.7.2 SS-RSRQ
- 5.7.3 SS-SINR

6 NR standalone in FR1

This section contains test scenarios for NR standalone. This configuration is also known as SA Option 2. All NR cells are in Frequency Range 1.

6.1 RRC IDLE state mobility

6.1.1 NR cell re-selection

6.1.1.0 Minimum conformance requirements

6.1.1.0.1 Minimum conformance requirements for intra-frequency cell re-selection

The cell re-selection delay shall be less than $T_{evaluate NR_Intra} + T_{SI-NR}$ in RRC_IDLE state.

The UE shall be able to identify new intra-frequency cells and perform SS-RSRP and SS-RSRQ measurements of the identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the reselection criteria defined in TS38.304 [30] within $T_{\text{detect},NR_Intra}$ as defined in table 4.2.2.3-1 of TS 38.133 [6] when that Treselection= 0. An intra frequency cell is considered to be detectable according to the conditions defined in Annex B.1.2 of TS 38.133 [6] for a corresponding Band.

The UE shall measure SS-RSRP and SS-RSRQ at least every $T_{measure,NR_Intra}$ (see table 4.2.2.3-1 of TS 38.133 [6]) for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter SS-RSRP and SS-RSRQ measurements of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,NR\ Intra}/2$.

The UE shall not consider a NR neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an intra-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met reselection criterion defined within $T_{\text{evaluate},NR_Intra}$ when $T_{\text{reselection}} = 0$ as specified in table 4.2.2.3-1 of TS 38.133 [6] provided that the cell has at least [3]dB better ranked.

When evaluating cells for reselection, the SSB side conditions apply to both serving and non-serving intra-frequency cells.

If $T_{reselection}$ timer has a non zero value and the intra-frequency cell is satisfied with the reselection criteria which are defined in TS38.304 [30], the UE shall evaluate this intra-frequency cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

The normative reference for this requirement is TS 38.133 [6] clause 4.2.2.2 and 4.2.2.3.

6.1.1.0.2 Minimum conformance requirements for inter-frequency cell re-selection

The cell re-selection delay shall be less than $T_{\text{evaluate NR_Intra}} + T_{\text{SI-NR}}$ in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform SS-RSRP or SS-RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in clause 4.2.2.7 of TS 38.133 [6].

If $Srxlev \leq S_{nonIntraSearchP}$ or $Squal \leq S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below in this subclause.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS38.304 [30] within $K_{carrier} * T_{detect,NR_Inter}$ if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least [5] dB for reselections based on ranking or [6]dB for SS-RSRP reselections based on absolute priorities or [4]dB for

SS-RSRQ reselections based on absolute priorities. The parameter $K_{carrier}$ is the number of NR inter-frequency carriers indicated by the serving cell. An inter-frequency cell is considered to be detectable according to the conditions defined in Annex B.1.3 of TS 38.133 [6] for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every T_{measure,NR_Inter}. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a NR carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure SS-RSRP or SS-RSRQ at least every $K_{carrier} * T_{measure,NR_Inter}$ (see table 4.2.2.4-1 of TS 38.133 [6]) for identified lower or equal priority inter-frequency cells. If the UE detects on a NR carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter SS-RSRP or SS-RSRQ measurements of each measured higher, lower and equal priority interfrequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{\text{measure},NR_Inter}/2$.

The UE shall not consider a NR neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met reselection criterion defined TS 38.304 [30] within $K_{carrier} * T_{evaluate,NR_Inter}$ when $T_{reselection} = 0$ as specified in table 4.2.2.4-1 of TS 38.133 [6] provided that the reselection criteria is met by

- the condition when performing equal priority reselection and the cell has at least [5]dB better ranked
- [6]dB for SS-RSRP reselections based on absolute priorities or
- [4]dB for SS-RSRQ reselections based on absolute priorities.

When evaluating cells for reselection, the SSB side conditions apply to both serving and inter-frequency cells.

If $T_{reselection}$ timer has a non zero value and the inter-frequency cell is satisfied with the reselection criteria, the UE shall evaluate this inter-frequency cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

The UE is not expected to meet the measurement requirements for an inter-frequency carrier under DRX cycle=320 ms defined in Table 4.2.2.4-1 of TS 38.133 [6] under the following conditions:

- $T_{SMTC_intra} = T_{SMTC_inter} = 160$ ms; where T_{SMTC_intra} and T_{SMTC_inter} are periodicities of the SMTC occasions configured for the intra-frequency carrier and the inter-frequency carrier respectively, and
- SMTC occasions configured for the inter-frequency carrier occur up to 1 ms before the start or up to TBD ms after the end of the SMTC occasions configured for the intra-frequency carrier, and
- SMTC occasions configured for the intra-frequency carrier and for the inter-frequency carrier occur up to TBD ms before the start or up to TBD ms after the end of the paging occasion [1].

The normative reference for this requirement is TS 38.133 [6] clause 4.2.2.4.

6.1.1.1 NR SA FR1 cell re-selection

6.1.1.1.1 Test purpose

The purpose of this test is to verify that when the current and target cell operates on the same carrier frequency the UE is able to search and measure cells to meet the intra-frequency NR cell re-selection requirements.

6.1.1.1.2 Test applicability

This test applies to all types of NR UE release 15.

6.1.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.1.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.1.1.1.

6.1.1.1.4 Test description

6.1.1.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 6.1.1.1.4.1-1.

Table 6.1.1.1.4.1-1: Supported test configurations for NR SA FR1 cell re-selection

Configuration	Description	
6.1.1.1-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
6.1.1.1-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
6.1.1.1-3	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations.		

Configure the test equipment and the DUT according to the parameters in Table 6.1.1.1.4.1-2.

Table 6.1.1.1.4.1-2: Initial conditions for NR SA FR1 cell re-selection

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1.				
Channel bandwidth	As specified by the test configuration selected from Table 6.1.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to connection diagram	- Without LTE link - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part.				

- 1. The general test parameter settings are set up according to Table 6.1.1.1.4.1-3.
- 2. Message contents are defined in clause 6.1.1.1.4.3.
- 3. There is one NR carrier and 2 NR Cells specified in the test. Cell 1 is the PCell and Cell 2 is the neighbour cell. Cell 1 and Cell 2 are configured according to Annex C.1.1 and C.1.2.

Table 6.1.1.1.4.1-3: General test parameters for NR SA FR1 cell re-selection

Parameter		Unit	Test configuration	Value	Comment
Initial	Active cell		1, 2, 3	Cell1	
condition	Neighbour cells		1, 2, 3	Cell2	
T2 end	Active cell		1, 2, 3	Cell2	
condition	Neighbour cells		1, 2, 3	Cell1	
Final condition	Active cell		1, 2, 3	Cell1	
RF Channe	el Number		1, 2, 3	1	
Time offset	t between cells		1	3 ms	Asynchronous cells
			2	3 μs	Synchronous cells
			3	3 μs	Synchronous cells
Access Ba	rring Information	-	1, 2, 3	Not Sent	No additional delays in random access procedure.
SSB config	juration		1	SSB.1 FR1	
	•		2	SSB.1 FR1	
			3	SSB.2 FR1	
SMTC con	SMTC configuration		1	SMTC.2	
	-		2	SMTC.1	
			3	SMTC.1	
	DRX cycle length		1, 2, 3	1.28	The value shall be used for all cells in the test.
PRACH co	PRACH configuration index		1, 2, 3	102	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
rangeToBe	stCell		1, 2, 3	Not configured	
T1		S	1, 2, 3	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2		S	1, 2, 3	40	T2 needs to be defined so that cell re- selection reaction time is taken into account.
Т3		S	1, 2, 3	15	T3 needs to be defined so that cell re- selection reaction time is taken into account.

6.1.1.4.2 Test procedure

Two cells are deployed in the test, which are one FR1 NR PCell (Cell 1) and an NR neighbour cell (Cell 2) on the same frequency. The test consists of 3 successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure.

- 1. Ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR with Test Mode *On* according to TS 38.508-1 [14] clause 4.5. Set Cell 2 physical cell identity = initial cell 2 physical cell identity.
- 2. Set the parameters according to T1 in Table 6.1.1.1.5-1. T1 starts.
- 3. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.1.1.5-1.
- 5. The SS waits for random access requests information from the UE to perform cell re-selection to a newly detectable cell, Cell 2.

- 6. If the UE responds on the newly detectable cell, Cell 2 during time duration T2 within 34 seconds from the beginning of time period T2, then count a success for the event "Re-select newly detected Cell 2". Otherwise count a fail for the event "Re-select newly detected Cell 2".
- 7. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 8. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 12.
- 8. The SS shall switch the power setting from T2 to T3 as specified in Table 6.1.1.1.5-1.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection to an already detected cell, Cell 1.
- 10. If the UE responds on the already detected cell, Cell 1 during time duration T3 within 8 seconds from the beginning of time period T3, then count a success for the event "Re-select already detected Cell 1". Otherwise count a fail for the event "Re-select already detected Cell 1".
- 11. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5 in Cell 1.
- 13. Repeat step 2-12 until a test verdict has been achieved.
 Each of the events "Re-select newly detected Cell 2" and "Re-select already detected Cell 1" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

 If both events pass, the test passes. If one event fails, the test fails.

6.1.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.1.1.1.4.3-1: Common Exception messages

Default Message Contents							
Common contents of system information blocks exceptions	Table H.2.1-1 with Condition SMTC.2 and Asynchronous cells for configuration 6.1.1.1-1 Table H.2.1-1 with Condition SMTC.1 and synchronous cells for configuration 6.1.1.1-2 Table H.2.1-1 with Condition SMTC.1 and synchronous cells for configuration 6.1.1.1-3						
	Table H.2.1-2 Table H.2.1-3						
Default RRC messages and information elements contents exceptions	Table H.3.2-1						

6.1.1.1.5 Test requirement

Tables 6.1.1.1.4.1-3 and 6.1.1.1.5-1 define the primary level settings including test tolerances for intra frequency NR cell re-selection test case.

Table 6.1.1.1.5-1: Cell specific test parameters for NR SA FR1 cell re-selection

Parameter					Cell 2			
		configuration	T1	T2	T3	T1	T2	T3
TDD configuration		1		N/A			N/A	
		2	TDDConf.1.1		TDDConf.1.1			
		3	TDDConf.2.1		Т	DDConf.2.	1	
PDSCH RMC		1		R.1.1 FDD			N/A	
configuration		2		R.1.1 TDD				
		3	5	R.2.1 TDD)			
RMSI CORESET		1		R.1.1 FDD)		CR.1.1 FDE	
RMC configuration		2		R.1.1 TDD)		CR.1.1 TDE)
		3		R.2.1 TDD)		CR.2.1 TDE)
Dedicated CORESET		1	C	CR.1.1 FDI	D	С	CR.1.1 FD	D
RMC configuration		2	С	CR.1.1 TDI	D	С	CR.1.1 TD	D
		3	С	CR.2.1 TDI	D	С	CR.2.1 TD	D
OCNG Pattern		1, 2, 3	OP.1 d	lefined in A	.2.1-1	OP.1 c	defined in A	\.2.1-1
Initial DL BWP		1, 2, 3]	DLBWP.0.1		[DLBWP.0.1	
configuration								
Initial UL BWP		1, 2, 3	l	JLBWP.0.1		l	JLBWP.0.1	_
configuration								
RLM-RS		1, 2, 3		SSB		SSB		
Qrxlevmin	dBm/SCS	1, 2		-140		-140		
		3	-137		-137			
Pcompensation	dB	1, 2, 3	0			0		
Qhyst _s	dB	1, 2, 3	0			0		
Qoffset _{s, n}	dB	1, 2, 3		0		0		
Cell_selection_and_		1, 2, 3						
reselection_quality_				SS-RSRP		SS-RSRP		
measurement								
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1	16	-3.55	3.24	-infinity	3.24	-3.55
s / Ot		2						
		3						
$N_{_{oc}}$ Note2	dBm/SCS	1			-98	,		
oc .		2	-98					
		3	-95					
$N_{\scriptscriptstyle oc}$ Note2	dBm/15 kHz	1	-98					
oc		2						
		3						
\hat{E}_s/N_{oc}	dB	1	16	13	16.45	-infinity	16.45	13
_s / 1 · oc		2						
		3						
SS-RSRP Note3	dBm/SCS	1	-82	-85	-81.55	-infinity	-81.55	-85
		2	-82	-85	-81.55	-infinity	-81.55	-85
		3	-79	-82	-78.54	-infinity	-78.54	-82
lo	dBm/9.36 MHz	1	-53.94	-51.91	-51.91		cified in Co	
	dBm/9.36 MHz	2	-53.94	-51.91	-51.91	1	columns	
	dBm/38.16 MHz	3	-47.85	-45.81	-45.81			
Treselection	S	1, 2, 3	0	0	0	0	0	0
Sintrasearch	dB	1, 2, 3		Not sent			Not sent	
Propagation		1, 2, 3			AWG	N		
Condition		_, _, _				•		

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell test requirement in this case is expressed as:

Cell re-selection delay to a newly detectable cell = $T_{detect,NR_Intra} + T_{SI-NR}$

 $T_{\text{detect,NR Intra}} = 32 \text{ s}$; as specified in TS 38.133 [6] clause 4.2.2.3.

 $T_{\text{SI-NR}}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test.

The cell re-selection delay to a newly detectable cell shall be less than a total of 33.28 seconds in this test case (note: this gives a total of 33.28 seconds but the test allows 34 seconds).

The cell re-selection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to an already detected cell test requirement in this case is expressed as:

Cell re-selection to an already detected cell delay = $T_{evaluate,NR_Intra} + T_{SI-NR}$

 $T_{evaluate,NR_Intra}$ = 6.4 s; as specified in TS 38.133 [6] clause 4.2.2.3.

 T_{SI-NR} = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test.

The cell re-selection delay to an already detected cell shall be less than a total of 7.68 seconds in this test case (note: this gives a total of 7.68 seconds but the test allows 8 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

6.1.1.2 NR SA FR1-FR1 cell re-selection

6.1.1.2.1 Test purpose

The purpose of this test is to verify the requirement for the inter frequency NR cell reselection.

6.1.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.1.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.1.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.1.1.2.

6.1.1.2.4 Test description

6.1.1.2.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 6.1.1.2.4.1-1.

Table 6.1.1.2.4.1-1: Supported test configurations for NR SA FR1-FR1 cell re-selection

Configuration	Description of serving cell	Description of target cell				
6.1.1.2-1	15 kHz SSB SCS, 10MHz bandwidth, FDD	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex				
	duplex mode	mode				
6.1.1.2-2	15 kHz SSB SCS, 10MHz bandwidth, TDD	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex				
	duplex mode	mode				
6.1.1.2-3	30 kHz SSB SCS, 40MHz bandwidth, TDD	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex				
duplex mode mode						
Note: The UE is only required to be tested in one of the supported test configurations.						

Configure the test equipment and the DUT according to the parameters in Table 6.1.1.2.4.1-2.

Table 6.1.1.2.4.1-2: Initial conditions for NR SA FR1-FR1 cell re-selection

Parameter		Value	Comment				
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1.						
Channel bandwidth	As specified by the test configuration selected from Table 6.1.1.2.4.1-1.						
Propagation conditions	AWGN		As specified in Annex C.2.2.				
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.2.3.4	1				
Exceptions to connection diagram	N/A						

- 1. The general test parameter settings are set up according to Table 6.1.1.2.4.1-3.
- 2. Message contents are defined in clause 6.1.1.2.4.3.
- 3. There is two NR carrier and 2 NR Cells specified in the test. Cell 1 is the PCell and Cell 2 is the neighbour cell in a different carrier than cell 1. Cell 1 and Cell 2 are configured according to Annex C.1.2.

Table 6.1.1.2.4.1-3: General test parameters for NR SA FR1-FR1 cell re-selection

Parameter		Unit	Test	Value	Comment
Initial condition	Active cell		configuration 1, 2, 3	Cell2	The UE camps on cell 2 in the initial phase and during T1 period the UE
					reselects to cell 1
T1 end	Active cell		1, 2, 3	Cell1	The UE shall perform reselection to cell 1
condition	Neighbour cells		1, 2, 3	Cell2	during T1
T3 end condition	Active cell		1, 2, 3	Cell2	The UE shall perform reselection to cell 2 with higher priority during T3
RF Channe			1, 2, 3	1, 2	
Time offset	t between cells		1	3 ms	Asynchronous cells
			2	3 µs	Synchronous cells
			3	3 µs	Synchronous cells
Access Ba	rring Information	-	1, 2, 3	Not Sent	No additional delays in random access procedure.
SSB config	guration		1	SSB.1 FR1	
			2	SSB.1 FR1	
			3	SSB.2 FR1	
SMTC con	SMTC configuration		1	SMTC 2	
			2	SMTC 1	
			3	SMTC 1	
DRX cycle length		S	1, 2, 3	1.28	The value shall be used for all cells in the test.
	onfiguration index		1, 2, 3	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
rangeToBe	estCell		1, 2, 3	Not configured	
T1		S	1, 2, 3	15	T1 needs to be defined so that cell reselection reaction time is taken into account.
T2		S	1, 2, 3	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
Т3		S	1, 2, 3	75	T3 needs to be defined so that cell re- selection reaction time is taken into account.

6.1.1.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one of the NR carriers. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure.

- 1. Ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR with Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.1.1.2.5-1. T1 starts.
- 3. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 1.

- 5. If the UE responds on lower priority cell, Cell 1 during time duration T1 within 8 seconds from the beginning of time period T1, then count a success for the event "Re-select lower priority Cell 1". Otherwise count a fail for the event "Re-select lower priority Cell 1".
- 6. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 7. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 12.
- 7. The SS shall switch the power setting from T1 to T2 as specified in Table 6.1.1.2.5-1. During time duration T2, Cell 2 shall be powered OFF and the physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) shall be changed to ensure Cell 2 is not detected by the UE.
- 8. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.1.1.2.5-1.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 2.
- 10. If the UE responds on higher priority cell, Cell 2 during time duration T3 within 68 seconds from the beginning of time period T3, then count a success for the event "Re-select higher priority Cell 2". Otherwise count a fail for the event "Re-select higher priority Cell 2".
- 11. If the UE has re-selected Cell 2 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 2, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5 in Cell 2.
- 13. Repeat step 3-12 until a test verdict has been achieved.
 Each of the events "Re-select lower priority Cell 1" and "Re-select higher priority Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

 If both events pass, the test passes. If one event fails, the test fails.

6.1.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.1.1.2.4.3-1: Common Exception messages

Default Message Co	ntents
Common contents of system information	Table H.2.2-1 with
blocks exceptions	Condition SMTC 2 for
·	configuration 6.1.1.2-1
	Table H.2.2-1 with
	Condition SMTC 1 for
	configuration 6.1.1.2-2 and
	6.1.1.2-3
	Table H.2.2-2 with
	Condition SSB.1 FR1,
	SMTC 2 and Asynchronous
	cells for configuration
	6.1.1.2-1
	Table H.2.2-2 with
	Condition SSB.1 FR1,
	SMTC 1 and synchronous
	cells for configuration
	6.1.1.2-2
	Table H.2.2-2 with
	Condition SSB.2 FR1,
	SMTC 1 and synchronous
	cells for configuration
	6.1.1.2-3
	Table H.2.2-3
Default RRC messages and information	Table H.3.2-1
elements contents exceptions	-

6.1.1.2.5 Test requirement

Tables 6.1.1.2.4.1-2 and 6.1.1.2.5-1 define the primary level settings including test tolerances for inter frequency NR cell re-selection test case.

Table 6.1.1.2.5-1: Cell specific test parameters for NR SA FR1-FR1 cell re-selection

Parameter	Unit	Test		Cell 1			Cell 2		
		configuration	T1	T2	Т3	T1	T2	T3	
TDD configuration		1		N/A			N/A		
		2	TDDConf.1.1		TDDConf.1.1		1		
		3	Т	TDDConf.2.1			TDDConf.2.1		
PDSCH RMC		1	SR.1.1 FDD				N/A		
configuration		2	SR.1.1 TDD						
		3	SR.2.1 TDD						
RMSI CORESET		1		R.1.1 FDD		(CR.1.1 FDI)	
RMC configuration		2		R.1.1 TDD			CR.1.1 TDI		
i iii o oo iii gaa oo ii o		3		CR.2.1 TDD			CR.2.1 TDI		
Dedicated CORESET		1		CR.1.1 FDI			CR.1.1 FD		
RMC configuration		2		CR.1.1 TDI			CR.1.1 TD		
Tivio comiguration		3		CR.2.1 TDI		+	CR.2.1 TD		
OCNG Pattern		1, 2, 3		lefined in A		+	defined in A		
Initial DL BWP		1, 2, 3		DLBWP.0.1		+	DLBWP.0.1		
configuration		1, 2, 3		JLDVVF.U.1			DLDVVF.U.	-	
Initial UL BWP		1, 2, 3	ı	JLBWP.0.1			ULBWP.0.1		
configuration		1, 2, 3	,	JLBVVP.U.I		·	OLDVVF.U.J	_	
RLM-RS		1 2 2		SSB			CCD		
Qrxlevmin	dBm/SCS	1, 2, 3 1, 2		-140		SSB			
Qixieviiiii	ubili/3C3	3		-140 -137		-140			
Desmananation	dD.					-137			
Pcompensation	dB	1, 2, 3		0		0			
Qhyst _s	dB	1, 2, 3	0			0			
Qoffset _{s, n}	dB	1, 2, 3	0			0			
Cell_selection_and_		1, 2, 3	00 0000			00 0000			
reselection_quality_				SS-RSRP		SS-RSRP			
measurement	-ID	1	15.0	15.0	15.0	2.0	:::-	10.0	
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1	15.6	15.6	15.6	-3.6	-infinity	13.6	
		2							
	ID (0.00	3				100	00	00	
$N_{_{oc}}$ Note2	dBm/SCS	1		-98		-100	-98	-98	
		2		-98		-100	-98	-98	
		3		-95		-97	-95	-95	
$N_{_{oc}}$ Note2	dBm/15 kHz	1		-98		-100	-98	-98	
		2							
		3							
\hat{E}_s/N_{oc}	dB	1	15.6	15.6	15.6	-3.6	-infinity	13.6	
3 / 00		2							
		3							
SS-RSRP Note3	dBm/SCS	1	-82.4	-82.4	-82.4	-103.6	-infinity	-84.4	
		2	-82.4	-82.4	-82.4	-103.6	-infinity	-84.4	
		3	-79.39	-79.39	-79.39	-	-infinity	-81.39	
						100.59			
lo	dBm/9.36 MHz	1	-54.33	-54.33	-54.33	-70.46	-infinity	-56.26	
	dBm/9.36 MHz	2	-54.33	-54.33	-54.33	-70.46	-infinity	-56.26	
	dBm/38.16 MHz	3	-48.23	-48.23	-48.23	-67.37	-infinity	-53.17	
Treselection	S	1, 2, 3	0	0	0	0	0	0	
Snonintrasearch	dB	1, 2, 3		50			Not sent		
Thresh _{x, high}	dB	1, 2, 3				48			
Thresh _{serving, low}	dB	1, 2, 3	48 44 44						
Thresh _{x, low}	dB	1, 2, 3	50 50						
Propagation	<u> </u>	1, 2, 3	AWGN						
Condition		1, 2, 0			AVV C	1			
	he used such that hot	h colle are fully alle	vootod and a	oonstant t	otal transm	itted nowe	r cpoetral o	donoity.	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell reselection delay to a higher priority cell is defined as the time from the beginning of time period T3, to the moment when the UE camps again on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to a higher priority cell shall be less than 68 s.

The cell reselection delay to a lower priority cell is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to a lower priority cell shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a higher priority cell can be expressed as: $T_{\text{higher_priority_search}} + T_{\text{evaluate, NR_inter}} + T_{\text{SI-NR}}$, and to a lower priority cell can be expressed as: $T_{\text{evaluate, NR_inter}} + T_{\text{SI-NR}}$,

Where:

 $T_{higher_priority_search}$ See clause 4.2.2.7 of TS 38.133 [6]

T_{evaluate, NR inter} See Table 4.2.2.4-1 in clause 4.2.2.4 of TS 38.133 [6]

T_{SI-NR} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s, allow 68 s for the cell re-selection delay to a higher priority cell and 7.68 s for the cell re-selection delay to a lower priority cell in the test case, which we allow 8 s.

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

6.1.2 NR – E-UTRA cell re-selection

6.1.2.0 Minimum conformance requirements

6.1.2.0.1 Minimum conformance requirements for NR – E-UTRA cell re-selection

The cell re-selection delay to a higher priority cell shall be less than $T_{higher_priority_search} + T_{evaluate, EUTRAN} + T_{SI-E-UTRA}$ in RRC_IDLE state.

The cell re-selection delay to a lower priority E-UTRA cell shall be less than $T_{\text{evaluate, E-UTRAN}} + T_{\text{SI-E-UTRA}}$ in RRC_IDLE state.

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-RAT E-UTRAN layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in clause 4.2.2 of TS 38.133 [6].

If $Srxlev \leq S_{nonIntraSearchP}$ or $Squal \leq S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-RAT E-UTRAN layers of higher, lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT E-UTRAN layers shall be the same as that defined below for lower priority RATs.

The requirements in this section apply for inter-RAT E-UTRAN FDD measurements and E-UTRA TDD measurements. When the measurement rules indicate that inter-RAT E-UTRAN cells are to be measured, the UE shall measure RSRP and RSRQ of detected E-UTRA cells in the neighbour frequency list at the minimum measurement rate specified in this section. The parameter $N_{EUTRA_carrier}$ is the total number of configured E-UTRA carriers in the neighbour frequency list. The UE shall filter RSRP and RSRQ measurements of each measured E-UTRA cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,EUTRAN}/2$.

An inter-RAT E-UTRA cell is considered to be detectable provided the following conditions are fulfilled:

- the same conditions as for inter-frequency RSRP measurements specified in TS 36.133 [15, Annex B.1.2] are fulfilled for a corresponding Band, and
- the same conditions as for inter-frequency RSRQ measurements specified in TS 36.133 [15, Annex B.1.2] are fulfilled for a corresponding Band.
- SCH conditions specified in TS 36.133 [15, Annex B.1.2] are fulfilled for a corresponding Band.

The UE shall be able to evaluate whether a newly detectable inter-RAT E-UTRAN cell meets the reselection criteria defined in TS38.304 [30] within ($N_{EUTRA_carrier}$) * $T_{detect,EUTRAN}$ when $Srxlev \le S_{nonIntraSearchP}$ or $Squal \le S_{nonIntraSearchQ}$ when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities.

Cells which have been detected shall be measured at least every $(N_{EUTRA_carrier}) * T_{measure,EUTRAN}$ when $Srxlev \le S_{nonIntraSearchP}$ or $Squal \le S_{nonIntraSearchP}$.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{measure,EUTRAN}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

If the UE detects on an inter-RAT E-UTRAN carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall not consider an inter-RAT E-UTRA cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified inter-RAT E-UTRA cell has met reselection criterion defined in TS 38.304~[30] within ($N_{EUTRA_carrier}$) * $T_{evaluate,EUTRAN}$ when $T_{reselection} = 0$ as specified in table 4.2.2.5-1 of TS 38.133~[6] provided that the reselection criteria is met by a margin of at least 6dB for RSRP reselections based on absolute priorities or 4dB for RSRQ reselections based on absolute priorities.

If $T_{reselection}$ timer has a non zero value and the inter-RAT E-UTRA cell is satisfied with the reselection criteria which are defined in TS 38.304 [30], the UE shall evaluate this E-UTRA cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

The normative reference for this requirement is TS 38.133 [6] clause 4.2.2.5.

6.1.2.1 NR SA FR1 – E-UTRA cell re-selection to higher priority E-UTRA

6.1.2.1.1 Test purpose

This test is to verify the requirement for the NR to E-UTRAN inter-RAT cell reselection requirements specified in clause 4.2.2.5 of TS 38.133 [6] when the E-UTRAN cell is of higher priority.

6.1.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.1.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.1.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.1.2.1.

6.1.2.1.4 Test description

6.1.2.1.4.1 Initial conditions

The Test shall be tested using any of the test configuration in Table 6.1.2.1.4.1-1.

Table 6.1.2.1.4.1-1: Supported test configurations

Configuration	Description of serving cell	Description of target cell					
6.1.2.1-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	LTE 10MHz bandwidth, TDD duplex mode					
6.1.2.1-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	LTE 10MHz bandwidth, TDD duplex mode					
6.1.2.1-3	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	LTE 10MHz bandwidth, TDD duplex mode					
6.1.2.1-4	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	LTE 10MHz bandwidth, FDD duplex mode					
6.1.2.1-5	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	LTE 10MHz bandwidth, FDD duplex mode					
6.1.2.1-6	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	LTE 10MHz bandwidth, FDD duplex mode					
Note: The UE							

Configure the test equirement and the DUT according to the parameters in Table 6.1.2.1.4.1-2.

Table 6.1.2.1.4.1-2: Initial conditions for NR SA FR1 – E-URTA cell re-selection o higher priority E-UTRA

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.		
Channel bandwidth	As specified	by the test configuration selected fr	from Table 6.1.2.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.6.1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part A.3.2.3.2				
Exceptions to connection diagram	N/A				

- 1. The general test parameter settings are set up according to Table 6.1.2.1.4.1-3.
- 2. Message contents are defined in clause 6.1.2.1.4.3.
- 3. The test scenario comprises of one NR cell and one E-UTRAN cell. Cell 1 is the NR PCell and Cell 2 is the E-UTRA neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2, Cell 2 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 6.1.2.1.4.1-3: General test parameters for NR to higher priority E-UTRAN cell re-selection test case

Parameter		Unit	Test configuration	Value	Comment
Initial condition	Active cell		1, 2, 3, 4, 5, 6	Cell1	The UE camps on cell 1 in the initial phase and during T2 period the UE reselects to cell 2.
T2 end	Active cell		1, 2, 3, 4, 5, 6	Cell2	The UE shall perform reselection to cell 2
condition	Neighbour cells		1, 2, 3, 4, 5, 6	Cell1	during T2.
T3 end	Active cell		1, 2, 3, 4, 5, 6	Cell1	The UE shall perform reselection to cell 1
condition	Neighbour cells		1, 2, 3, 4, 5, 6	Cell2	during T3 for iteration of the tests.

Access Barring Information	-	1, 2, 3, 4, 5, 6	Not Sent	No additional delays in random access procedure.
DRX cycle length	S	1, 2, 3, 4, 5, 6	1.28	The value shall be used for all cells in the test.
NR PRACH configuration index		1, 2, 3, 4, 5, 6	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
E-UTRAN PRACH configuration index		1, 2, 3, 4, 5, 6	4	As specified in table 5.7.1-2 in TS 36.211
T1	S	1, 2, 3, 4, 5, 6	>7	During T1, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2.
T2	S	1, 2, 3, 4, 5, 6	75	T2 needs to be defined so that cell reselection reaction time is taken into account.
ТЗ	S	1, 2, 3, 4, 5, 6	15	T3 needs to be defined so that cell re- selection reaction time is taken into account.

6.1.2.1.4.2 Test procedure

Two cells are deployed in the test, which are one FR1 NR PCell (Cell 1) and an E-UTRA neighbour cell (Cell 2). The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. NR cell 1 is already identified by the UE prior to the start of the test. E-UTRAN cell 2 is of higher priority than cell 1.

Before T1 the UE is camped on to cell 1. During T1, cell 2 shall be powered off. At the start of T2 the UE is expected to detect cell 2, send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Routing Area Update procedure on cell 2. At the start of T3 cell 2 becomes weaker than cell 1, and the UE reselects to Cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure.

- 1. Ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR with Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.1.2.1.5-1 and 6.1.2.1.5-2. T1 starts.
- 3. During T1, Cell 2 shall be powered off and set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.1.2.1.5-1 and 6.1.2.1.5-2.
- 5. The SS waits for random access requests information from the UE to perform cell re-selection to a higher priority cell, Cell 2.
- 6. If the UE responds on Cell 2 during time duration T2 within 68 seconds from the beginning of time period T2, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one
- 7. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 8. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 11.
- 8. The SS shall switch the power setting from T2 to T3 as specified in Table 6.1.2.1.5-1 and 6.1.2.1.5-2.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection to a lower priority cell, Cell 1.
- 10. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 12. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 11.

- 11. Switch off and on the UE and ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5.
- 12. Repeat step 2-11 until a test verdict has been achieved.

6.1.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.1.2.1.4.3-1: Common Exception messages

De	Default Message Contents			
Common contents of system information blocks exceptions	Table H.2.3-1			
	Table H.2.3-2 with Condition SMTC 1 and higher priority for configuration 6.1.2.1-2, 6.1.2.1-3, 6.1.2.1-5 and 6.1.2.1-6 Table H.2.3-2 with Condition SMTC 2 and higher priority for configuration 6.1.2.1-1 and 6.1.2.1-4			
	Table H.2.3-3 with Condition higher priority			
Default RRC messages and information elements contents exceptions	Table H.3.2-1			

6.1.2.1.5 Test requirement

Tables 6.1.2.1.4.1-3, 6.1.2.1.5-1 and 6.1.2.1.5-2 define the primary level settings including test tolerances for higher priority E-UTRA cell re-selection test case.

Table 6.1.2.1.5-1: Cell specific test parameters for NR cell 1

Parameter	Unit	Test configuration	Cell 1 T1 T2		
					Т3
TDD configuration		1, 4	N/A		
		2, 5	Т	TDDConf.1.1	
		3, 6	Т	DDConf.2	.1
PDSCH parameters		1, 4		SR.1.1 FD	D
		2, 5	SR.1.1 TDD		D
		3, 6	Ç	SR.2.1 TD	D
RMSI CORESET		1, 4	(CR.1.1 FD	D
parameters		2, 5	(CR.1.1 TD	D
		3, 6	(CR.2.1 TD	D
Dedicated CORESET		1, 4	С	CR.1.1 F	DD
parameters		2, 5	С	CR.1.1 TE	DD
		3, 6	С	CR.2.1 T	DD
SSB parameters		1, 4		SSB.1 FR	1
		2, 5		SSB.1 FR	
		3, 6	SSB.2 FR1		1
NR SMTC parameters		1, 4	SMTC 2		
		2, 5	SMTC 1		
		3, 6	SMTC 1		
OCNG Pattern		1, 2, 3, 4, 5, 6	OP.1 defined in A.3.2.1		
Initial DL BWP configuration		1, 2, 3, 4, 5, 6		DLBWP.0.	1
Initial UL BWP configuration		1, 2, 3, 4, 5, 6	ı	ULBWP.0.	1
RLM-RS		1, 2, 3, 4, 5, 6		SSB	
Qrxlevmin	dBm/SCS	1, 2, 4, 5		-140	
		3, 6		-137	
N_{oc}	dBm/SCS	1, 4	-98		
06		2, 5	-98		
		3, 6	-95		
N_{oc}	dBm/15 kHz	1, 2, 3, 4, 5, 6	-98		
SS-RSRP	dBm/SCS	1, 4	-84 -82.4 -82		-82.4
		2, 5	-84	-82.4	-82.4
		3, 6	-81 -79.39		-79.39

$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 4	14	15.6	15.6
s / Ot		2, 5			
		3, 6			
\hat{E}_{s}/N_{oc}	dB	1, 4	14	15.6	15.6
_s / - · oc		2, 5			
		3, 6			
lo	dBm/9.36 MHz	1, 4	-55.88	-54.33	-54.33
	dBm/9.36 MHz	2, 5	-55.88	-54.33	-54.33
	dBm/38.16 MHz	3, 6	-49.79	-48.23	-48.23
Treselection	S	1, 2, 3, 4, 5, 6	0		,
Snonintrasearch	dB	1, 2, 3, 4, 5, 6	50		
Thresh _{x, high (Note 2)}	dB	1, 2, 3, 4, 5, 6	48		
Thresh _{serving, low}	dB	1, 2, 3, 4, 5, 6	44		•
Thresh _{x, low}	dB	1, 2, 3, 4, 5, 6	50		
Propagation Condition		1, 2, 3, 4, 5, 6		AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, high} which is included in NR system information, and is a threshold for the E-UTRA target cell

Table 6.1.2.1.5-2: Cell specific test parameters for E-UTRA cell 2

Parameter	Unit	Cell 2			
		T1	T2	T3	
E-UTRA RF Channel		1			
number					
BW _{channel}	MHz		10		
OCNG Patterns defined in			2 TDD for		
TS 36.133 clause A.3.2			uration 1		
			2 FDD for		
		config	guration 4	, 5, 6	
PBCH_RA	dB				
PBCH_RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB	ļ			
PHICH_RA	dB	ļ	0		
PHICH_RB	dB				
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
Qrxlevmin	dBm		-140		
N_{oc}	dBm/15 kHz	-98	-98	-100	
RSRP	dBm/15 KHz	-infinity	-84.4	-103.6	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	-infinity	13.6	-3.6	
\hat{E}_s/N_{oc}	dB	-infinity	13.6	-3.6	
Treselection _{EUTRAN}	S	0			
Snonintrasearch	dB	Not sent			
Thresh _{x, high (Note 2)}	dB	48			
Thresh _{serving, low}	dB	44			
Thresh _{x, low}	dB	50			
Propagation Condition		AWGN			
Note 1: OCNG shall be used such that both cells are fully allocated					

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: This refers to the value of Thresh_{x, high} which is included in E-UTRA system information, and is a threshold for the NR target cell

The cell reselection delay to a higher priority E-UTRAN cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to a higher priority cell shall be less than 68 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a higher priority cell can be expressed as: $T_{higher_priority_search} + T_{evaluate, E-UTRAN} + T_{SI-E-UTRA}$

Where:

 $T_{higher_priority_search}$ See clause 4.2.2.7 of TS 38.133 [6]

T_{evaluate, E-UTRAN} See Table 4.2.2.5-1 in clause 4.2.2.5 of TS 38.133 [6]

 $T_{\text{SI-E-UTRA}}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s, allow 68 s for the cell re-selection delay to a higher priority E-UTRAN cell.

6.1.2.2 NR SA FR1 – E-UTRA cell re-selection to lower priority E-UTRA

6.1.2.2.1 Test purpose

This test is to verify the requirement for the NR to E-UTRAN inter-RAT cell reselection requirements specified in clause 4.2.2.5 of TS 38.133 [6] when the E-UTRAN cell is of lower priority.

6.1.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.1.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.1.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.1.2.2.

6.1.2.2.4 Test description

6.1.2.2.4.1 Initial conditions

The Test shall be tested using any of the test configuration in Table 6.1.2.2.4.1-1.

Table 6.1.2.2.4.1-1: Supported test configurations

Configuration	Description of serving cell	Description of target cell		
6.1.2.2-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD	LTE 10MHz bandwidth, TDD duplex mode		
	duplex mode			
6.1.2.2-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD	LTE 10MHz bandwidth, TDD duplex mode		
	duplex mode			
6.1.2.2-3	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD	LTE 10MHz bandwidth, TDD duplex mode		
	duplex mode			
6.1.2.2-4	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD	LTE 10MHz bandwidth, FDD duplex mode		
	duplex mode			
6.1.2.2-5	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD	LTE 10MHz bandwidth, FDD duplex mode		
	duplex mode			
6.1.2.2-6	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD	LTE 10MHz bandwidth, FDD duplex mode		
	duplex mode			
Note: The UE is only required to be tested in one of the supported test configurations.				

Configure the test equirement and the DUT according to the parameters in Table 6.1.2.2.4.1-2.

Table 6.1.2.2.4.1-2: Initial conditions for NR SA FR1 – E-URTA cell re-selection o lower priority E-UTRA

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	.508-1 [14] clause 4.3.1.	
Channel bandwidth	As specified	d by the test configuration selected from Table 6.1.2.2.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2. 2.	
Connection	TE Part	A.3.1.6.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.2]	
Exceptions to connection diagram	N/A			

- 1. The general test parameter settings are set up according to Table 6.1.2.2.4.1-3.
- 2. Message contents are defined in clause 6.1.2.2.4.3.
- 3. The test scenario comprises of one NR cell and one E-UTRAN cell. Cell 1 is the NR PCell and Cell 2 is the E-UTRA neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2, Cell 2 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 6.1.2.2.4.1-3: General test parameters for NR to lower priority E-UTRAN cell re-selection test case

	Parameter	Unit	Test configuration	Value	Comment
Initial condition	Active cell		1, 2, 3, 4, 5, 6	Cell2	The UE camps on cell 1 in the initial phase.
T1 end	Active cell		1, 2, 3, 4, 5, 6	Cell2	The UE shall perform reselection to cell 2
condition	Neighbour cells		1, 2, 3, 4, 5, 6	Cell1	during T1.
T2 end	Active cell		1, 2, 3, 4, 5, 6	Cell1	The UE shall perform reselection to cell 1
condition	Neighbour cells		1, 2, 3, 4, 5, 6	Cell2	during T2 for iteration of the tests.
Access Ba	rring Information	-	1, 2, 3, 4, 5, 6	Not Sent	No additional delays in random access procedure.
DRX cycle	length	S	1, 2, 3, 4, 5, 6	1.28	The value shall be used for all cells in the test.
NR PRACE	d configuration index		1, 2, 3, 4, 5, 6	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
E-UTRAN index	PRACH configuration		1, 2, 3, 4, 5, 6	4	As specified in table 5.7.1-2 in TS 36.211
T1		S	1, 2, 3, 4, 5, 6	15	T1 needs to be defined so that cell re- selection reaction time is taken into account.
T2		S	1, 2, 3, 4, 5, 6	75	T2 needs to be defined so that cell re- selection reaction time is taken into account.

6.1.2.2.4.2 Test procedure

Two cells are deployed in the test, which are one FR1 NR PCell (Cell 1) and an E-UTRA neighbour cell (Cell 2). The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both NR cell 1 and E-UTRAN cell 2 are already identified by the UE prior to the start of the test. E-UTRAN cell 2 is of lower priority than cell 1.

The cell reselection delay to a lower priority E-UTRAN cell is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

- 1. Ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.1.2.2.5-1 and 6.1.2.2.5-2. T1 starts.
- 3. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 1.
- 4. If the UE has re-selected Cell 2 within T1, after the re-selection or when T1 expires, continue with step 5. Otherwise, if T1 expires and the UE has not yet re-selected Cell 2, skip to step 9.
- 5. The SS shall switch the power setting from T1 to T2 as specified in Table 6.1.2.2.5-1 and 6.1.2.2.5-2.
- 6. The SS waits for random access requests information from the UE to perform cell re-selection on Cell 2.
- 7. If the UE responds on Cell 1 during time duration T2 within 8 seconds from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. If the UE has re-selected Cell 1 within T2, after the re-selection or when T2 expires, skip to step 10. Otherwise, if T2 expires and the UE has not yet re-selected Cell 1, continue with step 9.
- 9. Switch off and on the UE and ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.1.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.1.2.2.4.3-1: Common Exception messages

Default Message Contents				
Common contents of system information blocks exceptions	Table H.2.3-1			
	Table H.2.3-2 with Condition SMTC 1 and lower priority for configuration 6.1.2.2-2, 6.1.2.2-3, 6.1.2.2-5 and 6.1.2.2-6 Table H.2.3-2 with Condition SMTC 2 and lower priority for configuration 6.1.2.2-1 and 6.1.2.2-4			
	Table H.2.3-3 with Condition lower priority			
Default RRC messages and information	Table H.3.2-1			
elements contents exceptions				

6.1.2.2.5 Test requirement

Tables 6.1.2.2.4.1-3, 6.1.2.2.5-1 and 6.1.2.2.5-2 define the primary level settings including test tolerances for higher priority E-UTRA cell re-selection test case.

Table 6.1.2.2.5-1: Cell specific test parameters for NR cell 1

Parameter	Unit	Test configuration	Cell 1	
			T1	T2
TDD configuration		1, 4	N/A	
		2, 5	TDDCo	nf.1.1
		3, 6	TDDConf.2.1	
PDSCH RMC configuration		1, 4	SR.1.1	FDD
		2, 5	SR.1.1	TDD
		3, 6	SR.2.1	TDD
RMSI CORESET RMC		1, 4	CR.1.1	FDD
configuration		2, 5	CR.1.1 TDD	
		3, 6	CR.2.1	TDD
Dedicated CORESET RMC		1, 4	CCR.1.	l FDD
configuration		2, 5	CCR.1.	1 TDD
		3, 6	CCR.2.	1 TDD
SSB configuration		1, 4	SSB.1	FR1
		2, 5	SSB.1	FR1
		3, 6	SSB.2	FR1
SMTC configuration		1, 4	SMTC pa	attern 2
		2, 5	SMTC pa	attern 1
		3, 6	SMTC pa	attern 1
OCNG Pattern		1, 2, 3, 4, 5, 6	OP.1 defined in A.3.2.1	
Initial DL BWP configuration		1, 2, 3, 4, 5, 6	DLBWP.0.1	
Initial UL BWP configuration		1, 2, 3, 4, 5, 6	ULBWP.0.1	
RLM-RS		1, 2, 3, 4, 5, 6	SSB	
Qrxlevmin	dBm/SCS	1, 2, 4, 5	-140	
		3, 6	-137	
N_{oc}	dBm/SCS	1, 4	-100	-98
OC		2, 5	-100	-98
		3, 6	-97	-95
N_{oc}	dBm/15 kHz	1, 2, 3, 4, 5, 6	-100	-98
SS-RSRP	dBm/SCS	1, 4	-103.6	-84.4
		2, 5	-103.6	-84.4
		3, 6	-100.59	-81.39
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 4	-3.6	13.6
s / Ot		2, 5		
		3, 6		
$\hat{E}_{ m s}/N_{oc}$	dB	1, 4	-3.6	13.6
57 00		2, 5		
		3, 6		
lo	dBm/9.36 MHz	1, 4	-70.46	-56.26
	dBm/9.36 MHz	2, 5	-70.46	-56.26
	dBm/38.16 MHz	3, 6	-64.38	-50.16
Treselection	S	1, 2, 3, 4, 5, 6	0	
Snonintrasearch	dB	1, 2, 3, 4, 5, 6	50	
Thresh _{x, high (Note 2)}	dB	1, 2, 3, 4, 5, 6	48	
Thresh _{serving, low}	dB	1, 2, 3, 4, 5, 6	44	
Thresh _{x, low}	dB	1, 2, 3, 4, 5, 6	50	
Propagation Condition		1, 2, 3, 4, 5, 6	AWGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted

power spectral density is achieved for all OFDM symbols.

This refers to the value of Thresh_{x, high} which is included in NR system information, and is a threshold for the E-UTRA target cell Note 2:

Table 6.1.2.2.5-2: Cell specific test parameters for E-UTRA cell 2

Parameter	Parameter Unit Cell 2			
		T1	T2	
			Т3	
E-UTRA RF Channel		1		
number				
BW _{channel}	MHz		10	
OCNG Patterns defined in		_	D for test	
TS 36.133 clause A.3.2			tion 1, 2, 3; D for test	
PBCH RA	dB	Cornigura	tion 4, 5, 6	
PBCH_RB	dB			
PSS_RA	dB			
SSS RA	dB			
PCFICH RB	dB			
PHICH RA	dB			
PHICH RB	dB		0	
PDCCH RA	dB		U	
PDCCH_RA	dB dB			
PDSCH RA	dB			
PDSCH_RB	dB dB			
OCNG RA ^{Note 1}	dB			
OCNG_RA	dB	\dashv		
Qrxlevmin	dBm	_1	_40	
	dBm/15 kHz		98	
N_{oc}				
RSRP	dBm/15 KHz	-82.4	-84	
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	15.6	14	
\hat{E}_s/N_{oc}	dB	15.6	14	
Treselection _{EUTRAN}	S		0	
Snonintrasearch	dB	Not	sent	
Thresh _{x, high (Note 2)}	dB	4	48	
Thresh _{serving, low}	dB	4	14	
Thresh _{x, low}	dB 50		50	
Propagation Condition			/GN	
Note 1: OCNG shall be used such that both cells are fully allocated				
and a constant tota	•	ver spectral d	ensity is	
achieved for all OF				
Note 2: This refers to the va				
UTRA system inform	mation, and is a	threshold for t	he NR target	
cell				

The cell reselection delay to a lower priority E-UTRAN cell is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to a lower priority cell shall be less than 8 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

NOTE: The cell re-selection delay to a lower priority cell can be expressed as: $T_{\text{evaluate, E-UTRAN}} + T_{\text{SI-E-UTRA}}$,

Where:

T_{evaluate, E-UTRAN} See Table 4.2.2.5-1 in clause 4.2.2.5

 $T_{\text{SI-E-UTRA}}$ Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8 s for the cell re-selection delay to a lower priority E-UTRAN cell.

6.2 RRC_INACTIVE state mobility

6.3 RRC CONNECTED state mobility

6.3.1 Handover

6.3.1.0 Minimum conformance requirements

6.3.1.0.1 Minimum conformance requirements for NR – E-UTRAN handover

When the UE receives a RRC message implying handover to E-UTRAN the UE shall be ready to start the transmission of the uplink PRACH channel in E-UTRA within $D_{handover}$ seconds from the end of the last TTI containing the RRC command. $D_{handover}$ is defined as

$$D_{\text{handover}} = T_{\text{RRC_procedure_delay}} + T_{\text{interruption}}$$

Where:

T_{RRC_procedure_delay}: it is the RRC procedure delay, which is 50ms

 $T_{interruption}$: it is the time between end of the last TTI containing the RRC command on the NR PDSCH and the time the UE starts transmission of the PRACH in E-UTRAN, excluding $T_{RRC_procedure_delay}$.

When the inter-RAT handover to E-UTRAN is commanded, the interruption time shall be less than Tinterrupt

$$T_{interrupt} = T_{search} + T_{IU} + 20 \text{ ms}$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{\text{search}} = 0$ ms. If the target cell is unknown and signal quality is sufficient for successful cell detection on the first attempt, then $T_{\text{search}} = 80$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to 30 ms.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is know if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in TS 36.133 [6] clause [9.4.1].

The normative reference for this requirement is TS 38.133 [6] clause 6.1.2.1.

6.3.1.0.2 Minimum conformance requirements for NR FR1 – NR FR1 handover

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

Where:

 D_{handover} equals the maximum RRC procedure delay to be defined in clause12 in TS 38.331 [2] plus the interruption time stated in clause 6.1.1.2.2.

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than T_{interrupt}

$$T_{interrupt} = T_{search} + T_{IU} + 20 + T_{\Delta} ms$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{search} = 0$ ms. If the target cell is an unknown intra-frequency cell and the target cell Es/Iot \geq [-2] dB, then $T_{search} = T_{rs} + 2$ ms. If the target cell is an unknown inter-frequency cell and the target cell Es/Iot \geq [-2] dB, then $T_{search} = [3*T_{rs} + 2]$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{Δ} is time for fine time tracking and acquiring full timing information of the target cell. $T_{\Delta} = T_{rs}$.

- T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].
- T_{rs} is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the handover command, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this section is applied with Trs=[5]ms assuming the SSB transmission periodicity is 5ms. There is no requirement if the SSB transmission periodicity is not 5ms.

NOTE 1: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause [9.2.5] for intra-frequency handover and Clause [9.3.1] for inter-frequency handover.

The normative reference for this requirement is TS 38.133 [6] clause 6.1.1.2.

6.3.1.1 NR SA FR1 handover with known target cell

6.3.1.1.1 Test purpose

To verify the UE's ability to perform NR FR1-NR FR1 intra frequency handover in RRC_CONNECTED state by meeting the delay requirement and interruption length for handover to a known target cell.

6.3.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.3.1.1.

6.3.1.1.4 Test description

6.3.1.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

This test shall be tested using any of the test configurations in Table 6.3.1.1.4.1-1.

Table 6.3.1.1.4.1-1: Intra-frequency handover from FR1 to FR1 test configurations

Config	Description						
1	Source cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode						
	Target cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode						
2	Source cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode						
	Target cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode						
3	Source cell: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode						
	Target cell: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode						
Note: The UE is only r							

Configure the test equipment and the DUT according to the parameters in Table 6.3.1.1.4.1-2

Table 6.3.1.1.4.1-2: Initial conditions for NR SA FR1 handover with known target cell

Parameter		Value	Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As	s specified in Annex E.1.1, Table E.2	2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth		As specified by the test configurat	ion selected from Table 6.3.1.1.4-3
Propagation conditions		AWGN	As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 6.3.1.1.4.3.
- 2. The power levels and settings for NR Cell 1 are set according to Annex C.1.2 and C.1.3. Cell 2 is NR FR1 target Cell, and its power levels and settings are also set according to Annex C.1.2 and C.1.3.
- 3. The test parameters are given in Table 6.3.1.1.4.1-3 below, with A3-Offset modified by Test Tolerance.

Table 6.3.1.1.4.1-3: General test parameters Intra-frequency handover from FR1 to FR1

Pai	Parameter		Value	Comment
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
A3-Offset		dB	-1	Original Value 0dB, post TT Analysis, its -1 dB
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient	Filter coefficient		0	L3 filtering is not used
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
PRACH configuration index			FR1 PRACH configuration 1	As specified in Table 6.3.3.2-3 in TS 38.211 [6]
Time offset between cells			3 µs	Synchronous cells
T1		S	5	
T2		S	≤5	
T3		S	1	

6.3.1.1.4.2 Test procedure

The test scenario comprises of two NR carriers and one cell on each carrier as given in tables 6.3.1.1.4.1-3 and 6.3.1.1.5-1. No gap patterns are configured in the test case. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send measurement report A3. An

RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

- 1. Ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.1.1.5-1. Propagation conditions are set according to Annex C clause C.2.2. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message, configuring measurement object.
- 4. UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.1.15-1.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3.
- 7. SS shall transmit the RRCReconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T2 to T3 as specified in Table 6.3.1.1.5-1. T3 starts.
- 8. The UE shall transmit RRCReconfigurationComplete message.
- 9. If the UE transmits the uplink PRACH channel to Cell 2 less than 220 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 10. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 11. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 12. Repeat steps 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.3.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.1.1.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information blocks					
exceptions					
Default RRC messages and information	Table H.3.1-1				
elements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ and no GAP NEEDED				
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC				
	pattern 1 and Synchronous cells				
	Table H.3.1-4 with A3-offset = -1dB				
	Table H.3.1-5				
	Table H.3.1-7 with Condition INTRA-FREQ				
	Table H.3.2-2 with Condition RBConfig_KeyChange				

6.3.1.1.5 Test requirements

Table 6.3.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.3.1.1.5-1: Cell specific test parameters for NR FR1-FR1 Intra frequency handover test case

Doromotor	Unit	Cell 1			Cell 2		
Parameter		T1	T2	T3	T1	T2	T3

NR RF Cha	annel Number				1			1		
Duplex mod		Config 1				F	DD			
Duplex mod	u e	Config 2,3					DD			
		Config 1					plicable			
TDD configu	uration	Config 2				TDDC				
		Config 3		TDDConf.2.1						
		Config 1				10: N _R	_{B,c} = 52			
BW _{channel}		Config 2	MHz			10: N _R	_{B,c} = 52			
		Config 3				40: N _{RB}	_{,c} = 106			
BWP BW		Config 1	NALI-			10: N _R	_{B,c} = 52			
BWPBW		Config 2	MHz				_{B,c} = 52			
Config 3 DRx Cycle		me			40: N _{RB}	_{.c} = 106 plicable				
DRX Cycle		Config 1	ms			SR.1.2				
PDSCH Re	ference	Config 2	-				1 TDD			
measureme	ent channel	Config 3					1 TDD			
		Config 1				CR.1.1				
CORESET	Reference	Config 2					1 TDD			
Channel		Config 3					1 TDD			
		Config 1					.1 FDD			
TRS configu	uration	Config 2					.1 TDD			
	Config 3						.2 TDD			
OCNG Patt	erns					OCNG p	oattern 1			
SMTC Conf	SMTC Configuration						attern 1			
SSR Confin	SSB Configuration Config 1,2						1 FR1			
	•	Config 3					2 FR1			
PDSCH/PD	<u> </u>		kHz		15 kHz					
subcarrier s			KI IZ	30 kHz						
PUCCH/PU			kHz	15 kHz						
	subcarrier spacing Config 3			30 kHz						
	PRACH configuration			FR1 PRACH configuration 1						
BWP config	BWP configuration Initial DL BWP			DLBWP.0.1 DLBWP.1.1						
	Dedicated DL BWP					DLBV	VP.1.1			
		Initial UL BWP		ULBWP.0.1						
		Dedicated UL			ULBWP.1.1					
		BWP		OLDWF.I.I						
EPRE ratio	of PSS to SS									
	of PBCH DM									
	of PBCH to F									
	of PDCCH D									
EPRE ratio	of PDCCH to	PDCCH DMRS	dB			,	n			
EPRE ratio	of PDSCH D	MRS to SSS	ub		0					
	of PDSCH to									
		MRS to SSS(Note 1)								
	of OCNG to	OCNG DMRS (Note								
1)			15 (5-11)				ı			
$N_{_{oc}}$ Note2			dBm/15kH		-98			-98		
	Confic 1.2		Z							
$N_{_{oc}}$ Note	Config 1,2		<u></u>		-98			-98		
2	Config 3		dBm/SCS		-95			-95		
	Config 1,2		dB	8	-2.53	-3.3	-	1.66	2.36	
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	Jonny 1,2		"-				Infinity	2.00		
s / ot	Config 3		dB	8	-2.41	-2.41	- Infinite	1.36	1.36	
							Infinity			
<u> </u>	Config 1,2		dB	8	8.8	8	- Infinity	11	11	
\hat{E}_s/N_{oc}				_	_	_				
	Config 3		dB	8	8	8	Infinity	10	10	
CCD DD	Config 1,2		dBm/SCS	-90	-89	-90	Infinity	-87	-87	
SSB_RP Config 3			dBm/SCS	-87	-87	-87	Infinity	-84.99	-84.99	
33B_RP					İ		1			
Io ^{Note3}	Config 1,2		dBm/ 9.36MHz dBm/	-61.41	-56.79	-57.06	-61.41	-56.79	-57.06	

Propagation condition		-	AWGN		
Note 1:	OCNG shall be used such that both density is achieved for all OFDM sy		allocated, and a constant total transmitted power spectral		
Note 2:	Interference from other cells and no	noise sources not specified in the test is assumed to be constant over			
	subcarriers and time and shall be m	odelled as AW	/GN of appropriate power for N_{oc} to be fulfilled.		
Note 3:	lo levels have been derived from otl parameters themselves.	her parameters	s for information purposes. They are not settable		

The UE shall start to transmit the PRACH to Cell 2 less than 220 ms from the beginning of time period T3. The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T_{interrupt}, where:

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2].

 $T_{interrupt}$ = 210 ms in the test. $T_{interrupt}$ is defined in clause 6.3.1.0.2.

This gives a total of 220 ms.

6.3.1.2 NR SA FR1 handover with unknown target cell

6.3.1.2.1 Test purpose

To verify the UE's ability to perform NR FR1-NR FR1 intra frequency handover in RRC_CONNECTED state by meeting the delay requirement and interruption length for handover to an unknown target cell.

6.3.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.3.1.2.

6.3.1.2.4 Test description

6.3.1.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

This test shall be tested using any of the test configurations in Table 6.3.1.2.4.1-1.

Table 6.3.1.2.4.1-1: Intra-frequency handover from FR1 to FR1 test configurations

	Config	Description				
1		Source cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode				
		Target cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode				
2		Source cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode				
		Target cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode				
3		Source cell: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode				
		Target cell: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode				
Note:	Note: The UE is only required to be tested in one of the supported test configurations					

Configure the test equipment and the DUT according to the parameters in Table 6.3.1.2.4.1-2

Parameter		Value	Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As	s specified in Annex E.1.1, Table E.:	2-1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth		As specified by the test configurat	cion selected from Table 6.3.1.2.4-3
Propagation conditions		AWGN	As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

Table 6.3.1.2.4.1-2: Initial conditions for NR SA FR1 handover with unknown target cell

- 1. Message contents are defined in clause 6.3.1.2.4.3.
- 2. The power levels and settings for NR Cell 1 are set according to Annex C.1.2 and C.1.3. Cell 2 is NR FR1 target Cell, and its power levels and settings are also set according to Annex C.1.2 and C.1.3.
- 3. The test parameters are given in Table 6.3.1.2.4.1-4 below, with A3-Offset modified by Test Tolerance..

Table 6.3.1.2.4.1-3: General test parameters Intra-frequency handover from FR1 to FR1

Par	ameter	Unit	Value	Comment
Initial conditions	Active cell		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
A3-Offset		dB	-1	Original Value 0dB, post TT
				Analysis, its -1 dB
Hysteresis		dB	0	
Time To Trigger	Time To Trigger		0	
Filter coefficient			0	L3 filtering is not used
Access Barring Inf	formation	-	Not Sent	No additional delays in random
_				access procedure.
PRACH configurat	tion index		FR1 PRACH configuration 1	As specified in table 6.3.3.2-3 in
				TS 38.211 [6]
Time offset between cells			3 μs	Synchronous cells
T1		S	5	
T2		S	≤5	

6.3.1.2.4.2 Test procedure

The test scenario comprises of two NR carriers and one cell on each carrier as given in tables 6.3.1.2.4-3 and 6.3.1.2.5-1. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1and T2 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and start to transmit the PRACH to Cell 2. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

- 1. Ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.1.2.5-1. Propagation conditions are set according to Annex C clause C.2.2. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 6.3.1.2.5-1. T2 starts.
- 5. The UE shall transmit RRCReconfigurationComplete message.

- 6. If the UE transmits the uplink PRACH channel to Cell 2 less than 282 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.3.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.1.2.4.3-1: Common Exception messages

Default Message Contents						
Common contents of system information blocks exceptions						
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 with Condition INTRA-FREQ and no GAP NEEDED Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC pattern 1 and Synchronous cells Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC pattern 2 and Synchronous cells for Config 3 Table H.3.1-4 with A3-offset = -1dB Table H.3.1-5 Table H.3.1-7 with Condition INTRA-FREQ Table H.3.2-2 with Condition RBConfig_KeyChange					

6.3.1.2.5 Test requirements

Table 6.3.1.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.3.1.2.5-1: Cell specific test parameters for NR FR1-FR1 Intra frequency handover test case

Parameter		Unit	Ce	ell 1	Cell 2		
Parame	eter	Unit	T1	T2	T1	T2	
NR RF Channel Number				1	1		
Duplex mode	Config 1			FD	DD		
Duplex mode	Config 2,3			TD	DD		
	Config 1			Not App	olicable		
TDD configuration	Config 2			TDDC	onf.1.1		
	Config 3			TDDC	onf. 2.1		
	Config 1			10: N _{RI}	_{B,c} = 52		
BW _{channel}	Config 2	MHz	10: N _{RB,c} = 52				
	Config 3			40: N _{RB,}	c = 106		
	Config 1		10: N _{RB,c} = 52				
BWP BW	Config 2	MHz	10: N _{RB,c} = 52				
	Config 3		40: $N_{RB,c} = 106$				
DRx Cycle		ms	Not Applicable				
PDSCH Reference	Config 1			SR.1.1	LFDD		
measurement channel	Config 2			SR.1.	1 TDD		
measurement channel	Config 3		SR2.1 TDD				
CORESET Reference	Config 1			CR.1.1	. FDD		
Channel	Config 2			CR.1.	1 TDD		
Chamer	Config 3		CR2.1 TDD				
OCNG Patterns	OCNG Patterns			OCNG pattern 1			
SMTC configuration	Config 1,2			SMTC	.1 FR1		
Sivi 1 C Corniguration	Config 3			SMTC	.2 FR1		

PDSCH/PD	DSCH/PDCCH Config 1,2		kHz	15 kHz				
subcarrier	r spacing Config 3		KIIZ		30 I	kHz		
PUCCH/PU	USCH Config 1,2		kHz		15	kHz		
	subcarrier spacing Config 3		NI IZ			kHz		
PRACH co	nfiguration			FR1 PRACH configuration 1				
		Initial DL BWP		DLBWP.0.1		VP.0.1	0.1	
	Dedicated				DLBWP.1.1			
BWP config	nuration	BWP						
BW comi	garadon	Initial UL BWP			ULBV			
		Dedicated UL			ULBV	VP.1.1		
		BWP						
	of PSS to SS							
	of PBCH DM							
	of PBCH to F							
	EPRE ratio of PDCCH DMRS to SSS							
	EPRE ratio of PDCCH to PDCCH DMRS		dB		()		
	EPRE ratio of PDSCH DMRS to SSS							
	EPRE ratio of PDSCH to PDSCH							
	EPRE ratio of OCNG DMRS to SSS(Note 1)							
	of OCNG to	OCNG DMRS (Note						
1)								
$N_{ m oc}$ Note2			dBm/15kH z	-98		-98		
$N_{_{oc}}$ Note	Config 1,2			-98		-98		
2	Config 3		dBm/SCS	-9)5	-95		
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$			dB	8	-0.64	-Infinity	-0.64	
\hat{E}_s/N_{oc}			dB	8	8	-Infinity	8	
CCD DD	Config 1 2		dBm/SCS	-90	-90	-Infinity	-90	
SSB_RP	Config 3		dBm/SCS	-87	-87	-Infinity	-87	
Io ^{Note3}	Config 1,2		dBm/ 9.36MHz	-61.41	-57.95	-61.41	-57.95	
	Config 3		dBm/ 38.16MHz	-55.31	-51.84	-55.31	-51.84	
Propagatio			-		AW	_		
Note 1:	OCNG shall b	e used such that both	cells are fully a	allocated and a	a constant total	transmitted po	wer spectral	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE shall start to transmit the PRACH to Cell 2 less than 282 ms from the beginning of time period T2. The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + $T_{interrupt}$, where:

RRC procedure delay = 50 ms and is specified in clause 12 in TS 38.331 [2].

 $T_{interrupt}$ = 232 ms in the test. $T_{interrupt}$ is defined in clause 6.3.1.0.2.

This gives a total of 282 ms.

6.3.1.3 NR SA FR1-FR1 handover with unknown target cell

6.3.1.3.1 Test purpose

To verify the UE's ability to perform NR FR1-NR FR1 inter frequency handover in RRC_CONNECTED state by meeting the delay requirement and interruption length for handover to an unknown target cell.

6.3.1.3.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.1.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.3.1.3.

6.3.1.3.4 Test description

6.3.1.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

This test shall be tested using any of the test configurations in Table 6.3.1.3.4-1.

Table 6.3.1.3.4.1-1: Inter-frequency handover from FR1 to FR1 test configurations

	Config	Description
1		Source cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
		Target cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
2		Source cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
		Target cell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
3		Source cell: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
		Target cell: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
Note:	The UE is only re	quired to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 6.3.1.3.4-2

Table 6.3.1.3.4.1-2: Initial conditions for NR SA FR1 handover with unknown target cell

Parameter		Value	Comment			
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As	2-1 and TS 38.508-1 [14] clause 4.3.1.				
Channel bandwidth	As specified by the test configuration selected from Table 6.3.1.3.4-3					
Propagation conditions		AWGN	As specified in Annex C.2.2.			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to connection diagram		N/A				

- 1. Message contents are defined in clause 6.3.1.3.4.3.
- 2. The power levels and settings for NR Cell 1 are set according to Annex C.1.2 and C.1.3. Cell 2 is NR FR1 target Cell, and its power levels and settings are also set according to Annex C.1.2 and C.1.3.
- 3. The test parameters are given in Tables 6.3.1.3.4.1-3 and 6.3.1.3.5-1 below.

Table 6.3.1.3.4.1-3: General test parameters Inter-frequency handover from FR1 to FR1

Parameter		Unit	Value	Comment
Initial conditions	Initial conditions		Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
A3-Offset		dB	-4	
Hysteresis		dB	0	
Time To Trigger		S	0	
Filter coefficient			0	L3 filtering is not used
Access Barring Information		-	Not Sent	No additional delays in random
				access procedure.
T1		S	5	
T2		S	≤5	

6.3.1.3.4.2 Test procedure

The test scenario comprises of two NR carriers and one cell on each carrier as given in tables 6.3.1.3.4-3 and 6.3.1.3.5-1. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1and T2 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and start to transmit the PRACH to Cell 2.

- 1. Ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.1.3.5-1. Propagation conditions are set according to Annex C clause C.2.2. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last TTI containing the RRC reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 6.3.1.3.5-1. T2 starts.
- 5. The UE shall transmit RRCReconfigurationComplete message.
- 6. If the UE transmits the uplink PRACH channel to Cell 2 less than 282 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.3.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.1.3.4.3-1: Common Exception messages

Default Message Contents						
Common contents of system information blocks						
exceptions						
Default RRC messages and information	Table H.3.1-1					
elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ and no GAP NEEDED					
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC					
	pattern 1 and Synchronous cells for Config 1 and 2					
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC					
	pattern 2 and Synchronous cells for Config 3					
	Table H.3.1-4 with A3-offset = -4dB					
	Table H.3.1-5					
	Table H.3.1-7 with Condition INTER-FREQ					
	Table H.3.2-2 with Condition RBConfig_KeyChange					

6.3.1.3.5 Test requirements

Table 6.3.1.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.3.1.3.5-1: Cell specific test parameters for NR FR1-FR1 Intra frequency handover test case

Parameter		I Incid	С	ell 1	С	ell 2
Param	ieter	Unit	T1	T2	T1	T2
NR RF Channel Number				1		2
Duplex mode Config 1 Config 2,3				F	DD .	
		7 [ΤI	OD	
	Config 1			Not Ap	plicable	
TDD configuration	Config 2	7 [TDDC	onf.1.1	
ŭ	Config 3	7 [TDDC	onf.2.1	
	Config 1			10: N _R	_{B,c} = 52	
BW _{channel}	Config 2	MHz			_{B,c} = 52	
	Config 3	7 [40: N _{RB}		
	Config 1				_{B,c} = 52	
BWP BW	Config 2	MHz			_{B,c} = 52	
	Config 3	7 [40: N _{RB}		
DRx Cycle	1	ms			plicable	
	Config 1			SR.1.:		
PDSCH Reference	Config 2	1			1 TDD	
measurement channel	Config 3	†			1 TDD	
	Config 1			CR.1.1 FDD		
CORESET Reference	Config 2	-			1 TDD	
Channel	Config 3	1			1 TDD	
OCNG Patterns			OCNG pattern 1			
Config 1.2					.1 FR1	
SMTC configuration	Config 3	1			.2 FR1	
PDSCH/PDCCH	Config 1,2				kHz	
subcarrier spacing	Config 3	- kHz			kHz	
PUCCH/PUSCH	Config 1,2				kHz	
subcarrier spacing	Config 3	- kHz			kHz	
PRACH configuration	- Coming C			FR1 PRACH		1
110 Corr cornigaration	Initial DL BWP				VP.0.1	<u>-</u>
	Dedicated DL				VP.1.1	
5145	BWP					
BWP	Initial UL BWP			ULBV	VP.0.1	
	Dedicated UL				VP.1.1	
	BWP			-		
EPRE ratio of PSS to S	SS	dB		(0	
EPRE ratio of PBCH DN		7				
EPRE ratio of PBCH to		7				
EPRE ratio of PDCCH I		╡				
EPRE ratio of PDCCH t		╡				
EPRE ratio of PDSCH [╡				
EPRE ratio of PDSCH t		┥				

	o of OCNG DMRS to SSS(Note 1) o of OCNG to OCNG DMRS (Note					
N_{oc} Note2		dBm/15kH z	-6	98	-9	98
$N_{_{oc}}$ Note	Config 1,2		-(98	-g	8
2	Config 3	dBm/SCS	-95		-95	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	4	4	-Infinity	6.7
\hat{E}_{s}/N_{oc}		dB	4	4	-Infinity	6.7
SSB_RP	Config 1,2	dBm/SCS	-94	-94	-Infinity	-91.3
SSB_KP	Config 3	dBm/SCS	-91	-91	-Infinity	-88.3
Io ^{Note3}	Config 1,2	dBm/ 9.36MHz	-64.59	-64.59	-70.05	-62.51
10	Config 3	dBm/ 38.16MHz	-58.49	-58.49	-63.94	-56.40
Propagation	Propagation condition		AW	AWGN AWGN		GN
Note 1:	OCNG shall be used such that both		allocated and	a constant tota	transmitted po	wer spectral

density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves

The UE shall start to transmit the PRACH to Cell 2 less than 282 ms from the beginning of time period T2. The rate of correct handovers observed during repeated tests shall be at least 90%.

The handover delay can be expressed as: RRC procedure delay + T_{interrupt}, where:

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2].

 $T_{interrupt}$ = 272 ms in the test. $T_{interrupt}$ is defined in clause 6.3.1.0.2.

This gives a total of 282 ms.

6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell

6.3.1.4.1 Test purpose

To verify that the UE can make correct inter-RAT E-UTRAN handover when operating in standalone (SA) operation with PCell in FR1.

6.3.1.4.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.1.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.3.1.4.

6.3.1.4.4 Test description

6.3.1.4.4.1 **Initial conditions**

The Test shall be tested using any of the test configuration in Table 6.3.1.4.4.1-1.

Table 6.3.1.4.4.1-1: Supported test configurations

Configuration	Description						
6.3.1.4-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD						
6.3.1.4-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD						
6.3.1.4-3	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD						
6.3.1.4-4	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD						
6.3.1.4-5	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD						
6.3.1.4-6	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD						
Note: The UE	Note: The UE is only required to be tested in one of the supported test configurations.						

Configure the test requirement and the DUT according to the parameters in Table 6.3.1.4.4.1-2.

Table 6.3.1.4.4.1-2: Initial conditions for NR SA FR1 – E-UTRA handover with known target cell

Parameter		Value	Comment				
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified	As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1.					
Channel bandwidth	As specified	by the test configuration selected fr	om Table 6.3.1.4.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.				
Connection	TE Part	A.3.1.6.1	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.2.3.2					
Exceptions to connection diagram	N/A						

- 1. The general test parameter settings are set up according to Table 6.3.1.4.4.1-3.
- 2. Message contents are defined in clause 6.3.1.4.4.3.
- 3. The test comprises of one NR carrier and one E-UTRA carrier. There are two cells and one cell on each carrier. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2, Cell 2 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 6.3.1.4.4.1-3: General test parameters for SA inter-RAT E-UTRAN handover

Para	ameter	Unit	Value	Comment
NR RF Channel Number			1	1 NR carrier frequency is used in
				the test
LTE RF Channel N	lumber		2	1 E-UTRAN carrier frequency is
				used in the test
Initial conditions	Active cell		Cell 1	NR cell
	Neighbouring cell		Cell 2	E-UTRAN cell
Final condition	Active cell		Cell 2	
NR measurement of	quantity		SS-RSRP	
E-UTRAN measure	ement quantity		RSRP	
b2-Threshold1		dBm	As specified in Table	Absolute NR SS-RSRP threshold
			6.3.1.4.5-1	for event B2
b2-Threshold2EUTRAN		dBm	-98	Absolute E-UTRAN RSRP
				threshold for event B2
Hysteresis		dB	0	
TimeToTrigger		S	0	
Filter coefficient			0	L3 filtering is not used
DRX			OFF	Non-DRX test
Access Barring Info	ormation	-	Not sent	No additional delays in random
ű				access procedure
Time offset betwee	n cells		3 ms	Asynchronous cells
Gap pattern configuration Id			0	As specified in TS 38.133 [6], table
				9.1.2-1 started before T2 starts
T1		S	5	
T2		S	≤5	
T3	·	S	1	

6.3.1.4.4.2 Test procedure

The test comprises of one NR carrier and one E-UTRA carrier. There are two cells and one cell on each carrier. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 9.1.2-1 of TS 38.133 [6] is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2 after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain Cell 2 as the target cell.

- 1. Ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.1.4.5-1 and 6.3.1.4.5-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.1.4.5-1 and 6.3.1.4.5-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2.
- 7. SS shall transmit an RRCReconfiguration message implying handover to Cell 2.
- 8. The start of T3 is the instant when the last TTI containing the RRC Connection reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power setting from T2 to T3 as specified in Table 6.3.1.4.5-1 and 6.3.1.4.5-2.
- 9. The UE shall transmit RRCReconfigurationComplete message.

- 10. If the UE transmits the uplink PRACH channel to Cell 2 less than 85 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.3.1.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.1.4.4.3-1: Common Exception messages

Default Message Contents						
Common contents of system information						
blocks exceptions						
Default RRC messages and information elements contents exceptions	Table H.3.1-1					
ciements contents exceptions	Table H.3.1-2 with					
	Condition INTER-RAT and					
	GAP NEEDED					
	Table H.3.1-3 with					
	Condition SSB.1 FR1,					
	SMTC.1 and Asynchronous					
	cells for configuration					
	6.3.1.4-1, 6.3.1.4-2,					
	6.3.1.4-4 and 6.3.1.4-5					
	Table H.3.1-3 with					
	Condition SSB.2 FR1,					
	SMTC.1 and Asynchronous					
	cells for configuration 6.3.1.4-3 and 6.3.1.4-6					
	Table H.3.1-3A					
	Table H.3.1-4A					
	Table H.3.1-5					
	Table H.3.1-6 with					
	Condition Pattern #0					
	Table H.3.1-7 with					
	Condition INTER-RAT					
	Table H.3.3-1					

Table 6.3.1.4.4.3-2: PRACH-Config-DEFAULT: Inter-RAT handover to E-UTRAN known cell

Information Element	Value/remark	Comment	Condition
PRACH-Config-DEFAULT ::= SEQUENCE {			
prach-ConfigInfo SEQUENCE {			
prach-ConfigIndex	4		Config 1, 2, 3
	53		Config 4, 5, 6
}			
}			

6.3.1.4.5 Test requirement

Tables 6.3.1.4.4.1-3, 6.3.1.4.5-1 and 6.3.1.4.5-2 define the primary level settings including test tolerances for intra frequency NR cell re-selection test case.

Table 6.3.1.4.5-1: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 1)

Parameter		Unit	Configuratio n		Cell 1	
				T1	T2	Т3
RF channel number			1, 2, 3, 4, 5, 6		1	
Duplex mode			1, 4		FDD	
			2, 3, 5, 6		TDD	
TDD Configuration			2, 5		TDDConf.1.1	
			3, 6		TDDConf.2.1	
BW _{channel}		MHz	1, 4		$N_{RB,c} = 52 \text{ (FD)}$	
			2, 5		$N_{RB,c} = 52 (TD)$	
22221			3, 6	40	: N _{RB,c} = 106 (TI)D)
PDSCH reference	measurement		1, 4		SR.1.1 FDD	
channel			2, 5		SR.1.1 TDD	
CORSET reference	- channal		3, 6		SR.2.1 TDD CR.1.1 FDD	
CORSETTELETERICE	e channel		1, 4 2, 5			
			3, 6		CR.1.1 TDD CR.2.1 TDD	
OCNG pattern ^{Note1}			\		OP.1	
BWP	Initial DL BWP	1	1, 2, 3, 4, 5, 6 1, 2, 3, 4, 5, 6		DL BWP.0.1	
JVVF	Dedicated DL	†	1, 2, 3, 4, 5, 6		DL BWP.0.1	
	BWP				DL DVVI .I.I	
	Initial UL BWP	†			UL BWP.0.1	
	Dedicated UL	†			UL BWP.1.1	
	BWP					
SMTC configuratio	n		1, 2, 3, 4, 5, 6		SMTC.1	
SSB configuration			1, 2, 4, 5		SSB.1 FR1	
•			3, 6		SSB.2 FR1	
o2-Threshold1		dBm	1, 2, 4, 5		-96	
		иын	3, 6		-93	
EPRE ratio of PSS			1, 2, 3, 4, 5, 6			
EPRE ratio of PBC						
EPRE ratio of PBC	H to					
PBCH_DMRS		_				
EPRE ratio of PDC	CH_DMRS to					
SSS EPRE ratio of PDC	CII to	-				
PDCCH DMRS	CH IU	dB			0	
EPRE ratio of PDS	CH DMPS to	чь			U	
SSS	CI_DINKS to					
EPRE ratio of PDS	CH to	†				
PDSCH_DMRS						
EPRE ratio of OCN	IG DMRS to SSS	1				
EPRE ratio of OCN	IG to OCNG	1				
OMRS						
V _{oc} Note2		dBm/15 KHz	1, 2, 3, 4, 5, 6		-100	
V _{oc} Note2		dBm/SCS	1, 2, 4, 5		-100	
			3, 6		-97	
Ê _s /N _{oc}		dB	1, 2, 3, 4, 5, 6	13.55	-5.55	-5.55
Ê _s /I _{ot} Note3		dB	1, 2, 3, 4, 5, 6	13.55	-5.55	-5.55
SS-RSRP ^{Note3}		dBm/SCS	1, 2, 4, 5	-86.45	-105.55	-105.55
		ID (0.55	3, 6	-83.44	-102.54	-102.54
		dBm/9.36	1, 2, 4, 5	-58.31	-70.98	-70.98
O ^{Note3}		MHz	2.0	E2 21	64.00	64.00
		dBm/38.16	3, 6	-52.21	-64.88	-64.88
Propagation condit	ion	MHz	1 2 2 4 5 6		AVACNI	
Propagation condit Antenna Configura			1, 2, 3, 4, 5, 6		AWGN 1x2 Low	
Antenna Configura Correlation Matrix	uon and		1, 2, 3, 4, 5, 6		TYC FOM	
	shall he used such t		<u> </u> 			

OCNG shall be used such that both cells are fully allocated and a constant total transmitted power Note 1: spectral density is achieved for all OFDM symbols.

Interference from other cells and noise sources not specified in the test is assumed to be constant over Note 2:

subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. \hat{E}_s/I_{ot} , SS-RSRP, and Io levels have been derived from other parameters for information purposes. They Note 3: are not settable parameters themselves.

Table 6.3.1.4.5-2: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 2)

Parameter	Unit	Configuratio	Cell 2			
		n	T1	T2	Т3	
RF channel number		1, 2, 3, 4, 5, 6		2		
Duplex mode		1, 2, 3		FDD		
-		4, 5, 6		TDD		
TDD special subframe configuration ^{Note1}		4, 5, 6		6		
TDD uplink-downlink configuration Note1		4, 5, 6		1		
BW _{channel}	MHz	1, 2, 3, 4, 5, 6		5MHz: N _{RB,c} = 25 10MHz: N _{RB,c} = 50 20MHz: N _{RB,c} = 10)	
PRACH ConfigurationNote2		1, 2, 3		4		
_		4, 5, 6		53		
PDSCH parameters: DL Reference Measurement Channel ^{Note3}		1, 2, 3		5MHz: R.7 FDD 10MHz: R.3 FDD 20MHz: R.6 FDD		
		4, 5, 6		5MHz: R.4 TDD 10MHz: R.0 TDD 20MHz: R.3 TDD		
PCFICH/PDCCH/PHICH parameters: DL Reference Measurement		1, 2, 3		5MHz: R.11 FDD 10MHz: R.6 FDD 20MHz: R.10 FDD	1	
Channel ^{Note3}		4, 5, 6		5MHz: R.11 TDD 10MHz: R.6 TDD		
OCNG Patterns ^{Note3}		1, 2, 3	20MHz: R.10 TDD 5MHz: OP.20 FDD 10MHz: OP.10 FDD 20MHz: OP.17 FDD		D D	
		4, 5, 6	:	5MHz: OP.9 TDD 10MHz: OP.1 TDD 20MHz: OP.7 TDD)	
PBCH RA		1, 2, 3, 4, 5, 6	•	20111112. 01.17 101		
PBCH RB		_, _, _, ,, _,				
PSS RA						
SSS RA						
PCFICH_RB						
PHICH RA						
PHICH RB	dB			0		
PDCCH RA						
PDCCH RB						
PDSCH_RA						
PDSCH RB						
OCNG_RA ^{Note4}						
OCNG RB ^{Note4}						
N _{oc} ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6		-98		
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	9.55	9.55	
Ê _s /I _{ot} Note6	dB	1, 2, 3, 4, 5, 6	-Infinity	9.55	9.55	
RSRP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-88.45	-88.45	
SCH RP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-88.45	-88.45	
IO ^{Note6}	dBm/Ch BW	1, 2, 3, 4, 5, 6	-67.21 +10log (N _{RB,C} /100)	-57.20 +10log (N _{RB,c} /100)	-57.20 +10log (N _{RB,c} /100)	
Propagation Condition		1, 2, 3, 4, 5, 6	(AWGN	(
Antenna Configuration and Correlation Matrix Note7		1, 2, 3, 4, 5, 6				

Note 1:	Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211.	١
Note 2:	PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211.	١
Note 3:	DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 respectively.	١
Note 4:	OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral	١
	density is achieved for all OFDM symbols.	١
Note 5:	Interference from other cells and noise sources not specified in the test is assumed to be constant over	١
	subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\circ\circ}$ to be fulfilled.	١
Note 6:	\hat{E}_s/I_{ot} , RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes.	١
	They are not settable parameters themselves.	١
Note 7:	Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27].	١

The UE shall start to transmit the PRACH to Cell 2 less than 85 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T_{interrupt}, where:

RRC procedure delay = 50 ms and is specified in section 6.1.2.1 of TS 38.133 [6].

 $T_{interrupt} = 35$ ms in the test; $T_{interrupt}$ is defined in section 6.1.2.1 of TS 38.133 [6].

This gives a total of 85 ms.

6.3.1.5 NR SA FR1 – E-UTRA handover with unknown target cell

6.3.1.5.1 Test purpose

To verify that the UE can make correct inter-RAT E-UTRAN handover when operating in standalone (SA) operation with PCell in FR1. This test shall verify the NR to E-UTRAN handover requirements for the case when the target E-UTRAN cell is unknown as specified in section 6.1.2.1 of TS 38.133 [6].

6.3.1.5.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.1.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.1.0. 1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.3.1.2.

6.3.1.5.4 Test description

6.3.1.5.4.1 Initial conditions

The Test shall be tested using any of the test configuration in Table 6.3.1.5.4.1-1.

Table 6.3.1.5.4.1-1: Supported test configurations for SA inter-RAT E-UTRAN handover tests

Configuration	Description			
6.3.1.5-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD			
6.3.1.5-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD			
6.3.1.5-3	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD			
6.3.1.5-4	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD			
6.3.1.5-5	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD			
6.3.1.5-6	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD			
Note: The UE is only required to be tested in one of the supported test configurations.				

Configure the test requirement and the DUT according to the parameters in Table 6.3.1.5.4.1-2.

diagram

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	.508-1 [14] clause 4.3.1.	
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 6.3.1.5.4.1-1.	
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.6.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.2	1	
Exceptions to connection	N/A			

Table 6.3.1.5.4.1-2: Initial conditions for NR SA FR1 – E-UTRA handover with unknown target cell

- 1. The general test parameter settings are set up according to Table 6.3.1.5.4.1-3.
- 2. Message contents are defined in clause 6.3.1.5.4.3.
- 3. The test comprises of one NR carrier and one E-UTRA carrier. There are two cells and one cell on each carrier. Cell 1 is the NR PCell and Cell 2 is the E-UTRAN neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2. Cell 2 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 6.3.1.5.4.1-3: General test parameters for SA inter-RAT E-UTRAN handover

Parameter		Unit	Value	Comment
NR RF Channel Number			1	1 NR carrier frequency is used in the test
LTE RF Channel Number			2	1 E-UTRAN carrier frequency is used in the test
Initial conditions	Active cell		Cell 1	NR cell
	Neighbouring cell		Cell 2	E-UTRAN cell
Final condition	Active cell		Cell 2	
NR measurement	quantity		SS-RSRP	
E-UTRAN measur	ement quantity		RSRP	
DRX			OFF	Non-DRX test
Access Barring Information		-	Not sent	No additional delays in random access procedure
Time offset between cells			3 ms	Asynchronous cells
T1		S	≤5	
T2		S	1	

6.3.1.5.4.2 Test procedure

The test comprises of one NR carrier and one E-UTRA carrier. There are two cells and one cell on each carrier. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable. No Gap pattern shall be configured.

An RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last subframe containing the RRC message implying handover is sent to the UE. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and start to transmit the PRACH to Cell 2.

- 1. Ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.1.5.5-1 and 6.3.1.5.5-2. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message implying handover to Cell 2.
- 4. The start of T2 is the instant when the last subframe containing the RRC reconfiguration message implying handover is sent to the UE, at that instant the SS shall switch the power settings from T1 to T2 as specified in Table 6.3.1.5.5-1 and 6.3.1.5.5-2. T2 starts.

- 5. The UE shall transmit RRCReconfigurationComplete message.
- 6. If the UE transmits the uplink PRACH channel to Cell 2 less than 165 ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.3.1.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.1.5.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	Table H.3.3-1				
elements contents exceptions					

Table 6.3.1.5.4.3-2: PRACH-Config-DEFAULT: Inter-RAT handover to E-UTRAN known cell

Derivation Path: TS 36.508 [25], Table 4.6.3-7			
Information Element	Value/remark	Comment	Condition
PRACH-Config-DEFAULT ::= SEQUENCE {			
prach-ConfigInfo SEQUENCE {			
prach-ConfigIndex	4		Config 1, 2, 3
	53		Config 4, 5, 6
}			
}			

6.3.1.5.5 Test requirement

Tables 6.3.1.5.4.1-3, 6.3.1.5.5-1 and 6.3.1.5.5-2 define the primary level settings including test tolerances for inter-RAT E-UTRAN handover: unknown target cell test.

Table 6.3.1.5.5-1: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 1)

Parameter		Unit	Configuratio	Cel	
			n	T1	T2
RF channel number			1, 2, 3, 4, 5, 6	1	
Duplex mode			1, 4	FD	D
Į.			2, 3, 5, 6	TD	_
TDD Configuration			2, 5	TDDCc	onf.1.1
			3, 6	TDDCo	nf. 2.1
BW _{channel}		MHz	1, 4	10: N _{RB,c} =	
			2, 5	10: N _{RB,c} =	
			3, 6	40: N _{RB,c} = 1	
PDSCH reference me	easurement		1, 4	SR.1.1	
channel			2, 5	SR.1.1	
			3, 6	SR.2.1	
CORSET reference of	hannel		1, 4	CR.1.1	
CONSET TOTOTOTOCO	i di li loi		2, 5	CR.1.1	
OCNC pottor=Note1			3, 6	CR.2.1	
OCNG pattern ^{Note1}	itial DL DVVD		1, 2, 3, 4, 5, 6	OF	
	itial DL BWP	-	1, 2, 3, 4, 5, 6	DLBW	
	edicated DL			DLBW	P.1.1
	WP	_			
	itial UL BWP	_		ULBW	
	edicated UL			ULBW	P.1.1
	ΝP				
SMTC configuration			1, 2, 3, 4, 5, 6	SMT	
SSB configuration			1, 2, 4, 5	SSB.1	FR1
			3, 6	SSB.2	PFR1
b2-Threshold1		dD.mo	1, 2, 4, 5	-9	0
		dBm	3, 6	-8	7
EPRE ratio of PSS to	SSS		1, 2, 3, 4, 5, 6		
EPRE ratio of PBCH		-	, , , , , , , ,		
EPRE ratio of PBCH		1			
PBCH DMRS	10				
EPRE ratio of PDCC	H DMPS to	-			
SSS	II_DIVIING to				
EPRE ratio of PDCC	LI to	-			
PDCCH DMRS	ח נט	dB		0	1
EPRE ratio of PDSCI	I DMDC to	ub		0	
SSS	ח_חואועס וח				
SSS EPRE ratio of PDSC	Llto	-			
	⊓ เ∪				
PDSCH_DMRS	DMDC t- CCC	-			
EPRE ratio of OCNG		-			
EPRE ratio of OCNG	10 OCNG				
DMRS N. Note?		JD /4 = 1/11	400155	_	•
V _{oc} Note2		dBm/15 KHz	1, 2, 3, 4, 5, 6	-9	
N _{oc} Note2		dBm/SCS	1, 2, 4, 5	-9	
			3, 6	-9	
Ê _s /N _{oc}		dB	1, 2, 3, 4, 5, 6	0	0
Ê _s /I _{ot} Note3		dB	1, 2, 3, 4, 5, 6	0	0
SS-RSRP ^{Note3}		dBm/SCS	1, 2, 4, 5	-98	-98
]	3, 6	-95	-95
		dBm/9.36	1, 2, 4, 5	-67.04	-67.04
Note2		MHz	, , , , ,		
Io ^{Note3}		dBm/38.16	3, 6	-60.94	-60.94
		MHz	5, 5		33.01
Propagation condition		1711 12	1, 2, 3, 4, 5, 6	AW	GN
Antenna Configuration			1, 2, 3, 4, 5, 6	1x2 l	
Correlation Matrix	ni aliu		1, 2, 3, 4, 5, 6	1XZ I	LUVV
		<u> </u>	[l a constant total trans	*** 1

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: \hat{E}_s/I_{ot} , SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Table 6.3.1.5.5-2: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 2)

Parameter	Unit	Configuratio n	Ce	
			T1	T2
RF channel number		1, 2, 3, 4, 5, 6	2	
Duplex mode		1, 2, 3	FD	
TDD		4, 5, 6	TC	
TDD special subframe configuration ^{Note1}		4, 5, 6	6	
TDD uplink-downlink		4, 5, 6]	L
configuration ^{Note1}				
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5MHz: N	
			10MHz: N	
			20MHz: N	•
PRACH ConfigurationNote2		1, 2, 3		
		4, 5, 6	5	
PDSCH parameters:		1, 2, 3	5MHz: F	
DL Reference Measurement			10MHz:	
Channel ^{Note3}			20MHz:	
		4, 5, 6	5MHz: F	
			10MHz:	
		1 0 0	20MHz:	
PCFICH/PDCCH/PHICH		1, 2, 3	5MHz: R	
parameters:			10MHz:	-
DL Reference Measurement Channel ^{Note3}		4.5.0	20MHz: F	
Channel		4, 5, 6	5MHz: R	
			10MHz:	
OCNG Patterns ^{Note3}		1 0 0	20MHz: F	
OCNG Pallems		1, 2, 3	5MHz: OI 10MHz: O	
			20MHz: O	
		4, 5, 6	5MHz: O	
		4, 5, 0	10MHz: 0	
			20MHz: C	
PBCH RA		1, 2, 3, 4, 5, 6	2011112.	J1.1 100
PBCH RB		1, 2, 0, 1, 0, 0		
PSS RA				
SSS RA				
PCFICH RB				
PHICH RA				
PHICH RB	dB)
PDCCH RA			`	,
PDCCH RB				
PDSCH_RA				
PDSCH RB				
OCNG RA ^{Note4}				
OCNG RB ^{Note4}				
N _{oc} Note5	dBm/15kHz	1, 2, 3, 4, 5, 6	-9	18
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	7
Ê _s /I _{ot} ^{Note6}	dB	1, 2, 3, 4, 5, 6	-Infinity	7
RSRP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-91
SCH RP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-91
Io ^{Note6}	dBm/9MHz	1, 2, 3, 4, 5, 6	-70.22	-62.43
Propagation Condition	GDITI/SIVILIZ	1, 2, 3, 4, 5, 6	-70.22 AW	
Antenna Configuration and		1, 2, 3, 4, 5, 6	1x2	
Correlation Matrix Note7			1,72	LOVV
	unlink downlink or	nfigurations are s	pecified in table 4.2-1 in T	C 26 211

Note 2: PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211.

Note 3: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 respectively.

Note 4: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 5: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N₀c to be fulfilled.

Note 6: Ê_s/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes.

They are not settable parameters themselves.

Note 7: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27].

The UE shall start to transmit the PRACH to Cell 2 less than 165 ms from the beginning of time period T2.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T_{interrupt}, where:

RRC procedure delay = 50 ms and is specified in section 6.1.2.1 of TS 38.133 [6].

 $T_{interrupt}$ = 115 ms in the test; $T_{interrupt}$ is defined in section 6.1.2.1 of TS 38.133 [6].

This gives a total of 165 ms.

6.3.2 RRC connection mobility control

6.3.2.1 RRC re-establishment

6.3.2.1.0 Minimum conformance requirements

6.3.2.1.0.1 Minimum conformance requirements for FR1 RRC re-establishment

In RRC connected mode the UE shall be capable of sending RRCReestablishmentRequest message within $T_{re-establish_delay}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re-establish_delay}$) shall be less than:

$$T_{re-establish_delay} = T_{UE_re-establish_delay} + T_{UL_grant}$$

 T_{UL_grant} : It is the time required to acquire and process uplink grant from the target PCell. The uplink grant is required to transmit *RRCReestablishmentRequest* message.

The UE re-establishment delay ($T_{UE_re-establish_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in clause 5.3.7 in TS 38.331 [2] is detected by the UE and when the UE sends PRACH to the target PCell. The UE re-establishment delay ($T_{UE_re-establish_delay}$) requirement shall be less than:

$$T_{\textit{UE_re-establish_delay}} = 50 + T_{\textit{identify_intra_NR}} + \sum\nolimits_{i=1}^{\textit{Nfreq-1}} T_{\textit{identify_inter_NR},i} + T_{\textit{SI-NR}} + T_{\textit{PRACH}}$$

The intra-frequency target NR cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Section 10.1.2 and 10.1.3 are fulfilled for a corresponding NR Band for FR1 and FR2, respectively,
- SSB_RP and SSB £s/Iot according to Annex B.2.2 for a corresponding NR Band.

The inter-frequency target NR cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Section 10.1.4 and 10.1.5 are fulfilled for a corresponding NR Band for FR1 and FR2, respectively,
- SSB_RP and SSB Ês/Iot according to Annex B.2.2 for a corresponding NR Band.

 $T_{identify_intra_NR}$: It is the time to identify the target intra-frequency NR cell and it depends on whether the target NR cell is known cell or unknown cell and on the frequency range (FR) of the target NR cell. If the UE is not configured with intra-frequency NR carrier for RRC re-establishment then $T_{identify_intra_NR}$ =0; otherwise $T_{identify_intra_NR}$ shall not exceed the values defined in table 6.3.2.1.0.1-1.

 $T_{identify_inter_NR,i}$: It is the time to identify the target inter-frequency NR cell on inter-frequency carrier i configured for RRC re-establishment and it depends on whether the target NR cell is known cell or unknown cell and on the frequency range (FR) of the target NR cell. $T_{identify_inter_NR,i}$ shall not exceed the values defined in table 6.3.2.1.0.1-2.

 T_{SMTC} : It is the periodicity of the SMTC occasion configured for the intra-frequency carrier. If the UE has been provided with higher layer in TS 38.331 [2] signaling of *smtc2*, T_{smtc} follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.

 $T_{SMTC,i}$: It is the periodicity of the SMTC occasion configured for the inter-frequency carrier *i*.

 T_{SI-NR} = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 38.331 [2] for the target NR cell.

 T_{PRACH} = It is the delay caused due to the random access procedure when sending random access to the target NR cell. The delay depends on the PRACH configuration defined in Table 6.3.3.2-2 [6] or Table 6.3.3.2-3 [6] for FR1 and in Table 6.3.3.2-4 [6] for FR2.

 N_{freq} : It is the total number of NR frequencies to be monitored for RRC re-establishment; $N_{\text{freq}} = 1$ if the target intra-frequency NR cell is known, else $N_{\text{freq}} = 2$ and $T_{\text{identify_intra_NR}} = 0$ if the target inter-frequency NR cell is known.

There is no requirement if the target cell does not contain the UE context.

In the requirement defined in the below tables, the target FR1 cell is known if it has been meeting the relevant cell identification requirement during the last [5] seconds otherwise it is unknown.

Table 6.3.2.1.0.1-1: Time to identify target NR cell for RRC connection re-establishment to NR intrafrequency cell

Serving cell	Frequency range	Tidentify_intra_NR [ms]				
SSB Ês/lot (dB)	(FR) of target NR	Known NR cell	Unknown NR cell			
≥ [-8]	cell FR1	MAX (200 ms, [5] x T _{SMTC})	MAX (800 ms, [10] x T _{SMTC})			
≥ [-8]	FR2	N/A	MAX (1000 ms, [80] x T _{SMTC})			
< [-8]	FR1	N/A	800 ^{Note1}			
< [-8]	FR2	N/A	3520 ^{Note1}			
Note 1: The UE is not required to successfully identify a cell on any NR frequency layer when T _{SMTC} > 20 ms and						
serving cell SSB Ês/lot < [-8] dB.						

Table 6.3.2.1.0.1-2: Time to identify target NR cell for RRC connection re-establishment to NR interfrequency cell

Serving cell SSB	Frequency range	T _{identify_inter_NR, i} [ms]				
Ês/lot (dB)	(FR) of target NR	Known NR cell	Unknown NR cell			
	cell					
≥ [-8]	FR1	MAX (200 ms, [6] x T _{SMTC, i})	MAX (800 ms, [13] x T _{SMTC, i})			
≥ [-8]	FR2	N/A	MAX (1000 ms, [104] x T _{SMTC, i}))			
< [-8]	FR1	N/A	800 ^{Note1}			
< [-8]	FR2	N/A	4000 ^{Note1}			
Note 1: The UE is not required to successfully identify a cell on any NR frequency layer when T _{SMTC,i} > 20 ms and						
	ell SSB Ês/lot < [-8] d					

The normative reference for this requirement is TS 38.133 [6] clauses 6.2.1.2.1.

6.3.2.1.1 NR SA FR1 RRC re-establishment

Editor's Note: This test case is incomplete. The following aspects are either missing or TBD:

- The core requirements in TS 38.133 are between [.] or TBD.

6.3.2.1.1.1 Test purpose

The purpose is to verify that the NR intra-frequency RRC re-establishment delay in FR1 with known target cell is within the specified limits.

6.3.2.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.2.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.2.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.3.2.1.1.

6.3.2.1.1.4 Test description

6.3.2.1.1.4.1 Initial conditions

The Test shall be tested using any of the test configuration in Table 6.3.2.1.1.4.1-1

Table 6.3.2.1.1.4.1-1: Supported test configurations

Configuration	Description
6.3.2.1.1-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
6.3.2.1.1-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode
6.3.2.1.1-3	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode
Note: The UE is only red	quired to be tested in one of the supported test configurations.

Configure the test equirement and the DUT according to the parameters in Table 6.3.2.1.1.4.1-2

Table 6.3.2.1.1.4.1-2: Initial conditions for NR Intra-frequency RRC Re-establishment in FR1

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.			
Channel	As specified	by the test configuration selected fr	om Table 6.3.2.1.1.4.1-1.			
bandwidth						
Propagation	AWGN		As specified in Annex C.2.2.			
conditions						
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to	N/A					
connection						
diagram						

- 1. The general test parameter settings are set up according to Table 6.3.2.1.1.4.1-3.
- 2. Message contents are defined in clause 6.3.2.1.1.4.3.

There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.3.2.1.1.4.1-3: General test parameters for NR intra-frequency RRC Re-establishment test case in FR1

Parameter		Unit	Test	Value	Comment
			configuration		
Initial	Active cell		1, 2, 3	Cell1	
condition	Neighbour cells		1, 2, 3	Cell2	
Final condition	Active cell		1, 2, 3	Cell2	
RF Channe	el Number		1, 2, 3	1	
	t between cells		1	3 ms	Asynchronous cells
			2	3 μs	Synchronous cells
			3	3 μs	Synchronous cells
N310		-	1, 2, 3	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1, 2, 3	1	Minimum consecutive in-sync indications from lower layers
T310		ms	1, 2, 3	0	Radio link failure timer; T310 is disabled
T311	T311		1, 2, 3	3000	RRC re-establishment timer
Access Ba	rring Information	-	1, 2, 3	Not Sent	No additional delays in random access procedure.
SSB config	uration		1	SSB.1 FR1	•
	•		2	SSB.1 FR1	
			3	SSB.2 FR1	
SMTC con	figuration		1	SMTC	
				pattern 2	
			2	SMTC	
				pattern 1	
			3	SMTC	
				pattern 1	
DRX cycle		S	1, 2, 3 1, 2, 3	OFF	
PRACH co	nfiguration index		1, 2, 3	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
T1		S	1, 2, 3	5	
T2		ms	1, 2, 3	200	Time for the UE to detect RLF
T3		S	1, 2, 3	2	

6.3.2.1.1.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.3.2.1.1.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.2.1.1.5-1. T2 starts
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.3.2.1.1.5-1. T3 starts
- 7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2 within [1.6] s from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.

- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.2.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.2.1.1.4.3-1: Common Exception messages intra-frequency RRC re-establishment

Default Message Contents						
Common contents of system information blocks						
exceptions						
Default RRC messages and information elements contents exceptions	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 6.3.2.1.1-1 Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and synchronous cells for configuration 6.3.2.1.1-2 Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and synchronous cells for configuration 6.3.2.1.1-3					
	Table H.3.2-1					

Table 6.3.2.1.1.4.3-2: UE-TimersAndConstants for intra-frequency RRC re-establishment

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200			
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
t311	ms3000		
}			

Table 6.3.2.1.1.4.3-3: MeasConfig for intra-frequency RRC re-establishment

Derivation Path: TS 38.508-1 [14], Table 4.6.3-69			
Information Element	Value/remark	Comment	Condition
MeasConfig::= SEQUENCE {			
reportConfigToAddModList	Not present		
measIdToAddModList	Not present		
quantityConfig	Not present		
}			

6.3.2.1.1.5Test requirement

Table 6.3.2.1.1.5-1 defines the primary level settings including test tolerances for NR Intra-frequency RRC Reestablishment in FR1 test case.

Table 6.3.2.1.1.5-1: Cell specific test parameters for NR intra-frequency RRC Re-establishment test case in FR1

Parameter	Unit	Test		Cell 1			Cell 2		
1		configuration	T1	T2	Т3	T1	T2	T3	
TDD configuration		1		N/A			N/A		
G		2	•	TDDConf.1.1			TDDConf.1.1		
		3		TDDConf.2.1			TDDConf.2.1		
PDSCH RMC		1		SR.1.1 FDD			N/A		
configuration		2		SR.1.1 TDD					
		3		SR.2.1 TDD					
RMSI CORESET		1		CR.1.1 FDD		(CR.1.1 FD	<u> </u>	
RMC configuration		2		CR.1.1 TDD			CR.1.1 TD		
i iii e e e iii gai e iii e ii		3		CR.2.1 TDD			CR.2.1 TD		
Dedicated CORESET		1		CCR.1.1 FD			CR.1.1 FD		
RMC configuration		2		CCR.1.1 TD			CR.1.1 TD		
Tivio comigaration		3		CCR.2.1 TD			CR.2.1 TD		
OCNG Pattern		1, 2, 3		defined in A			defined in A		
TRS configuration		1, 2, 3		TRS.1.1 FDI		OF.1	N/A	1.0.2.1	
The configuration		2		TRS.1.1 TDI		-	IN/A		
		3		TRS.1.1 TDI					
Initial DL BWP		1, 2, 3					DI DWD O	1	
		1, 2, 3	DLBWP.0.1 DLBW			DLBWP.0.	L		
configuration Initial UL BWP		1, 2, 3	LIII DILI DO A			LIL DW/D 0 4			
		1, 2, 3		ULBWP.0.1		ULBWP.0.1			
configuration Active DL BWP		1, 2, 3	DLBWP	N/A	N/A	N/A	N/A	DLBW	
		1, 2, 3		IN/A	IN/A	IN/A	IN/A		
confgiuration Active UL BWP		1 2 2	.1.1 ULBWP	NI/A	NI/A	NI/A	NI/A	P.1.1	
configuration		1, 2, 3	.1.1	N/A	N/A	N/A	N/A	ULBW P.1.1	
RLM-RS		1, 2, 3	.1.1	SSB			SSB	P.1.1	
	dB	1, 2, 3	1.54	-infinity	-infinity	-3.79	336	4	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	uБ		1.54	-inititity	-inininty	-3.79	4	4	
		3	-						
	-ID /COC				00				
$N_{_{oc}}$ Note2	dBm/SCS	1			-98				
		2			-98				
	15 (451)	3			-95				
$N_{oc}^{$	dBm/15 kHz	1			-98				
		2	1						
		3		1	1	1			
\hat{E}_s/N_{oc}	dB	1	7	-infinity	-infinity	4	4	4	
.,		2	1						
		3							
SS-RSRP Note3	dBm/SCS	1	-91	-infinity	-infinity	-94	-94	-94	
		2	-91	-infinity	-infinity	-94	-94	-94	
		3	-88	-infinity	-infinity	-91	-91	-91	
lo	dBm/9.36 MHz	1	-60.74	-64.59	-64.59	-60.74	-64.59	-64.59	
	dBm/9.36 MHz	2	-60.74	-64.59	-64.59	-60.74	-64.59	-64.59	
	dBm/38.16 MHz	3	-54.65	-58.50	-58.50	-54.65	-58.50	-58.50	
Propagation Condition		1, 2, 3			AWG	N			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers N

and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known NR intra frequency cell shall be less than [1.6] s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re-establish_delay} = T_{UL_grant} + T_{UE_re-establish_delay}$$
.

Where:

 $T_{\text{UL_grant}}$ = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence $T_{\text{UL_grant}}$ is not used.

$$T_{\textit{UE_re-establish_delay}} = 50 + T_{\textit{identify_intra_NR}} + \sum\nolimits_{i=1}^{\textit{Nfreq-1}} T_{\textit{identify_inter_NR},i} + T_{\textit{SI-NR}} + T_{\textit{PRACH}}$$

 $N_{freq} = 1$

 $T_{identify_intra_NR} = [200] \text{ ms}$

 T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target intra-frequency NR cell.

 T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of [1545] ms, allow [1.6] s in the test case.

6.3.2.1.2 NR SA FR1 - FR1 RRC re-establishment

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.

6.3.2.1.2.1 Test purpose

The purpose is to verify that the NR inter-frequency RRC re-establishment delay in FR1 without known target cell is within the specified limits.

6.3.2.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.2.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.2.1.0.1.

The normative reference for this requirement is TS 38.133 [6] A.6.3.2.1.2.

6.3.2.1.2.4 Test description

6.3.2.1.2.4.1 Initial conditions

The Test shall be tested using any of the test configuration in Table 6.3.2.1.2.4.1-1

Table 6.3.2.1.2.4.1-1: Supported test configurations

Configuration	Description of serving cell	Description of target cell			
6.3.2.1.2-1	15 kHz SSB SCS, 10MHz bandwidth, FDD	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex			
	duplex mode	mode			
6.3.2.1.2-2	15 kHz SSB SCS, 10MHz bandwidth, TDD	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex			
	duplex mode	mode			
6.3.2.1.2-3	30 kHz SSB SCS, 40MHz bandwidth, TDD	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex			
	duplex mode	mode			
Note: The UE is only required to be tested in one of the supported test configurations.					

Configure the test equirement and the DUT according to the parameters in Table 6.3.2.1.2.4.1-2

Table 6.3.2.1.2.4.1-2: Initial conditions for NR Inter-frequency RRC Re-establishment in FR1

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.			
Channel bandwidth	As specified	d by the test configuration selected from Table 6.3.2.1.2.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to connection diagram	N/A					

- 1. The general test parameter settings are set up according to Table 6.3.2.1.2.4.1-3.
- 2. Message contents are defined in clause 6.3.2.1.2.4.3.

There are two NR carriers and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.3.2.1.2.4.1-3: General test parameters for NR inter-frequency RRC Re-establishment test case in FR1

	Parameter	Unit	Test configuration	Value	Comment
Initial	Active cell		1, 2, 3	Cell1	
condition	Neighbour cells		1, 2, 3	Cell2	
Final condition	Active cell		1, 2, 3	Cell2	
RF Channe	el Number		1, 2, 3	1, 2	
Time offset	between cells		1	3 ms	Asynchronous cells
			2	3 μs	Synchronous cells
			3	3 µs	Synchronous cells
N310		-	1, 2, 3	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1, 2, 3	1	Minimum consecutive in-sync indications from lower layers
T310		ms	1, 2, 3	0	Radio link failure timer; T310 is disabled
T311		ms	1, 2, 3	5000	RRC re-establishment timer
Access Barring Information		-	1, 2, 3	Not Sent	No additional delays in random access procedure.
SSB config	uration		1	SSB.1 FR1	
			2	SSB.1 FR1	
			3	SSB.2 FR1	
SMTC conf	figuration		1	SMTC	
				pattern 2	
			2	SMTC	
				pattern 1	
			3	SMTC	
				pattern 1	
DRX cycle		S	1, 2, 3	OFF	
	nfiguration index		1, 2, 3	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
T1		S	1, 2, 3	5	
T2		ms	1, 2, 3	200	Time for the UE to detect RLF
T3		S	1, 2, 3	5	

6.3.2.1.2.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, becomes inactive. The time period T3 starts after the occurrence of the radio link failure. During T1, the UE shall be configured with the carrier frequency of cell 2 (with RF Channel Number #2) to ensure that the UE has the context of the carrier frequency of cell 2 by the end of T1.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.3.2.1.2.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.2.1.2.5-1. T2 starts
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 6.3.2.1.2.5-1. T3 starts
- 7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2 within [3] s from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.2.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.2.1.2.4.3-1: Common Exception messages inter-frequency RRC re-establishment

De	Default Message Contents						
Common contents of system information blocks exceptions							
Default RRC messages and information elements contents exceptions	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 6.3.2.1.2-1 Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC.1 and synchronous cells for configuration 6.3.2.1.2-2 Table H.3.1-3 with Condition INTER-FREQ MO, SSB.2 FR1, SMTC.1 and synchronous cells for configuration 6.3.2.1.2-3						
	Table H.3.2-1						

Table 6.3.2.1.2.4.3-2: UE-TimersAndConstants for inter-frequency RRC re-establishment

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200			
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
t311	ms5000		
}			

Table 6.3.2.1.2.4.3-3: MeasConfig for inter-frequency RRC re-establishment

Derivation Path: TS 38.508-1 [14], Table 4.6.3-69			
Information Element	Value/remark	Comment	Condition
MeasConfig::= SEQUENCE {			
reportConfigToAddModList	Not present		
measIdToAddModList	Not present		
quantityConfig	Not present		
}			

6.3.2.1.2.5 Test requirement

Table 6.3.2.1.2.5-1 defines the primary level settings including test tolerances for NR Inter-frequency RRC Reestablishment in FR1 test case.

Table 6.3.2.1.2.5-1: Cell specific test parameters for NR inter-frequency RRC Re-establishment test case in FR1

Parameter	Unit	Test	Cell 1				Cell 2		
		configuration	T1	T2	T3	T1	T2	T3	
RF Channel Number		1, 2, 3		1	•		2		
TDD configuration		1		N/A			N/A		
		2	TDDConf.1.1			Т	TDDConf.1.1		
		3	TDDConf.2.1			TDDConf.2.1			
PDSCH RMC		1	SR.1.1 FDD			N/A			
configuration		2		SR.1.1 TDD			1		
		3	SR.2.1 TDD			1			
RMSI CORESET		1	CR.1.1 FDD				CR.1.1 FDD		
RMC configuration		2	CR.1.1 TDD			CR.1.1 TDD			
i iii e eeiiii garataeii		3	CR.2.1 TDD			CR.2.1 TDD			
Dedicated CORESET		1	CCR.1.1 FDD			CCR.1.1 FDD			
RMC configuration		2	CCR.1.1 TDD			CCR.1.1 TDD			
,gg		3		CCR.2.1 TDI		CCR.2.1 TDD			
OCNG Pattern		1, 2, 3	OP.1 defined in A.3.2.1		OP.1 defined in A.3.2.1				
TRS configuration		1		TRS.1.1 FDD		N/A			
Tro comigaration		2	TRS.1.1 TDD		IN/A				
		3		TRS.1.2 TDI		_			
Initial DL BWP		1, 2, 3	DLBWP.0		DLBWP.0				
configuration		1, 2, 3		DLDWI .0			DLDWI .0		
Initial UL BWP		1, 2, 3	ULBWP.0		ULBWP.0				
configuration		1, 2, 3		OLDWI .0			OLDWI .0		
Active DL BWP		1, 2, 3	DLBWP	N/A	N/A	N/A	N/A	DLBW	
confgiuration		1, 2, 3	.1.1	IN//-X	13//-3	IN/A	13//3	P.1.1	
Active UL BWP		1, 2, 3	ULBWP	N/A	N/A	N/A	N/A	ULBW	
configuration		1, 2, 0	.1.1	14// (14// (14//	14// (P.1.1	
RLM-RS		1, 2, 3		SSB			SSB		
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1	4	-infinity	-infinity	-infinity	-infinity	7	
$\mathbf{L}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	u.b	2	† '						
		3	†						
Note2	dBm/SCS	1	-98						
$N_{_{oc}}$ Note2	ubiii/303	2	-98 -95						
		3							
Note2	dBm/15 kHz	1	-98						
$N_{_{oc}}$ Note2	UDIII/13 KI IZ	2							
		3	1						
\$ /27	dB	1	4	-infinity	-infinity	-infinity	-infinity	7	
\hat{E}_{s}/N_{oc}	uБ	2	4	-inininty	-inininity	-iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	-11111111Ly	<i>'</i>	
			+						
SS-RSRP Note3	dBm/SCS	3	0.4	infinit /	infinit:	infinity	infinit:	01	
55-R5RP	ubiii/SCS	1 2	-94	-infinity	-infinity	-infinity	-infinity	-91	
		3	-94 -91	-infinity	-infinity -infinity	-infinity	-infinity	-91	
lo	dDm/0.26 MU-			-infinity		-infinity	-infinity -70.05	-88	
lo	dBm/9.36 MHz	1	-64.59	-70.05	-70.05	-70.05		-62.26	
-	dBm/9.36 MHz	2	-64.59	-70.05	-70.05	-70.05	-70.05	-62.26	
Dunnanatia	dBm/38.16 MHz	3	-58.50	-63.94	-63.94	-63.94	-63.94	-56.15	
Propagation Condition		1, 2, 3	AWGN						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown NR inter frequency cell shall be less than [3] s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

$$T_{re-establish\ delay} = T_{UL\ grant} + T_{UE\ re-establish\ delay}$$

Where:

 T_{UL_grant} = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence T_{UL_grant} is not used.

$$T_{\textit{UE_re-establish_delay}} = 50 + T_{\textit{identify_intra_NR}} + \sum\nolimits_{i=1}^{\textit{NJreq-1}} T_{\textit{identify_inter_NR},i} + T_{\textit{SI-NR}} + T_{\textit{PRACH}}$$

 $N_{\text{freq}} = 2$

 $T_{identify_intra_NR} = [800] \text{ ms}$

 $T_{identify_inter_NR} = [800] \text{ ms}$

 T_{SI} = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target inter-frequency NR cell.

 T_{PRACH} = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of [2945] ms, allow [3] s in the test case.

6.3.2.2 Random access

6.3.2.2.0 Minimum conformance requirements

6.3.2.2.0.1 Minimum conformance requirements for Contention based random access

The random access procedure is used when establishing the layer 1 communication between the UE and NG-RAN. The random access is as defined in TS 38.213 [8] clause 7.4 and the control of the RACH transmission is as defined in TS 38.321 [12] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 38.213 [8] clause 7.4 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in TS 38.101-1 [2] Table 6.3.4.2-1. The relative power applied to additional preambles shall have an accuracy as specified in TS 38.101-1 [2] Table 6.3.4.3-1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preamble transmission counter has been reached for the random access procedure on PCell or PSCell as specified in TS 38.321 [12] clause 5.1.4.

With the UE selected SSB with SS-RSRP above *rsrp-ThresholdSSB*, UE shall have the capability to select a Random Access Preamble randomly with equal probability from the Random Access Preambles associated with the selected SSB if the association between Random Access Preambles and SS blocks is configured, as specified in clause 5.1.2 in TS 38.321 [12].

With the UE selected SSB with SS-RSRP above *rsrp-ThresholdSSB*, UE shall have the capability to transmit Random Access Preamble on the next available PRACH occasion from the PRACH occasions corresponding to the selected SSB permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex* if configured, if the association between PRACH occasions and SSBs is configured, and PRACH occasion shall be randomly selected with equal probability amongst the selected SSB associated PRACH occasions occurring simultaneously but on different subcarriers, as specified in clause 5.1.2 in TS 38.321 [12].

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window defined in clause 5.1.4 in TS 38.321 [12].

The UE shall re-transmit the msg3 upon the reception of an UL grant for msg3 retransmission.

The UE shall send ACK if the Contention Resolution is successful.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

The normative reference for this requirement is TS 38.133 [6] clauses 6.2.2.

6.3.2.2.0.2 Minimum conformance requirements for Non-Contention based random access

The random access procedure is used when establishing the layer 1 communication between the UE and NG-RAN. The random access is as defined in TS 38.213 [8] clause 7.4 and the control of the RACH transmission is as defined in TS 38.321 [12] clause 5.1.

The UE shall have capability to calculate PRACH transmission power according to the PRACH power formula as defined in TS 38.213 [8] clause 7.4 and apply this power level at the first preamble or additional preambles. The absolute power applied to the first preamble shall have an accuracy as defined in TS 38.101-1 [2] Table 6.3.4.2-1. The relative power applied to additional preambles shall have an accuracy as specified in TS 38.101-1 [2] Table 6.3.4.3-1.

The UE shall indicate a Random Access problem to upper layers if the maximum number of preamble transmission counter has been reached for the random access procedure on PCell or PSCell as specified in TS 38.321 [12] clause 5.1.4.

If the contention-free Random Access Resources and the contention-free PRACH occasions associated with SSBs is configured, with the UE selected SSB with SS-RSRP above *rsrp-ThresholdSSB* amongst the associated SSBs, UE shall have the capability to select the Random Access Preamble corresponding to the selected SSB, and to transmit Random Access Preamble on the next available PRACH occasion from the PRACH occasions corresponding to the selected SSB permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex* if configured, and PRACH occasion shall be randomly selected with equal probability amongst the selected SSB associated PRACH occasions occurring simultaneously but on different subcarriers, as specified in clause 5.1.2 in TS 38.321 [12].

If the contention-free Random Access Resources and the contention-free PRACH occasions associated with CSI-RSs is configured, with the UE selected CSI-RS with CSI-RSRP above *cfra-csirs-DedicatedRACH-Threshold* amongst the associated CSI-RSs, UE shall have the capability to select the Random Access Preamble corresponding to the selected CSI-RS, and to transmit Random Access Preamble on the next available PRACH occasion from the PRACH occasions in *ra-OccasionList* corresponding to the selected CSI-RS, and PRACH occasion shall be randomly selected with equal probability amongst the selected CSI-RS associated PRACH occasions occurring simultaneously but on different subcarriers, as specified in clause 5.1.2 in TS 38.321 [12].

The UE may stop monitoring for Random Access Response(s), if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble, unless the random access procedure is initialized for Other SI request from UE.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12] for the next available PRACH occasion, and transmit the preamble with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure defined in clause 5.1.2 in TS 38.321 [12] for the next available PRACH occasion, and transmit the preamble with the calculated PRACH transmission power, if no Random Access Response is received within the RA Response window configured in *RACH-ConfigCommon* or if no PDCCH addressed to UE's C-RNTI is received within the RA Response window configured in *BeamFailureRecoveryConfig*, as defined in clause 5.1.4 in TS 38.321 [12].

The normative reference for this requirement is TS 38.133 [6] clauses 6.2.2.

Non-contention based random access procedure is not initialized for Other SI requested from UE or for beam failure recovery, so the requirements related to those features are omitted.

6.3.2.2.1 Contention based random access test in FR1 for NR standalone

6.3.2.2.1.1 Test purpose

The purpose of this test is to verify that the behaviour of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits.

6.3.2.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.2.2.1.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 6.3.2.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clauses A.6.3.2.2.1.

6.3.2.2.1.4 Test description

6.3.2.2.1.4.1 Initial conditions

This test can be run in the configurations defined in Table 6.3.2.2.1.4.1-1.

Table 6.3.2.2.1.4.1-1: Contention based random access test in FR1 for NR standalone supported test configurations

Test Case ID	Test Config Index	Description	
6.3.2.2.1-1	1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
6.3.2.2.1-2 2 NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD			
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 6.3.2.2.1.4.1-2.

Table 6.3.2.2.1.4.1-2: Initial conditions for Contention based random access test in FR1 for NR standalone

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.1-1 and TS 38.	508-1 [14] subclause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 6.3.2.2.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

^{1.} Message contents are defined in clause 6.3.2.2.1.4.3.

^{2.} Cell 1 is the NR FR1 serving cell (PCell). The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.3.2.2.1.4.2 Test procedure

The test consists of a single cell, configured as PCell in FR1. The System Simulator shall not explicitly assign a random access preamble via dedicated signalling in the downlink.

- 1. Ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity *NR* and Test Mode *On*according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to Table 6.3.2.2.1.5-1.
- 3. The UE shall establish a connection setup with SS, the random access procedure within the connection setup is used in the test.
- 4. Test 1: Correct behaviour when transmitting Random Access Preamble
 - 4.1. The UE shall send a preamble to the System Simulator. The System Simulator shall check that the Random Access Preamble belongs to one of the Random Access Preambles associated with the SSB with index 0, which has SS-RSRP above the configured rsrp-ThresholdSSB.
- 5. Test 2: Correct behaviour when receiving Random Access Response
 - 5.1. Repeat steps 1-3.
 - 5.2. The UE shall send preambles to the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response containing Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.
 - 5.3. As the received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires.
 - 5.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.
 - 5.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.
 - 5.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 6.3.2.2.1.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 6.3.2.2.1.5.
- 6. Test 3: Correct behaviour when not receiving Random Access Response
 - 6.1. Repeat steps 1-3.
 - 6.2. The UE shall send preambles to the System Simulator. The System Simulator shall not respond to the first 4 preambles.
 - 6.3. As no Random Access Response was received within the RA Response window, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires.
 - 6.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.
 - 6.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.
 - 6.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 6.3.2.2.1.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 6.3.2.2.1.5.
- 7. Test 4: Correct behaviour when receiving an UL grant for msg3 retransmission

- 7.1. Repeat steps 1-3.
- 7.2. The UE shall send a preamble to the System Simulator. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble.
- 7.3. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.
- 7.4. The System Simulator shall send PDCCH addressed to the Temporary C-RNTI after receiving the msg3.
- 7.5. The UE shall re-transmit the msg3.
- 7.6. The System Simulator shall check if UE re-transmit the msg3.
- 8. Test 5: Correct behaviour when receiving an unsuccessful UE Contention Resolution
 - 8.1. Repeat steps 1-3.
 - 8.2. The UE shall send a preamble to the System Simulator. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble.
 - 8.3. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.
 - 8.4. The System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element not matching the CCCH SDU transmitted in msg3 uplink message.
 - 8.5. As the UE Contention Resolution Identity included in the MAC control element did not match the CCCH SDU transmitted in the uplink message, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the backoff time expires.
 - 8.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 6.3.2.2.1.5.
- 9. Test 6: Correct behaviour when receiving a successful UE Contention Resolution
 - 9.1. Repeat steps 1-3.
 - 9.2. The UE shall send a preamble to the System Simulator. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble.
 - 9.3. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.
 - 9.4. The System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in msg3 uplink message.
 - 9.5. As the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU, the Contention Resolution is successful and the UE shall send ACK.
- 10. Test 7: Correct behaviour when contention Resolution timer expires
 - 10.1. Repeat steps 1-3.
 - 10.2. The UE shall send a preamble to the System Simulator. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble.
 - 10.3. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE shall transmit the msg3.

- 10.4. The System Simulator shall not send a response.
- 10.5. As there was no response, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power when the Contention Resolution Timer expires and then after the backoff timer expires.
- 10.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 6.3.2.2.1.5.

6.3.2.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.2.2.1.4.3-1: FrequencyInfoUL-SIB for Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-62				
Information Element	Value/remark	Comment	Condition	
FrequencyInfoUL-SIB SEQUENCE {				
p-Max	23	23 dBm		
}				

Table 6.3.2.2.1.4.3-2: RACH-ConfigCommon for Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-128			
Information Element	Value/remark	Comment	Condition
RACH-ConfigCommon::= SEQUENCE {			
rach-ConfigGeneric	RACH-ConfigGeneric		
totalNumberOfRA-Preambles	48		
ssb-perRACH-OccasionAndCB-PreamblesPerSSB			
CHOICE {			
oneFourth	n48		FR1
}			
groupBconfigured SEQUENCE {			
numberOfRA-PreamblesGroupA	48		
}			
ra-ContentionResolutionTimer	sf48		
rsrp-ThresholdSSB	RSRP_51		
prach-RootSequenceIndex CHOICE {			
0			
}			
msg1-SubcarrierSpacing	kHz 15		
	kHz 30		
}			

Table 6.3.2.2.1.4.3-3: RACH-ConfigGeneric for Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-130			
Information Element	Value/remark	Comment	Condition
RACH-ConfigGeneric ::= SEQUENCE {			
prach-ConfigurationIndex	102		FR1
msg1-FDM	one		FR1
zeroCorrelationZoneConfig	11		
preambleReceivedTargetPower	-120		
preambleTransMax	n6		
powerRampingStep	dB2		
ra-ResponseWindow	sl10		
}			

Table 6.3.2.2.1.4.3-4: ServingCellConfigCommonSIB for Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-169 Information Element	Value/remark	Comment	Condition
	value/TellialK	Comment	Condition
ServingCellConfigCommonSIB ::= SEQUENCE {			
ssb-PositionsInBurst SEQUENCE {			
inOneGroup	'1100 0000'B		
}			
ss-PBCH-BlockPower	-5		
}			

6.3.2.2.1.5 Test requirement

Table 6.3.2.2.1.5-1 defines the primary level settings for contention based random access test in FR1 for NR Standalone. Tables 6.3.2.2.1.5-2, 6.3.2.2.1.5-3 and 6.3.2.2.1.5-4 define the Absolute power limits, Relative power limits and uplink timing error limits respectively, and all include test tolerances.

Table 6.3.2.2.1.5-1: General test parameters for contention based random access test in FR1 for NR Standalone

Parameter			Unit	Test-1	Comments
SSB Configu	SSB Configuration Config 1			SSB.1 FR1	As defined in A.3.1,
		Config 2		SSB.2 FR1	except for number of SSBs per SS-burst and SS/PBCH block index as below
Number of S	SBs per SS	-burst		2	Different from the definition in A.3.1
SS/PBCH blo	ock index			0,1	Different from the definition in A.3.1
Duplex Mode	for Cell 2	Config 1		FDD	
		Config 2		TDD	
TDD Configu	ration	Config 2		TDDConf.1.2	
OCNG Patter				OCNG pattern 1	As defined in A.3.2.1
PDSCH para	meters ^{Note}	Config 1		SR.1.1 FDD	As defined in A.3.1.1
4		Config 2		SR.2.1 TDD	-
NR RF Chan	nel Number	:		1	
EPRE ratio o			dB		
EPRE ratio o			dB	_	
		PBCH DMRS	dB	7	
		DMRS to SSS	dB		
		PDCCH DMRS	dB	7	
		OMRS to SSS	dB		
		PDSCH DMRS	dB		
SSB with index 0	SSB with \hat{F}/I		dB	3	Power of SSB with index 0 is set to be above
	N_{oc}	Config 1	dBm/15kHz	-98	configured rsrp-
	oc oc	Config 2		-101	ThresholdSSB
	\hat{E}_{s}/N_{oc}		dB	3	
	SS-RSRI	P Note 3	dBm/ SCS	-95	1
SSB with index 1	\hat{E}_s/I_{ot}		dB	-17	Power of SSB with index 1 is set to be below
	N_{oc}	Config 1	dBm/15kHz	-98	configured rsrp-
	1 oc	Config 2	1	-101	ThresholdSSB
	\hat{E}_{s}/N_{oc}	!	dB	-17	
	SS-RSRI	P Note 3	dBm/ SCS	-115	1
. Nete 0	•	Config 1	dBm	-65.3/9.36MHz	For symbols without SSB
lo Note 2	Io Note 2 Config 2			-62.2/38.16MHz	index 1
ss-PBCH-BlockPower		dBm/ SCS	-5	As defined in clause 6.3.2 in TS 38.331 [13].	
Configured UE transmitted power ($P_{ m CMAX.f.c.}$)		dBm	23	As defined in clause 6.2.4 in TS 38.101-1 [2].	
PRACH Configuration			FR1 PRACH configuration 1	As defined in A.3.x.	
Propagation Condition Note 1: OCNG shall be used such that the			- ne cell is fully allo	AWGN	mitted nower spectral

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: Es/lot, SS-RSRP and lo level have been derived from other parameters for information purpose. They are not settable parameters.

Note 3: Void.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.

Test 1: Correct behaviour when transmitting Random Access Preamble

- The Random Access Preamble shall be one of the Random Access Preambles associated with SSB index 0.

Test 2: Correct behaviour when receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 6.3.2.2.1.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 6.3.2.2.1.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.3.2.2.1.5-4.

Test 3: Correct behaviour when not receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 6.3.2.2.1.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 6.3.2.2.1.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.3.2.2.1.5-4.

Test 4: Correct behaviour when receiving an UL grant for msg3 retransmission

- The UE shall re-transmit the msg3 upon the reception of an UL grant for msg3 retransmission.

Test 5: Correct behaviour when receiving an incorrect message over Temporary C-RNTI

- The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires.
- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 6.3.2.2.1.5-2.
- The transmit timing of the PRACH transmission shall be within the accuracy specified in Table 6.3.2.2.1.5-4.

Test 6: Correct behaviour when receiving a correct message over Temporary C-RNTI

- The UE shall send ACK if the contention resolution is successful.

Test 7: Correct behaviour when contention resolution timer expires

- The UE shall re-select a preamble and transmit with the calculated PRACH transmission power when the back off time expires if the contention resolution timer expires.
- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 6.3.2.2.1.5-2.
- The transmit timing of the PRACH transmission shall be within the accuracy specified in Table 6.3.2.2.1.5-4.

Table 6.3.2.2.1.5-2 Absolute power tolerance Test requirements

Conditions	Tolerance
Normal	± 11.1 dB

Table 6.3.2.2.1.5-3 Relative power tolerance Test requirements

Power step ∆P (Up or down) (dB)	PRACH (dB)
2 ≤ ΔP < 3	± 3.2

Table 6.3.2.2.1.5-4: Te Timing error Test requirements

Frequency Range	SCS of SSB signals (kHz)	SCS of uplink signals s(KHz)	T _e
1	15	15	880*T _c
1	30	30	624*T _c
Note 1: T _c is the basic timing unit defined in TS 38.211 [7]			

6.3.2.2.2 Non-Contention based random access test in FR1 for NR standalone

6.3.2.2.2.1 Test purpose

The purpose of this test is to verify that the behaviour of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits.

6.3.2.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.2.2.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 6.3.2.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clauses A.6.3.2.2.2.

6.3.2.2.4 Test description

6.3.2.2.2.4.1 Initial conditions

This test can be run in the configurations defined in Table 6.3.2.2.2.4.1-1.

Table 6.3.2.2.2.4.1-1: Non-Contention based random access test in FR1 for NR standalone supported test configurations

Test Case ID	Test Config Index	Description	
6.3.2.2.2-1	1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
6.3.2.2.2-2	2	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 6.3.2.2.2.4.1-2.

Table 6.3.2.2.2.4.1-2: Initial conditions for Non-Contention based random access test in FR1 for NR standalone

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies		in Annex E, Table E.1-1 and TS 38.	
Channel	As specified	by the test configuration selected fr	om Table 6.3.2.2.2.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. Message contents are defined in clause 6.3.2.2.2.4.3.
- 2. Cell 1 is the NR FR1 serving cell (PCell). The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.3.2.2.4.2 Test procedure

The test consists of a single cell, configured as PCell in FR1. The System Simulator shall explicitly assign a random access preamble via dedicated signalling in the downlink. There are two subtests, to test both SSB-based non-contention based random access (subtest 1) and CSI-RS-based non-contention based random access (subtest 2).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to Table 6.3.2.2.5-1 Subtest 1.
- 3. The SS shall signal a Random Access Preamble ID via a PDCCH order to the UE and initiate a Non-contention based Random Access procedure.
- 4. Test 1: Correct behaviour when transmitting SSB-based Random Access Preamble
 - 4.1. The UE shall send a preamble to the System Simulator. The System Simulator shall check that the Random Access Preamble has the Preamble Index associated with the SSB with index 0, that it arrives on a PRACH occasion which belongs to the PRACH occasions corresponding to the SSB with index 0, and that the selected PRACH occasion belongs to the PRACH occasions permitted by the restrictions given by the *rassb-OccasionMaskIndex*.
- 5. Test 2: Correct behaviour when transmitting CSI-RS-based Random Access Preamble
 - 5.1. Set the parameters according to Table 6.3.2.2.2.5-1 Subtest 2.
 - 5.2. Repeat steps 1-3
 - 5.3. The UE shall send a preamble to the System Simulator. The System Simulator shall check that the Random Access Preamble has the Preamble Index associated with the CSI-RS configured, that it arrives on a PRACH occasion which belongs to the PRACH occasions corresponding to the CSI-RS configured, and that the selected PRACH occasion belongs to the PRACH occasions permitted by the restrictions given by the *ra-OccasionList*.
- 6. Test 3: Correct behaviour when receiving Random Access Response
 - 6.1. Repeat steps 1-3
 - 6.2. The UE shall send preambles to the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response containing Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.
 - 6.3. As the received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power.
 - 6.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.
 - 6.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE may stop monitoring for Random Access Response(s).
 - 6.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 6.3.2.2.2.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 6.3.2.2.2.5.
- 7. Test 4: Correct behaviour when not receiving Random Access Response
 - 7.1. Repeat steps 1-3.
 - 7.2. The UE shall send preambles to the System Simulator. The System Simulator shall not respond to the first 4 preambles.
 - 7.3. As no Random Access Response was received within the RA Response window configured in *RACH-ConfigCommon*, the UE shall perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [12], and transmit with the calculated PRACH transmission power.
 - 7.4. The System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier matching the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator.

- 7.5. As the received Random Access Response contains a Random Access Preamble identifier that matches the transmitted Random Access Preamble, the UE may stop monitoring for Random Access Response(s).
- 7.6. Measure the power and timing of the first preamble and it shall not exceed the values specified in 6.3.2.2.2.5. Measure the relative power and timing applied to additional preambles (last 4 preambles) and it shall not exceed the values specified in 6.3.2.2.2.5.

6.3.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.2.2.4.3-1: FrequencyInfoUL-SIB for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-62			
Information Element	Value/remark	Comment	Condition
FrequencyInfoUL-SIB SEQUENCE {			
p-Max	23	23 dBm	
}			

Table 6.3.2.2.2.4.3-2: RACH-ConfigCommon for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-12	28		
Information Element	Value/remark	Comment	Condition
RACH-ConfigCommon::= SEQUENCE {			
rach-ConfigGeneric	RACH-ConfigGeneric		
totalNumberOfRA-Preambles	48		
groupBconfigured SEQUENCE {			
numberOfRA-PreamblesGroupA	48		
}			
ra-ContentionResolutionTimer	Not present		
rsrp-ThresholdSSB	RSRP_51		Subtest 1
prach-RootSequenceIndex CHOICE {			
0			
}			
msg1-SubcarrierSpacing	kHz 15		
-	kHz 30		
}			

Table 6.3.2.2.4.3-3: RACH-ConfigDedicated for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-129			
Information Element	Value/remark	Comment	Condition
RACH-ConfigDedicated::= SEQUENCE {			
cfra SEQUENCE {			
occasions SEQUENCE {			
ssb-perRACH-Occasion	oneFourth		
}			
resources CHOICE {			
ssb SEQUENCE {			
ssb-ResourceList SEQUENCE (SIZE(1maxRA-	2 entries		
SSB-Resources)) OF {			
ssb[1]	0		
ssb[2]	1		
ra-PreambleIndex[1]	50		Subtest 1
}			
ra-ssb-OccasionMaskIndex	1		Subtest 1
}			
csirs SEQUENCE {			
csirs-ResourceList SEQUENCE			
(SIZE(1maxRA- CSIRS -Resources)) OF {			
ra-OccasionList	1		Subtest 2
ra-PreambleIndex[1]	50		Subtest 2
}			
rsrp-ThresholdCSI-RS	RSRP_51		Subtest 2
}			
}			
}			
}			

Table 6.3.2.2.2.4.3-4: RACH-ConfigGeneric for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-130			
Information Element	Value/remark	Comment	Condition
RACH-ConfigGeneric ::= SEQUENCE {			
prach-ConfigurationIndex	102		FR1
msg1-FDM	one		FR1
zeroCorrelationZoneConfig	11		
preambleReceivedTargetPower	-120		
preambleTransMax	n6		
powerRampingStep	dB2		
ra-ResponseWindow	sl10		
}			

Table 6.3.2.2.4.3-5: ServingCellConfigCommonSIB for Non-Contention Based Random Access

Derivation Path: TS 38.508-1 [14], table 4.6.3-169			
Information Element	Value/remark	Comment	Condition
ServingCellConfigCommonSIB ::= SEQUENCE {			
ssb-PositionsInBurst SEQUENCE {			
inOneGroup	'1100 0000'B		
}			
ss-PBCH-BlockPower	-5		
}			

6.3.2.2.5 Test requirement

Table 6.3.2.2.5-1 defines the primary level settings for non-contention based random access test in FR1 for NR Standalone. Tables 6.3.2.2.2.5-2, 6.3.2.2.5-3 and 6.3.2.2.2.5-4 define the Absolute power limits, Relative power limits and uplink timing error limits respectively, and all include test tolerances.

Table 6.3.2.2.5-1: General test parameters for non-contention based random access test in FR1 for NR Standalone

Parameter			Unit	Subtest 1	Subtest 2	Comments
SSB Configu	ration	Config 1		SSB.1 FR1	SSB.1 FR1	As defined in
J		Config 2		SSB.2 FR1	SSB.2 FR1	A.3.10, except for number of SSBs per SS-burst and SS/PBCH block index as below
Number of S	SBs per SS	-burst		2	2	Different from the definition in A.3.10
SS/PBCH blo	ock index			0,1	0,1	Different from the definition in A.3.10
CSI-RS Conf	iguration	Config 1 Config 2		N/A	CSI-RS.1.1 FDD CSI-RS.2.1 TDD	As defined in A.3.1.4
Duplex Mode	for Cell 2	Config 1 Config 2		FDD TDD	FDD TDD	_
TDD Configu	ration	Config 2		TDDConf.1.2	TDDConf.1.2	
OCNG Patte	rn ^{Note 1}	3		OCNG pattern 1	OCNG pattern 1	As defined in A.3.2.1.
PDSCH para	meters ^{Note}	Config 1		SR.1.1 FDD	SR.1.1 FDD	As defined in
4		Config 2	7	SR.2.1 TDD	SR.2.1 TDD	A.3.1.1.
NR RF Chan	nel Number	:		1	1	
EPRE ratio o			dB			
EPRE ratio o	f PBCH_DN	/IRS to SSS	dB			
EPRE ratio o	f PBCH to F	PBCH_DMRS	dB			
EPRE ratio o	f PDCCH_	OMRS to SSS	dB	0	0	
EPRE ratio o	f PDCCH to	PDCCH_DMRS	dB			
		OMRS to SSS	dB			
	f PDSCH to	PDSCH_DMRS	dB			
SSB with index 0	\hat{E}_{s}/I_{ot}		dB	3	3	Power of SSB with index 0 is set to be
	N_{oc}	Config 1	dBm/15kHz	-98	-98	above configured
	00	Config 2		-101	-101	rsrp-ThresholdSSB
	$\hat{E}_{\rm s}/N_{oc}$		dB	3	3	
	SS-RSR	P Note 3	dBm/ SCS	-95	-95	
SSB with index 1	$\hat{E}_{\scriptscriptstyle extsf{s}}/I_{\scriptscriptstyle ot}$		dB dE	-17	-17	Power of SSB with index 1 is set to be
	N_{oc}	Config 1	dBm/15kHz	-98	-98	below configured
		Config 2		-101	-101	rsrp-ThresholdSSB
	$\hat{E}_{\scriptscriptstyle extsf{S}}/N_{\scriptscriptstyle oc}$		dB	-17	-17	
	SS-RSR		dBm/ SCS	-115	-115	
Io Note 2 Config 1 Config 2		Config 1	dBm	-65.3/9.36MHz	-65.3/9.36MHz	For symbols without
		Config 2		-62.2/38.16MHz	-62.2/38.16MHz	SSB index 1
ss-PBCH-BlockPower		dBm/ SCS	-5	-5	As defined in clause 6.3.2 in TS 38.331 [13].	
Configured UE transmitted power ($P_{ m CMAX,f,c}$)		dBm	23	23	As defined in clause 6.2.4 in TS 38.101-1 [2].	
PRACH Configuration			FR1 PRACH configuration 2	FR1 PRACH configuration 3	As defined in A.3.8.	
Propagation	Condition		1 -	AWGN	AWGN	
11 1 1	21.0.1.1.1	1 1 1 1 1 1	<u> </u>	1		

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.

Note 2: Es/lot, SS-RSRP and lo level have been derived from other parameters for information purpose. They are not settable parameters.

Note 3: Void.

Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.

Test 1: Correct behaviour when transmitting SSB-based Random Access Preamble

- The Random Access Preamble shall be one of the Random Access Preambles associated with SSB index 0.
- The Random Access Preamble shall arrive on a PRACH occasion which belongs to the PRACH occasions corresponding to the SSB with index 0.
- The selected PRACH occasion shall belong to the PRACH occasions permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex*.

Test 2: Correct behaviour when transmitting CSI-RS-based Random Access Preamble

- The Random Access Preamble shall have the Preamble Index associated with the CSI-RS configured.
- The Random Access Preamble shall arrive on a PRACH occasion which belongs to the PRACH occasions corresponding to the CSI-RS configured.
- The selected PRACH occasion belongs to the PRACH occasions permitted by the restrictions given by the *ra-OccasionList*.

Test 3: Correct behaviour when receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 6.3.2.2.2.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 6.3.2.2.2.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.3.2.2.2.5-4.

Test 4: Correct behaviour when not receiving Random Access Response

- The power of the first preamble shall be -30 dBm within the accuracy specified in Table 6.3.2.2.2.5-2.
- The relative power for preamble ramping step shall be 2 dB within the accuracy specified in Table 6.3.2.2.2.5-3.
- The transmit timing of all PRACH transmissions shall be within the accuracy specified in Table 6.3.2.2.2.5-4.

Table 6.3.2.2.5-2 Absolute power tolerance Test requirements

Conditions	Tolerance
Normal	± 11.1 dB

Table 6.3.2.2.5-3 Relative power tolerance Test requirements

Power step ΔP (Up or down) (dB)	PRACH (dB)
2 ≤ ∆P < 3	± 3.2

Table 6.3.2.2.5-4: T_e Timing error Test requirements

Frequency Range	SCS of SSB signals (kHz)	SCS of uplink signals s(KHz)	T _e
1	15	15	880*T _c
1	30	30	624*T _c
Note 1: T _c is the basic timing unit defined in TS 38.211 [7]			

6.3.2.3 RRC connection release with redirection

6.3.2.3.0 Minimum conformance requirements

6.3.2.3.0.1 Minimum conformance requirements for FR1 RRC connection release with redirection

The UE shall be capable of performing the RRC connection release with redirection to the target NR cell within $T_{\text{connection release redirect NR}}$.

The time delay ($T_{connection_release_redirect_NR}$) is the time between the end of the last slot containing the RRC command, "RRCRelease" (TS 38.331 [2]) on the NR PDSCH and the time the UE starts to send random access to the target NR cell. The time delay ($T_{connection_release_redirect_NR}$) shall be less than:

$$T_{connection_release_redirect_NR} = T_{RRC_procedure_delay} + T_{identify_NR} + T_{SI_NR} + T_{RACH}$$

The target NR cell shall be considered detetable when for each relevant SSB, the side conditions should be met that,

- SSB RP and SSB £s/Iot according to Annex B.2.5 for a corresponding NR Band.

 $T_{RRC_procedure_delay}$: It is the RRC procedure delay for processing the received message "*RRCRelease*" as defined in clause 6.2.2 of TS 38.331 [2].

 $T_{identify-NR}$: It is the time to identify the target NR cell and depend on the frequency range (FR) of the target NR cell. It is defined in table 6.3.2.3.0.1-1. Note that $T_{identify-NR} = T_{PSS/SSS-sync} + T_{meas}$, in which $T_{PSS/SSS-sync}$ is the cell search time and T_{meas} is the measurement time due to cell selection criteria evaluation.

 T_{SI-NR} : It is the time required for acquiring all the relevant system information of the target NR cell. This time depends upon whether the UE is provided with the relevant system information of the target NR cell or not by the old NR cell before the RRC connection is released. $T_{SI-NR} = 0$ provided the UE is provided with the SI (including MIB and all relevant SIBs) of the target NR cell before the RRC connection is released by the old NR cell.

 T_{RACH} : It is the delay caused due to the random access procedure when sending random access to the target NR cell. This delay depends on the PRACH configuration defined in Table 6.3.3.2-2 [6] or Table 6.3.3.2-3 [6] for FR1 and in Table 6.3.3.2-4 [6] for FR2.

 T_{rs} is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the redirection command, otherwise T_{rs} is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing configured for the RRC connection release with redirection. If the UE is not provided with SMTC configuration or measurement object for the frequency which is also configured for the RRC connection release with redirection then:

- the requirement in this section is applied with $T_{\rm rs}$ = 20 ms assuming the SSB transmission periodicity is not larger than 20 ms,
- there is no requirement if the SSB transmission periodicity is larger than 20ms.

Table 6.3.2.3.0.1-1: Time to identify target NR cell for RRC connection release with redirection to NR

Freque	ncy range (FR) of target NR cell	T _{identify-NR}	
FR1		MAX (680 ms, [11] x T _{rs})	
FR2		MAX (880 ms, 8x[11] x T _{rs})	
Note:	: If the UE has been provided with higher layer in TS 38.331 [2] signaling of smtc2 prior to the		
	redirection command, SMTC follows <i>smtc1</i> or <i>smtc2</i> according to the physical cell ID of the target cell.		

The normative reference for this requirement is TS 38.133 [6] clauses 6.2.3.2.1.

6.3.2.3.0.2 Minimum conformance requirements for FR1 – E-UTRAN RRC connection release with redirection

The UE shall be capable of performing the RRC connection release with redirection to the target E-UTRAN cell within $T_{\text{connection_release_redirect_E-UTRA}$.

The time delay ($T_{connection_release_redirect_E-UTRA}$) is the time between the end of the last slot containing the RRC command, "RRCRelease" (TS 38.331 [2]) on the PDSCH and the time the UE starts to send random access to the target E-UTRA cell. The time delay ($T_{connection_release_redirect_E-UTRA}$) shall be less than:

$$T_{connection_release_redirect_E_UTRA} = T_{RRC_procedure_delay} + T_{identify_E_UTRA} + T_{SI_E_UTRA} + T_{RACH}$$

The target E-UTRA FDD or TDD cell shall be considered detectable when for each relevant SSB:

- RSRP related conditions in the accuracy requirements in Section 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2 and Annex B.3 of TS 36.133 [15],
- RSRQ related conditions in the accuracy requirements in Section 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2 and Annex B.3 of TS 36.133 [15],
- RS-SINR related conditions in the accuracy requirements in Section 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2 and Annex B.3 of TS 36.133 [15].

 $T_{RRC_procedure_delay}$: It is the RRC procedure delay for processing the received message "*RRCRelease*" as defined in clause 6.2.2 of TS 38.331 [2].

T_{identify-E-UTRA}: It is the time to identify the target E-UTRA cell. It shall be less than 320 ms.

 $T_{SI\text{-}E\text{-}UTRA}$: It is the time required for acquiring all the relevant system information of the target E-UTRA cell. This time depends upon whether the UE is provided with the relevant system information (SI) of the target E-UTRA cell or not by the old NR cell before the RRC connection is released. $T_{SI\text{-}E\text{-}UTRA} = 0$ provided the UE is provided with the SI (including MIB and all relevant SIBs) of the target E-UTRA cell before the RRC connection is released by the old NR cell.

 T_{RACH} : It is the delay caused due to the random access procedure when sending random access to the target E-UTRA cell.

The normative reference for this requirement is TS 38.133 [6] clauses 6.2.3.2.2.

6.3.2.3.1 NR SA FR1 RRC connection release with redirection

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.

6.3.2.3.1.1 Test purpose

This test is to verify RRC connection release with redirection from NR to NR.

6.3.2.3.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.2.3.1.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 6.3.2.3.0.1.

The normative reference for this requirement is TS 38.133 [6] A.6.3.2.3.1.

6.3.2.3.1.4 Test description

6.3.2.3.1.4.1 Initial conditions

This test can be run in the configurations defined in Table 6.3.2.3.1.4.1-1.

Table 6.3.2.3.1.4.1-1: Redirection from NR to NR test configurations

Configuration Description			
6.3.2.3.1-1 Source cell: NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
	Target cell: NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
6.3.2.3.1-2 Source cell: NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
Target cell: NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
6.3.2.3.1-3 Source cell: NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
Target cell: NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
Note: The U	Note: The UE is only required to be tested in one of the supported test configurations.		

Configure the test equipment and the DUT according to the parameters in Table 6.3.2.3.1.4.1-2.

Table 6.3.2.3.1.4.1-2: Initial conditions for Redirection from NR to NR test case

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 6.3.2.3.1.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram	N/A		

- 1. The general test parameters for PCell and neighbour cell are given in Table 6.3.2.3.1.4.1-3 below.
- 2. Message contents are defined in clause 6.3.2.3.1.4.3.
- 3. There are two carriers and two NR cells specified in the test. Cell 1 and Cell 2 are configured according to Annex C.1.1 and C.1.2.

Table 6.3.2.3.1.4.1-3: General test parameters for Redirection from NR to NR test case

Parameter		Unit	Value	Comment
Initial conditions			Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
Filter coefficient			0	L3 filtering is not used
Access Barring Inf	formation	-	Not Sent	No additional delays in random
				access procedure.
Time offset between cells			3 μs	Synchronous cells
T1		S	5	
T2		S	1	

6.3.2.3.1.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "*RRCRelease*" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.2.3.1.5-1. T1 starts.
- 3. SS shall transmit an *RRCRelease* containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the *RRCRelease* message is sent to UE.

- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.2.3.1.5-1.
- 6. If the UE transmits the PRACH to Cell 2 less than [960] ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 8. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.2.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.2.3.1.4.3-1: RRCRelease for NR RRC redirection

Derivation Path: TS 38.508-1 [14], Table 4.6.1-16			
Information Element	Value/remark	Comment	Condition
RRCRelease ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcRelease SEQUENCE {			
redirectedCarrierInfo CHOICE {			
nr SEQUENCE {			
carrierFreq	ARFCN-ValueNR	Frequency of Cell 2	
ssbSubcarrierSpacing	kHz15		Config 1,2
	kHz30		Config 3
smtc SEQUENCE {			
duration	sf1		SMTC.1 FR1
	sf5		SMTC.2 FR1
}			
}			
}			
}			
}			
}			

Table 6.3.2.3.1.4.3-2: FilterCoefficient for NR RRC redirection

Derivation Path: TS 38.508-1 [14], Table 4.6.3-57			
Information Element	Value/remark	Comment	Condition
FilterCoefficient	fc0		

6.3.2.3.1.5Test requirement

Table 6.3.2.3.1.5-1 defines the primary level settings for Redirection from NR to NR test case.

Table 6.3.2.3.1.5-1: Cell specific test parameters for Redirection from NR to NR test case

Parameter	Unit	Cell 1		Cell 2	
Parameter		T1	T2	T1	T2
NR RF Channel Number			1	2	2

		Config 1			FC	DD .	
Duplex mo	ode	Config 2,3				DD	
		Config 1			Not App	plicable	
TDD config	guration	Config 2			TDDC	onf.1.1	
		Config 3			TDDC	onf.2.1	
		Config 1		10: N _{RB,c} = 52			
$\text{BW}_{\text{channel}}$		Config 2	MHz		10: N _R	_{B,c} = 52	
	Config 3				40: N _{RB} ,	_{.c} = 106	
		Config 1			10: N _R	_{B,c} = 52	
BWP BW		Config 2	MHz		10: N _R	_{B,c} = 52	
		Config 3			40: N _{RB}	$_{,c} = 106$	
DRx Cycle	!		ms		Not App	plicable	
DDCCI I D		Config 1			SR.1.1	L FDD	
PDSCH Remarks	eterence ent channel	Config 2			SR.1.:	1 TDD	
mododiom	one onamor	Config 3			SR2.1	l TDD	
0005057	. D. (Config 1			CR.1.1	FDD	
CORESET	Reference	Config 2			CR.1.	1 TDD	
- Criamioi		Config 3			CR2.1	1 TDD	
OCNG Pat	tterns				OCNG p	oattern 1	
SMTC con	figuration	Config 1,2		SMTC.1 FR1			
SWITC COIL	Inguration	Config 3			SMTC.2 FR1		
PDSCH/PDCCH Config 1,2		kHz	15 kHz				
subcarrier spacing Config 3		KIIZ	30 kHz				
PUCCH/PI		Config 1,2	kHz	15 kHz			
subcarrier		Config 3	KIIZ	30 kHz			
	onfiguration			FR1 PRACH configuration 1			
BWP confi	guraiton	Initial DL BWP		DLBWP.0.1			
		Dedicated DL BWP		DLBWP.1.1			
		Initial UL BWP		ULBWP.0.1			
		Dedicated UL		ULBWP.1.1			
		BWP					
	o of PSS to SS o of PBCH DM						
	of PBCH to I						
EPRE ratio	of PDCCH D	MRS to SSS					
		PDCCH DMRS	dB	0			
	o of PDSCH D o of PDSCH to						
		MRS to SSS(Note 1)					
EPRE ratio of OCNG to OCNG DMRS (Note							
1)		dBm/15kH					
$N_{oc}^{$ Note2		Z		-98			
N _{oc} Note Config 1,2		dBm/SCS			98		
2 Config 3		ubili/303		-95		r	
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$		dB	4	4	-infinity	4	
\hat{E}_{s}/N_{oc}			dB	4	4	-infinity	4
Io ^{Note3}	Config 1,2		dBm/ 9.36MHz	-64.59	-64.59	-70.05	-64.59
	Config 3		dBm/ 38.16MHz	-58.49	-58.49	-63.94	-58.49
Propagation	n condition		-		AW	'GN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled. Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE shall start to transmit the PRACH to Cell 2 less than [960] ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to NR observed during repeated tests shall be at least 90%.

NOTE: The redirection delay can be expressed as:

 $T_{connection_release_redirect_NR} = T_{RRC_procedure_delay} + T_{identify_NR} + T_{SI_NR} + T_{RACH}$

where:

 $T_{RRC_procedure_delay}$ = 110 ms and is specified in clause 12 in TS 38.331 [2].

 $T_{identify-NR} = [680]$ ms in the test.

 $T_{\text{SI-NR}}$ = 0 ms is assumed, since the UE is provided with the SI (including MIB and all relevant SIBs) of the target NR cell before the RRC connection is released by the old NR cell.

 $T_{RACH} = 170 \text{ ms in the test.}$

This gives a total of [960] ms.

6.3.2.3.2 NR SA FR1 – E-UTRA RRC connection release with redirection

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.

6.3.2.3.2.1 Test purpose

This test is to verify RRC connection release with redirection from NR to E-UTRAN.

6.3.2.3.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.3.2.3.2.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 6.3.2.3.0.2.

The normative reference for this requirement is TS 38.133 [6] A.6.3.2.3.2.

6.3.2.3.2.4 Test description

6.3.2.3.2.4.1 Initial conditions

This test can be run in the configurations defined in Table 6.3.2.3.2.4.1-1.

Table 6.3.2.3.2.4.1-1: Redirection from NR to E-UTRAN test configurations

Configuration	Description
6.3.2.3.2-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD
6.3.2.3.2-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD
6.3.2.3.2-3	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD
6.3.2.3.2-4	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD
6.3.2.3.2-5	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD
6.3.2.3.2-6	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD
Note: The UE is	only required to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 6.3.2.3.2.4.1-2.

Table 6.3.2.3.2.4.1-2: Initial conditions for Redirection from NR to E-UTRAN test case

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.		
Channel bandwidth	As specified	by the test configuration selected from Table 6.3.2.3.2.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.6.1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.2			
Exceptions to connection diagram	N/A				

- 1. The general test parameters settings are given in Table 6.3.2.3.2.4.1-3 below.
- 2. Message contents are defined in clause 6.3.2.3.2.4.3.
- 3. There are two cells specified in the test. Cell 1 is the NR PCell and Cell 2 is the E-UTRAN neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2, Cell 2 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 6.3.2.3.2.4.1-3: General test parameters for Redirection from NR to E-UTRAN test case

Parameter		Unit	Value	Comment
Initial conditions			Cell 1	
	Neighbouring cell		Cell 2	
Final condition	Active cell		Cell 2	
Filter coefficient	Filter coefficient		0	L3 filtering is not used
Access Barring Information		-	Not Sent	No additional delays in random access procedure.
Time offset between cells			3 µs	Synchronous cells
T1		S	5	
T2		S	1	

6.3.2.3.2.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1, and T2 respectively. The "*RRCRelease*" message containing the relevant system information of Cell 2 shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 2. Set the parameters according to T1 in Table 6.3.2.3.2.5-1 and 6.3.2.3.2.5-2. T1 starts.
- 3. SS shall transmit an *RRCRelease* containing the relevant system information of Cell 2 during period T1.
- 4. The SS shall start T2 timer when the last TTI containing the RRCRelease message is sent to UE.
- 5. When T2 starts, the SS shall switch the power setting from T1 to T2 as specified in Table 6.3.2.3.2.5-1 for Cell 1 and Table 6.3.2.3.2.5-2 for Cell 2.
- 6. If the UE transmits the PRACH to Cell 2 less than [925] ms from the beginning of time period T2 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. After T2 expires, the UE shall be switched off. Then ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.

- 8. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

6.3.2.3.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.3.2.3.2.4.3-1: RRCRelease for Inter-RAT RRC redirection

Derivation Path: TS 38.508-1 [14], Table 4.6.1-16			
Information Element	Value/remark	Comment	Condition
RRCRelease ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcRelease SEQUENCE {			
redirectedCarrierInfo CHOICE {			
eutra SEQUENCE {			
eutraFrequency	ARFCN-ValueEUTRA	Frequency of Cell 2	
cnType	ерс		
}			
}			
}			
}			
}			

Table 6.3.2.3.2.4.3-2: FilterCoefficient for Inter-RAT RRC redirection

Derivation Path: TS 38.508-1 [14], Table 4.6.3-57				
Information Element Value/remark Comment Condition				
FilterCoefficient	fc0			

6.3.2.3.2.5 Test requirement

Table 6.3.2.3.2.5-1 and 6.3.2.3.2.5-2 define the primary level settings for Redirection from NR to E-UTRAN test case.

Table 6.3.2.3.2.5-1: Cell specific test parameters for Redirection from NR to E-UTRAN test case(Cell 1)

Parameter	Unit	Cell 1	
Parameter		T1	T2
RF Channel Number		1	

Duplex mo	ude.	Config 1		FC	DD	
Duplex III0	ue	Config 2,3		T		
		Config 1		Not App		
TDD confiç	guration	Config 2		TDDC		
		Config 3		TDDC		
		Config 1		10: N _{RI}	_{3,c} = 52	
BW _{channel}		Config 2	MHz	10: N _R	_{3,c} = 52	
	Config 3			40: N _{RB} ,	c = 106	
		Config 1		10: N _R	_{3,c} = 52	
BWP BW		Config 2	MHz	10: N _R	_{3,c} = 52	
		Config 3		40: N _{RB,}	c = 106	
DRx Cycle			ms	Not App	olicable	
	_	Config 1		SR.1.1	. FDD	
PDSCH Re	eference ent channel	Config 2		SR.1.2	1 TDD	
Illeasureili	eni channei	Config 3		SR2.1	TDD	
		Config 1		CR.1.:	1 FDD	
CORESET Channel	Reference	Config 2		CR.1.:	1 TDD	
Chame		Config 3		CR2.1	LTDD	
OCNG Pat	terns	<u> </u>		OCNG p	oattern 1	
		Config 1,2		SMTC		
SMTC con	figuration	Config 3		SMTC.2 FR1		
PDSCH/PDCCH Config 1,2			15	KHz		
subcarrier spacing Config 3		kHz	30 kHz			
PUCCH/PI	ISCH	Config 1,2		15		
subcarrier		Config 3	kHz	30		
	nfiguration				FR1 PRACH configuration 1	
BWP confi		Initial DL BWP		DLBW		
	9	Dedicated DL		DLBW		
		BWP				
		Initial UL BWP		ULBW		
		Dedicated UL BWP		ULBV	/P.1.1	
EPRE ratio	of PSS to S					
	of PBCH DN					
	of PBCH to PBCH DMRS of PDCCH DMRS to SSS of PDCCH to PDCCH DMRS					
EPRE ratio	of PDSCH	MRS to SSS	dB	0		
	of PDSCH to					
		MRS to SSS(Note 1) OCNG DMRS (Note				
1)						
$oldsymbol{N}_{oc}$ Note2		dBm/15kH z	-6	8		
N _{oc} Note Config 1,2			-6	8		
² Config 3		dBm/SCS	-9	95		
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$		dB	4	4		
\hat{E}_s/N_{oc}		dB	4	4		
Io ^{Note3}	Config 1,2		dBm/ 9.36MHz -64.59		-64.59	
	Config 3		dBm/ 38.16MHz	-58.49	-58.49	
Propagation condition			-	AW	GN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled. Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.3.2.3.2.5-1: Cell specific test parameters for Redirection from NR to E-UTRAN test case(Cell 2)

Parameter	Unit	Configuratio n	Cel	12
		"	T1	T2
RF channel number		1, 2, 3, 4, 5, 6	2	
Duplex mode		1, 2, 3	FD	D
		4, 5, 6	TD	D
TDD special subframe		4, 5, 6	6	
configuration ^{Note1}				
TDD uplink-downlink		4, 5, 6	1	
configuration ^{Note1}		100150	51411 11	0.5
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5MHz: N	1.
			10MHz: N 20MHz: N	
PRACH Configuration ^{Note2}		1, 2, 3	20MHZ. N	
FRACITCOINIguration		4, 5, 6	53	
PDSCH parameters:		1, 2, 3	5MHz: R	
DL Reference Measurement		1, 2, 3	10MHz: F	
Channel ^{Note3}			20MHz: F	
		4, 5, 6	5MHz: R	
		, -, -	10MHz: F	
			20MHz: F	
PCFICH/PDCCH/PHICH		1, 2, 3	5MHz: R.	11 FDD
parameters:			10MHz: F	R.6 FDD
OL Reference Measurement			20MHz: R	.10 FDD
Channel ^{Note3}		4, 5, 6	5MHz: R.	
			10MHz: F	
Noto?			20MHz: R	
OCNG Patterns ^{Note3}		1, 2, 3	5MHz: OF	
			10MHz: O	
		4 5 6	20MHz: O 5MHz: O	
		4, 5, 6	10MHz: C	
			20MHz: C	
PBCH RA		1, 2, 3, 4, 5, 6	ZOIVII IZ. C	1.7 100
PBCH RB		2, 2, 0, 1, 0, 0		
PSS RA				
SSS RA				
PCFICH RB				
PHICH RA				
PHICH RB	dB		0	
PDCCH_RA				
PDCCH_RB				
PDSCH_RA				
PDSCH_RB				
OCNG_RA ^{Note4}				
OCNG_RB ^{Note4}				
V _{oc} Note5	dBm/15kHz	1, 2, 3, 4, 5, 6	-9	
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	4
Ê _s /I _{ot} Note6	dB	1, 2, 3, 4, 5, 6	-Infinity	4
RSRP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-94
SCH_RP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-94
Io ^{Note6}	dBm/9MHz	1, 2, 3, 4, 5, 6	-70.22	-64.76
Propagation Condition		1, 2, 3, 4, 5, 6	AW0 specified in table 4.2-1 in T	

Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211.

Note 2: PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211.

Note 3: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 respectively.

Note 4: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 5: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 6: \hat{E}_s/I_{ot} , RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 7: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27].

The UE shall start to transmit the PRACH to Cell 2 less than [925] ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to E-UTRAN observed during repeated tests shall be at least 90%.

NOTE: The redirection delay can be expressed as:

 $T_{connection_release_redirect_E_UTRA} = T_{RRC_procedure_delay} + T_{identify_E_UTRA} + T_{SI_E_UTRA} + T_{RACH},$

where:

 $T_{RRC_procedure_delay}$ = 110 ms and is specified in clause 12 in TS 38.331 [2].

 $T_{identify-NR} = [800]$ ms in the test.

 $T_{\text{SI-NR}} = 0$ ms is assumed, since the UE is provided with the SI (including MIB and all relevant SIBs) of the target E-UTRAN cell before the RRC connection is released by the old NR cell.

 $T_{RACH} = 15$ ms in the test.

This gives a total of [925] ms.

6.4 Timing

6.4.1 UE transmit timing

6.4.1.0 Minimum conformance requirements

6.4.1.0 Minimum conformance requirements

6.4.1.0.1 Minimum conformance requirements for UE transmit timing accuracy

The UE initial transmission timing error shall be less than or equal to $\pm T_e$ where the timing error limit value T_e is specified in Table 6.4.1.0.1-1. This requirement applies:

- when it is the first transmission in a DRX cycle for PUCCH, PUSCH and SRS or it is the PRACH transmission.

The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{c}}$. The downlink timing is defined as the time when the first detected path (in time) of the corresponding downlink frame is received from the reference cell. N_{TA} for PRACH is defined as 0.

 $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_{\text{c}}$ (in T_{c} units) for other channels is the difference between UE transmission timing and the downlink timing immediately after when the last timing advance in clause 7.3 was applied. N_{TA} for other channels is not changed until next timing advance is received. The value of $N_{\text{TA offset}}$ depends on the duplex mode of the cell in which the uplink transmission takes place and the frequency range (FR). $N_{\text{TA offset}}$ is defined in Table 6.4.1.0.1-2.

Table 6.4.1.0.1-1: Te Timing Error Limit

Frequency Range	SCS of SSB signals (KHz)	SCS of uplink signals s(KHz)	T _e
		15	12*64*T _c
	15	30	10*64*T _c
1		60	10*64*T _c
		15	8*64*T _c
	30	30 8*64*T _c	8*64*T _c
		60	7*64*T _c
	120		3.5*64*T _c
2	120	120	3.5*64*T _c
240	240	60	3*64*T _c
	240	120	3*64*T _c
Note 1: T _c is the basic timing unit defined in TS 38.211 [6]			

Table 6.4.1.0.1-2: The Value of $N_{\mathrm{TA~offset}}$

Frequency range and band of cell used for uplink transmission	N _{TA offset} (Unit: T _c)
FR1 FDD band without LTE-NR coexistence case or FR1	25600 (Note 1)
TDD band without LTE-NR coexistence case	
FR1 FDD band with LTE-NR coexistence case	0 (Note 1)
FR1 TDD band with LTE-NR coexistence case	39936 (Note 1)
FR2	13792

Note 1: The UE identifies $N_{\mathrm{TA~offset}}$ based on the information n-TimingAdvanceOffset according to [2]. If UE is not provided with the information n-TimingAdvanceOffset, the default value of $N_{\mathrm{TA~offset}}$ is set as 25600 for FR1 band. In case of multiple UL carriers in the same TAG, UE expects that the same value of n-TimingAdvanceOffset is provided for all the UL carriers according to section 4.2 in [3] and the value 39936 of $N_{\mathrm{TA~offset}}$ can also be provided for a FDD serving cell.

When it is not the first transmission in a DRX cycle or there is no DRX cycle, and when it is the transmission for PUCCH, PUSCH and SRS transmission, the UE shall be capable of changing the transmission timing according to the received downlink frame of the reference cell except when the timing advance in clause 7.3 is applied.

When the transmission timing error between the UE and the reference timing exceeds $\pm T_e$, the UE is required to adjust its timing to within $\pm T_e$. The reference timing shall be $(N_{\text{TA}} + N_{\text{TA offset}}) \times T_c$ before the downlink timing of the reference cell. All adjustments made to the UE uplink timing shall follow these rules:

- 1) The maximum amount of the magnitude of the timing change in one adjustment shall be T_q.
- 2) The minimum aggregate adjustment rate shall be T_p per second.
- 3) The maximum aggregate adjustment rate shall be T_q per [200]ms.

where the maximum autonomous time adjustment step T_q and the aggregate adjustment rate T_p are specified in Table 6.4.1.0.1-3.

Table 6.4.1.0.1-3: T_q Maximum Autonomous Time Adjustment Step and T_p Minimum Aggregate Adjustment rate

Frequency Range	SCS of uplink signals (KHz)	Tq	Тр		
	15	5.5*64*T _c	5.5*64*T _c		
1	30	5.5*64*T _c	5.5*64*T _c		
	60	5.5*64*T _c	5.5*64*T _c		
2	60	2.5*64*T _c	2.5*64*T _c		
	120	2.5*64*T _c	2.5*64*T _c		
NOTE 1: T _c is the bas	NOTE 1: T _c is the basic timing unit defined in TS 38.211 [6]				

The normative reference for this requirement is TS.38.133 [6] clause 7.1.2.

6.4.1.1 NR SA FR1 UE transmit timing accuracy

6.4.1.1.1 Test purpose

The purpose of this test is to verify that the UE can follow frame timing change of the connected gNodeb and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in TS 38.133 [6] clause 7.1.2.

6.4.1.1.2 Test applicability

This test applies to all types of NR UE release 15.

6.4.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.4.1.0.1.

The normative reference for this requirement is TS.38.133 [6] clause A.6.4.1.1

6.4.1.1.4 Test Description

6.4.1.1.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, test channel bandwidths and subcarrier spacing based on NR operating bands specified in Table 5.3.5-1 of 38.521-1 [17].

This test can be run in one of the configurations defined in Table 6.4.1.1.4.1-1.

Table 6.4.1.1.4.1-1: Supported test configurations for FR1 PCell

Configuration	Description		
6.4.1.1-1	NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz		
6.4.1.1-2	NR TDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz		
6.4.1.1-3	NR TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz		
Note: The UE is only required to be tested in one of the supported test			
confi	gurations in FR1 depending on UE capability.		

Configure the test equipment and the DUT according to the parameters in Table 6.4.1.1.4.1-2

Table 6.4.1.1.4.1-2: Initial conditions for NR SA FR1 transmit timing accuracy

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E.1.2, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 6.4.1.1.4.1-1		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		Without LTE link	

1. Message contents are defined in clause 6 6.4.1.1.4.3.

2. A single NR cell is used. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1. The general test parameters are given in Table 6.4.1.1.5-1 below.

6.4.1.1.4.2 Test procedure

The test consists of a single NR cell (PCell). The downlink timing of the NR Cell is changed and the changes in UE transmit timing are observed. The transmit timing is verified by the UE transmitting SRS used as a measurement reference facilitating the SS timing estimation.

The test sequence shall be carried out in RRC_CONNECTED for every test case.

Following will be the test sequence for this test

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* NR, Connected without release *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set up NR Cell according to parameters given in Table 6.4.1.1.4.1-1.
- 3. The SS shall transmit an RRCReconfiguration message configuring the UE with the message content defined in clause 6.4.1.1.4.3.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. After connection set up with the cell, the test equipment will verify that the timing of the NR cell is within ($N_{TA} + N_{TA_offset}$) $\times T_c \pm T_e$ of the first detected path of DL SSB.
 - a. The N_{TA} offset value (in T_c units) is 25600 for FR1
 - b. The T_e values depend on the DL and UL SCS for which the test is being run and are given in Table 6.4.1.1.5-
- 6. The test system shall adjust the timing of the DL path by values given in Table 6.4.1.1.4.2-1

Table 6.4.1.1.4.2-1: Adjustment Value for DL Timing

SCS of SSB signals (KHz)	Adjustment Value	
	Test1	Test2
15	+64*64Tc	+32*64Tc
30	+32*64Tc	+16*64Tc

- 7. The test system shall verify that the adjustment step size and the adjustment rate shall be according to requirements specified in Table 6.4.1.1.5-5. This will only be done for Test1.
- 8. The test system shall verify that the UE transmit timing offset stays within $(N_{TA} + N_{TA_offset}) \times T_c \pm T_e$ of the first detected path of DL SSB. For Test 2 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment

6.4.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions:

Table 6.4.1.1.4.3-1: SRS-Config: Additional test requirement for UE transmit timing accuracy for NR SA FR1 UE

Derivation Path: TS 38.508-1 [14], Table 4.6.3-182			
Information Element	Value/remark	Comment	Condition
SRS-Config ::= SEQUENCE {			
srs-ResourceSetToAddModList SEQUENCE			
(SIZE(0maxNrofSRS-ResourceSets)) OF			
SEQUENCE {			
srs-ResourceSetId	0		
resourceType CHOICE {			
periodic SEQUENCE {			
periodicityAndOffset-p	sl1		Test 1
periodicityAndOffset-p	sl320		Test 2 and
			SCS 15 kHz
periodicityAndOffset-p	sl640		Test 2 and
			SCS 30 kHz
}			
}			
}			
srs-ResourceToAddModList SEQUENCE			
(SIZE(1maxNrofSRS-Resources)) OF SEQUENCE {	1		
srs-Resourceld	0		
freqHopping SEQUENCE {			
c-SRS	1		
b-SRS	0		
b-hop	0		
}			
groupOrSequenceHopping		NOT PRESENT	
}			
}			

Table 6.4.1.1.4.3-2: *DRX-Config* : Additional test requirement for UE transmit timing accuracy Test 2 for NR SA FR1

Information Element	Value/remark	Comment	Condition
DRX-Config ::= CHOICE {			
drx-InactivityTimer	ms1		
drx-RetransmissionTimerDL	sl1		
drx-RetransmissionTimerUL	sl1		
drx-LongCycleStartOffset CHOICE {			
ms320	0		
}			
}			

Table 6.4.1.1.4.3-3: PUSCH-TimeDomainResourceAllocationList

Derivation Path: TS 38.508-1, Table 4.6.3-122			
Information Element	Value/remark	Comment	Condition
PUSCH-TimeDomainResourceAllocationList ::= SEQUENCE (SIZE(1maxNrofUL-Allocations)) OF {	2 entries		
PUSCH-TimeDomainResourceAllocation[1] SEQUENCE {			
startSymbolAndLength	41	Start symbol(S)=0, Length(L)=13	
}			
PUSCH-TimeDomainResourceAllocation[2] SEQUENCE {		addressed by Msg3 PUSCH time resource allocation field of the Random Access Response acc. to TS 38.213 [22] Table 8.2-1.	
startSymbolAndLength	41	Start symbol(S)=0, Length(L)=13	
}			
]			

6.4.1.1.5 Test Requirements

Table 6.4.1.1.5-1: Cell Specific Test Parameters for UL Transmit Timing test

Parameter	Unit	Config	Test1	Test2
SSB ARFCN		1,2,3	Freq1	Freq1
NR Channel Number		1,2,3	2	2
		1	Not Ap	plicable
TDD configuration		2	TDDC	onf.1.1
		3	TDDC	onf.2.1
		1	10: N _{RB,c} = 52	
BW _{channel}	MHz	2	10: N _R	_{B,c} = 52
		3		
Initial BWP Configuration		1,2,3		
Dedicated BWP Configuration		1,2,3		
DRx Cycle	ms	1,2,3	N/A	DRX.5 ^{Note5}
PDSCH Reference		1	SR.1.1 FDD	
measurement channel		2	SR.1.1 TDD	
		3	40: N _{RB,C} = 106 DLBWP.0.1 ULBWP.0.1 JUBWP.1.1 1 TDD	
RMSI CORESET		1	CR.1.	1 FDD
Reference Channel		2	CR.1.	1 TDD
		3	CR.2.	1 TDD
Dedicated CORESET		1	CCR.1	.1 FDD
Reference Channel		2	CCR.1	.1 TDD
Reference Chamilei			CCR.2	.1 TDD
OCNG Patterns		+		
SSB configuration		· ·	SSB.	1 FR1
33D comiguration		3 TDD 1 10: N 2 10: N 3 40: N 1,2,3 DLE 1,2,3 N/A 1,2,3 N/A 1 SR.: 2 SR.: 3 SR.: 1 CR.: 2 CR.: 3 CR.: 1 CCR 2 CCR 3 CCR 3 CCR 1,2,3 CCR 1,2,3 SSE 1 SSE 3 SSE	2 FR1	
SMTC			SM	ΓC.1
SIVITO		3	SM	ΓC.2
		1	TRS.1	.1 FDD
TRS configuration		2	TRS.1	.1 TDD
		3	TRS.1	.2 TDD

EPRE ratio of PSS to						
SSS						
EPRE ratio of PBCH						
DMRS to SSS						
EPRE ratio of PBCH to						
PBCH DMRS						
EPRE ratio of PDCCH						
DMRS to SSS						
EPRE ratio of PDCCH to	dB	1,2,3	0	0		
PDCCH DMRS		1,2,0				
EPRE ratio of PDSCH						
DMRS to SSS						
EPRE ratio of PDSCH to						
PDSCH						
EPRE ratio of OCNG						
DMRS to SSS(Note 1)						
EPRE ratio of OCNG to						
OCNG DMRS (Note 1)						
$N_{\scriptscriptstyle oc}$ Note2	dBm/15 kHz	1,2,3	-98	-98		
$N_{_{OC}}$ Note2	dBm/SCS	1,2	-98	-98		
	ubili/303	3	-95	-95		
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		1,2,3	3	3		
\hat{E}_s/N_{oc}		1,2,3	3	3		
SS-RSRP ^{Note3}	dBm/SCS	1,2	-95	-95		
	ubili/SCS	3	-92	-92		
Io ^{Note3}	dBm/9.36MHz	1,2	-65.2	-65.2		
	dBm/38.1MHz	3	-59.2	-59.2		
Propagation condition		1,2,3		GN		
SRS Config		1	Config1 ^{Note6}	Config3 ^{Note6}		
		2,3	Config1 ^{Note6}	Config2 ^{Note6}		
		th cells are fully all		stant total		
		is achieved for al				
		noise sources not				
		time and shall be r	nodelled as AWG	N of appropriate		
power for N_{oc}	to be fulfilled.					
	purposes. They are not settable parameters themselves.					
		are specified assu		it interference		
and noise at each receiver antenna port.						
			Note 5: DRx related parameters are given in Table 6.4.1.1.5-3			
Note 6: SRS configs are given in Table 6.4.1.1.5-2						

Table 6.4.1.1.5-2: SRS Configuration for Timing Accuracy Test

	Field	Config1	Config 2	Config3	Comments
SRS-	srs-ResourceSetId	0	0	0	
ResourceSet	srs-ResourceIdList	0	0	0	
	resourceType	Periodic	Periodic	Periodic	
	Usage	Codebook	Codebook	Codebook	
	SRS-ResourceSetId	0	0	0	
SRS-Resource	nrofSRS-Ports	Port1	Port1	Port1	
	transmissionComb	n2	n2	n2	
	combOffset-n2	0	0	0	
	cyclicShift-n2	0	0	0	
	resourceMapping startPosition	0	0	0	
	resourceMapping nrofSymbols	n1	n1	n1	
	resourceMapping repetitionFactor	n1	n1	n1	
	freqDomainPosition	0	0	0	
	freqDomainShift	0	0	0	

freqHopping c-SRS	sl1	sl1	sl1	
freqHopping b-SRS	0	0	0	
freqHopping b-hop	0	0	0	
groupOrSequenceHopping	Neither	Neither	Neither	
resourceType	Periodic	Periodic	Periodic	
periodicityAndOffset-p	sl1	sl640	sl320,0	Offset to align with DRx periodicity
sequenceld	0	0	0	Any 10 bit number

Table 6.4.1.1.5-3: DRX-Configuration for UL Timing Tests

Field	Test 2				
Field	Value				
drx-onDurationTimer	6 ms				
drx-InactivityTimer	1 ms				
drx-RetransmissionTimerDL	1 slot				
drx-RetransmissionTimerUL	1 slot				
longDRX-CycleStartOffset	320 ms				
shortDRX	disable				
TimeAlignmentTimer	Infinity				
Note: The DRX cycle and time alignment timer parameters are specified in clause 6.3.2 in TS 38.331 [13]					

Table 6.4.1.1.5-4: Te Timing Error Limit

Frequenc Range	у	SCS of SSB signals (KHz)	SCS of uplink signals (KHz)	T _e
			15	13.75*64*T _c
		15	30	11.75*64*T _c
1			60	11.75*64*T _c
_			15	9.75*64*T _c
		30	30	9.75*64*T _c
			60	8.75*64*T _c
Note 1: T _c is the basic timing unit defined in TS 38.211 [6]				

Table 6.4.1.1.5-5: T_q Maximum Autonomous Time Adjustment Step and T_p Minimum Aggregate Adjustment rate

Frequency Range	SCS of uplink signals (KHz)	Tq	T _p		
	15	5.5*64*T _c	5.5*64*T _c		
1	30	5.5*64*T _c	5.5*64*T _c		
	60	5.5*64*T _c	5.5*64*T _c		
NOTE 1: T _c is the basic timing unit defined in TS 38.211 [6]					

6.4.2 UE timer accuracy

6.4.3 Timing advance

6.4.3.0 Minimum conformance requirement

6.4.3.0.1 Minimum conformance requirement for timing advance adjustment

The UE shall adjust the timing of its transmissions with a relative accuracy better than or equal to the UE Timing Advance adjustment accuracy requirement in Table 6.4.3.1.3-1, to the signalled timing advance value compared to the timing of preceding uplink transmission. The timing advance command step is defined in TS38.213 [8].

Table 6.4.3.1.3-1: UE Timing Advance adjustment accuracy

Sub Carrier Spacing, SCS kHz	15	30	60	120
UE Timing Advance adjustment accuracy	±256 T _c	±256 T _c	±128 T _c	±32 T _c

6.4.3.1 NR SA FR1 timing advance adjustment accuracy

6.4.3.1.1 Test purpose

The purpose of the test is to verify UE timing advance adjustment delay and accuracy requirement defined in clause 7.3 of TS 38.133 [6].

6.4.3.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.4.3.1.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 6.4.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.4.3.1.

6.4.3.1.4 Test description

6.4.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.4.3.1.4.1-1.

Table 6.4.3.1.4.1-1: NR SA FR1 timing advance adjustment accuracy supported test configurations

Config	Description			
1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
2 NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
3 NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode				
Note: The UE is only required to be tested in one of the supported test configurations				

Configure the test equipment and the DUT according to the parameters in Table 6.4.3.1.4.1-2

Table 6.4.3.1.4.1-2: Initial conditions for NR SA FR1 timing advance adjustment accuracy

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified in Annex E.1.2, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1.			
Channel bandwidth	As specified by the test configuration selected from Table 6.4.3.1.4.1-1			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram		Without LTE Link		

Parameter	Unit	Value	Comment
RF channel number		1	
Initial DL BWP		DLBWP.0.1	As specified in Table A.8.1-1
Dedicated DL BWP		DLBWP.1.1	As specified in Table A.8.1-2
Initial UL BWP		ULBWP.0.1	As specified in Table A.8.2-1
Dedicated UL BWP		ULBWP.1.1	As specified in Table A.8.2-2
Timing Advance Command (T_A) value during T1		31	N _{TA_new =} N _{TA_old} for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2
Timing Advance Command (T_A) value during T2		39	For SCS = 15kHz : $N_{TA_new} = N_{TA_old} + 8192*T_c$ (based on equation in TS38.213 section 4.2) For SCS = 30kHz : $N_{TA_new} = N_{TA_old} + 4096*T_c$ (based on equation in TS38.213 section 4.2)
T1	S	5	
T2	S	5	

Table 6.4.3.1.4.1-3: General test parameters for timing advance

- 1. Message contents are defined in clause 6.4.3.1.4.3.
- 2. Single Cell is used, which is NR FR1 PCell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3.
- 3. The test parameters are given in Table 6.4.3.1.4.1-3 above.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.2 and C.1.3.
- 5. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [10] clause 4.5.

6.4.3.1.4.2 Test Procedure

The test consists of single cell. The test consists of two successive time periods, with time durations of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table 6.4.3.1.5-1 and table 6.4.3.1.4.1-3, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured. The UE Time Alignment Timer, described in Clause 5.2 in TS 38.321, shall be configured so that it does not expire in the duration of the test.

- 1. Set the parameters according to values in Tables 6.4.3.1.4.1-3.
- 2. SS shall transmit an RRCReconfiguration message.
- 3. The UE shall transmit RRCReconfigurationComplete message.
- 4. During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Clause 6.1.3.4 in TS 38.321. The Timing Advance Command value shall be set to 31, which according to Clause 4.2 in TS 38.213 results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.
- 5. During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value 39 as specified in table 6.4.3.1.4.1-3. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.
- 6. As specified in Clause 7.3.2.1 of TS 38.133 [6], the UE adjusts its uplink timing at slot n+k for a timing advance command received in slot n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.
- 7. The UE Time Alignment Timer, described in Clause 5.2 in TS 38.321, shall be configured so that it does not expire in the duration of the test.

- 8. The result from the SRS and adjustment of the timing advance in step 7) is used to measure that the UE adjusts the timing of its transmission with a relative accuracy better than or equal to value specified in Table 6.4.3.1.3-1 to the signalled timing advance value compared to the timing of preceding uplink transmission.
- 9. If the UE adjust the timing of its transmission within a relative accuracy greater than or equal to value specified in Table 6.4.3.1.3-1 to the signalled timing advance value compared to the timing of preceding uplink transmission then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one
- 10. The SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 11. After the RRC connection release, the SS:

[transmits in Cell a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE is in State RRC_CONNECTED according to [TS 38.508-1] [14] clause 4.5.4 (if the paging fails, switch off and on the UE and ensure the UE is in RRC_CONNECTED according to [TS 38.508-1] [14] clause 4.5.4)],

or

- [if the paging fails, switch off and on the UE and ensure the UE in RRC_CONNECTED according to [TS 38.508-1] [14] clause 4.5.4)].
- 12. Repeat step 2-11 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.4.3.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1., with exceptions listed below in the Table 6.4.3.1.4.3-1

Table 6.4.3.1.4.3-1: srs-Config setup

Value/remark	Comment	Condition
[1 entry]		
0		
1 entry		
0		
Codebook		
SSB-Index		
1 entry		
0		
port1		
0		
0		
0		
n1		
n1		
0		
0		
12	Config 1,2	
24	Config 3	
0		
neither		
- 10.10		
periodic		
1		
sl5 : 0	Once every 5 Slots	
	1 entry 0 Codebook SSB-Index 1 entry 0 port1 0 0 11 11 11 11 11 12 14 15 16 17 18 18 18 18 18 18 18 18 18	[1 entry] 0 1 entry 0 Codebook SSB-Index 1 entry 0 port1 0 0 0 11 11 11 11 11 11 0 0 0 0 12 24 Config 1,2 Config 3 0 0 neither periodic sl5:0 Once every 5

6.4.3.1.5 Test Requirement

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. k slots after the reception of the timing advance command, where:

k = 5 for Config 1, 2, and 3

The Timing Advance adjustment accuracy shall be within the limits specified in Table 6.4.3.1.3-1.

Note 3:

parameters themselves.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

Table 6.4.3.1.5-1 and Table 6.4.3.1.5-2 define the primary level settings.

Table 6.4.3.1.5-1: Cell specific test parameters for timing advance

Donomester		Unit	Test1		
Parameter		Unit	T1 T2		
Dunla	x mode	Config 1		FD	D
Duple	x mode	Config 2,3		TC	D
С		Config 1		Not Applicable	
TDD cor	nfiguration	Config 2		TDDCc	onf.1.1
		Config 3		TDDConf.2.1	
		Config 1		10: N _{RE}	
BW	channel	Config 2	MHz	10: N _{RE}	
		Config 3		40: N _{RB,0}	
		Config 1		10: N _{RE}	
BW	P BW	Config 2	MHz	10: N _{RE}	
		Config 3		40: N _{RB,0}	
	DRx Cy		ms	Not App	
PDSCH	Reference	Config 1	<u> </u>	SR.1.1	
	ent channel	Config 2	<u> </u>	SR.1.1	
, , , , , , , , , , , , , , , , , , , ,		Config 3		SR2.1	
CORESET	Γ Reference	Config 1		CR.1.1	
		Config 2		CR.1.1	
Channel Config 3 Config 1		CR2.1			
				TRS.1.	
TRS Cor	nfiguration	Config 2		TRS.1.	
	00110.0	Config 3		TRS.1.	
	OCNG Pa			OCNG p	
SMTC co	nfiguration	Config 1,2	 	SMTC.	
		Config 3		SMTC.	
	I/PDCCH	Config 1,2	kHz —	15 k	
	er spacing	Config 3		30 1	
PUCCH/PUSCH Config 1,2 subcarrier spacing Config 3		kHz —	15 k		
	er spacing PRE ratio of P	Config 3		30 k	KMZ
		I DMRS to SSS	-		
		to PBCH DMRS	-		
		H DMRS to SSS	-		
		to PDCCH DMRS	-		
		H DMRS to SSS	- dB	C	
		CH to PDSCH	-		
		MRS to SSS(Note 1)	1		
		OCNG DMRS (Note	1		
	1)	2 2.10 2 (11010			
	-	ote?	dBm/15kH		0
	N_{oc} N	0102	Z	-9	8
N_{oc} Note	C	onfig 1,2		-9	8
0C 2		Config 3	dBm/SCS	-9	
-					
	$\mathbf{\hat{E}}_{s}/\mathbf{I}$		dB	3	<u> </u>
	\hat{E}_s/N	oc	dB	3	1
Io ^{Note3}	C	onfig 1,2	dBm/ 9.36MHz	-67	.57
10	Config 3		dBm/ 38.16MHz	-62	.58
Propagation condition			-	AW	
lote 2:	density is achi Interference fr	eved for all OFDM sy om other cells and no	mbols. pise sources not spe	ited and a constant total cified in the test is assun f appropriate power for	

lo levels have been derived from other parameters for information purposes. They are not settable

Field Value Comment Config 1,2 12 c-SRS Config 3 24 Frequency hopping is disabled b-SRS 0 b-hop 0 freqDomainPosition 0 Frequency domain position of SRS freqDomainShift 0 groupOrSequenceHopping neither No group or sequence hopping SRS-PeriodicityAndOffset sl5=0 Once every 5 slots SSB #0 is used for SRS path loss pathlossReferenceRS ssb-Index=0 estimation Codebook Codebook based UL transmission usage startPosition resourceMapping setting. SRS on last nrofSymbols symbol of slot, and 1symbols for SRS n1 repetitionFactor without repetition. n1 combOffset-n2 0 transmissionComb setting cyclicShift-n2 0 nrofSRS-Ports Number of antenna ports used for SRS port1 transmission Note: For further information see clause 6.3.2 in TS 38.331.

Table 6.4.3.1.5-2: Sounding Reference Symbol Configuration for timing advance

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.5 Signaling characteristics

6.5.1 Radio link monitoring

The UE shall monitor the downlink link quality based on the reference signal in the configured RLM-RS resource(s) in order to detect the downlink radio link quality of the PCell and PCell as specified in [3]. The configured RLM-RS resources can be all SSBs, or all CSI-RSs, or a mix of SSBs and CSI-RSs. UE is not required to perform RLM outside the active DL BWP.

On each RLM-RS resource, the UE shall estimate the downlink radio link quality and compare it to the thresholds Q_{out} and Q_{in} for the purpose of monitoring downlink radio link quality of the cell.

The threshold Q_{out} is defined as the level at which the downlink radio link cannot be reliably received and shall correspond to the out-of-sync block error rate (BLER_{out}) as defined in Table 6.5.1-1.

The threshold Q_{in} is defined as the level at which the downlink radio link quality can be significantly more reliably received than at Q_{out} and shall correspond to the in-sync block error rate (BLER_{in}) as defined in Table 6.5.1-1.

The out-of-sync block error rate (BLER $_{out}$) and in-sync block error rate (BLER $_{in}$) are determined from the network configuration via parameter rlmInSyncOutOfSyncThreshold signalled by higher layers. When UE is not configured with RLM-IS-OOS-thresholdConfig from the network, UE determines out-of-sync and in-sync block error rates from Configuration #0 in Table 6.5.1-1 as default. All requirements here are applicable for BLER Configuration #0 in Table 6.5.1-1.

Table 6.5.1-1: Out-of-sync and in-sync block error rates

Configuration	BLERout	BLERin
0	10%	2%

UE shall be able to monitor up to X_{RLM-RS} RLM-RS resources of the same or different types in each corresponding carrier frequency range, where X_{RLM-RS} is specified in Table 6.5.1-2, and meet the requirements as specified in this section.

Table 6.5.1-2: Maximum number of RLM-RS resources X_{RLM-RS}

Maximum number of RLM-RS resources, X _{RLM-RS}	Carrier frequency range of PCell/Pcell
2	FR1, ≤ 3 GHz
4	FR1, > 3 GHz
8	FR2

If different SCS is used for CSI-RS based RLM-RS and SSB, then CSI-RS based RLM-RS and SSB shall be TDMed. If same SCS is used for CSI-RS based RLM-RS and SSB, then CSI-RS based RLM-RS and SSB can be FDMed or TDMed.

Any uplink signal transmitted by the UE is used for detecting the In-/Out-of-Sync state of the UE. In terms of measurement, the uplink signal is verified on the basis of the UE output power:

For intra-band contiguous carrier aggregation, transmit OFF power is measured as the mean power per component carrier.

For UE with multiple transmit antennas, transmit OFF power is measured as the mean power at each transmit connector.

- UE output power higher than Transmit OFF power -50 dBm (as defined in TS 38.101-3 [4]) means uplink signal
- UE output power equal to or less than Transmit OFF power -50 dBm (as defined in TS 38.101-3 [4]) means no uplink signal.

6.5.1.0 Minimum conformance requirements

6.5.1.0.1 Minimum conformance requirements for out-of-sync SSB-based RLM

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_out_SSB}}$ [ms] period becomes worse than the threshold $Q_{\text{out_SSB}}$ within $T_{\text{Evaluate_out_SSB}}$ [ms] evaluation period. The requirements in this section apply for each SSB based RLM-RS resource configured for PSCell, provided that the SSB configured for RLM is transmitted within UE active DL BWP during the entire evaluation period defined in Table 6.5.1.0.1-1.

 $T_{\mbox{\scriptsize Evaluate_out_SSB}}$ is defined in Table 6.5.1.0.1-1 for FR1.

Table 6.5.1.0.1-1: Evaluation period T_{Evaluate_out} for FR1

Configuration	T _{Evaluate_out_SSB} (ms)		
no DRX	max(200,ceil(10*P)*T _{SSB})		
DRX cycle≤320	$max(200,ceil(15*P)*max(T_{DRX},T_{SSB}))$		
DRX cycle>320	ceil(10*P)*T _{DRX}		
NOTE: T _{SSB} is the periodicity of SSB configured for RLM.			

For FR1,

- P=1/(1 T_{SSE}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the SSB; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB.

If the high layer in TS 38.331 [13] signaling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; otherwise $T_{SMTCperiod}$ follows smtc1.

Longer evaluation period would be expected if the combination of RLM-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

When the downlink radio link quality on all the configured RLM-RS resources is worse than Q_{out} , Layer 1 of the UE shall send an out-of-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 38.331 [13].

The out-of-sync and in-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 in TS 38.213 [8]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval}$.

If DRX is used, when the UE transitions between DRX and no DRX or when DRX cycle periodicity changes, for each RLM-RS resource, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation period corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode for each RLM-RS resource. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When

- the UE transitions from a first configuration of RLM-RS resources to a second configuration of RLM-RS resources that is different from the first configuration,

or

- the UE transitions between DRX and no DRX or DRX cycle periodicity changes,

for each RLM-RS resource, for a duration of time equal to the evaluation period corresponding to the second configuration after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first configuration and the second configuration. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second configuration for each RLM-RS resource present in the second configuration. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When DRX is not used $T_{Indication_interval}$ is max(10ms, $T_{RLM-RS,M}$), where $T_{RLM,M}$ is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to T_{SSB} specified in section 8.1.2 if the RLM-RS resource is SSR

When DRX is used, TIndication_interval is max(10ms, 1.5*DRX_cycle_length, 1.5*TRLM-RS,M) if DRX cycle_length is less than or equal to 320ms, and TIndication_interval is DRX_cycle_length if DRX cycle_length is greater than 320ms. Upon start of T310 timer as specified in TS 38.331 [13], the UE shall monitor the configured RLM-RS resources for recovery using the evaluation period and Layer 1 indication interval corresponding to the no DRX mode until the expiry or stop of T310 timer.

The transmitter power of the UE in the monitored cell shall be turned off within 40ms after expiry of T310 timer as specified in TS 38.331 [13].

There are no scheduling restrictions due to radio link monitoring performed with a same subcarrier spacing as PDSCH/PDCCH on FR1.

For UE which support *simultaneousRxDataSSB-DiffNumerology* [14] there are no restrictions on scheduling availability due to radio link monitoring based on SSB as RLM-RS. For UE which do not support *simultaneousRxDataSSB-DiffNumerology* [11] the following restrictions apply due to radio link monitoring based on SSB as RLM-RS.

- The UE is not expected to transmit PUCCH/PUSCH or receive PDCCH/PDSCH on SSB symbols to be measured for radio link monitoring.

The normative reference for this requirement is TS 38.133 [6] clauses 8.1.2, 8.1.4, 8.1.5, 8.1.6 and 8.1.7.

6.5.1.0.2 Minimum conformance requirements for in-sync SSB-based RLM

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_in_SSB}}$ [ms] period becomes better than the threshold $Q_{\text{in_SSB}}$ within $T_{\text{Evaluate_in_SSB}}$ [ms] evaluation period.

 $T_{\text{Evaluate out SSB}}$ and $T_{\text{Evaluate in SSB}}$ are defined in Table 6.5.1.0.2-1 for FR1.

For FR1,

- P=1/(1 T_{SSB}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the SSB; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB.

If the high layer in TS 38.331 [2] signaling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; Otherwise $T_{SMTCperiod}$ follows smtc1.

Note: The overlap between CSI-RS RLM and SMTC means that CSI-RS based RLM is within the SMTC window duration.Longer evaluation period would be expected if the combination of RLM-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The values of $M_{\mbox{\scriptsize out}}$ and $M_{\mbox{\scriptsize in}}$ used in Table 6.5.1.2.3-1 are defined as:

- $M_{out} = 20$ and $M_{in} = 10$, if the CSI-RS resource configured for RLM is transmitted with Density = 3.

 $\begin{array}{|c|c|c|c|c|c|} \hline \textbf{Configuration} & \textbf{T}_{\text{Evaluate_out}} \textbf{ (ms)} & \textbf{T}_{\text{Evaluate_in}} \textbf{ (ms)} \\ \hline \textbf{no DRX} & \text{max}(200, \text{ceil}(|\mathsf{M}_{\text{out}} \times \mathsf{P}) \times \mathsf{T}_{\text{CSI-RS}}) & \text{max}(100, \text{ceil}(|\mathsf{M}_{\text{in}} \times \mathsf{P}) \times \mathsf{T}_{\text{CSI-RS}}) \\ \hline \textbf{DRX} \leq 320 \text{ms} & \text{max}(200, \text{ceil}(|1.5 \times \mathsf{M}_{\text{out}} \times \mathsf{P}) \times \text{max}(\mathsf{T}_{\text{DRX}}, & \text{max}(100, \text{ceil}(|1.5 \times \mathsf{M}_{\text{in}} \times \mathsf{P}) \times \text{max}(\mathsf{T}_{\text{DRX}}, \mathsf{T}_{\text{CSI-RS}})) \\ \hline \textbf{DRX} > 320 \text{ms} & \text{ceil}(|\mathsf{M}_{\text{out}} \times \mathsf{P}) \times \mathsf{T}_{\text{DRX}} & \text{ceil}(|\mathsf{M}_{\text{in}} \times \mathsf{P}) \times \mathsf{T}_{\text{DRX}} \\ \hline \textbf{NOTE:} & \mathsf{T}_{\text{CSI-RS}} \text{ is the periodicity of CSI-RS resource configured for RLM. } \mathsf{T}_{\text{DRX}} \text{ is the DRX cycle length.} \\ \hline \end{array}$

Table 6.5.1.0.2-1: Evaluation period T_{Evaluate_out} and T_{Evaluate_in} for FR1

If the high layer in TS 38.331 [2] signaling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; Otherwise $T_{SMTCperiod}$ follows smtc1.

When the downlink radio link quality on at least one of the configured RLM-RS resources is better than $Q_{\rm in}$, Layer 1 of the UE shall send an in-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the in-sync indications as specified in TS 38.331 [2].

The in-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 in TS 38.213 [3]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication interval}$.

When DRX is not used $T_{Indication_interval}$ is max(10ms, $T_{RLM-RS,M}$), where $T_{RLM,M}$ is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to T_{SSB} specified in section 8.1.2 of TS 38.133 [6] if the RLM-RS resource is SSB, or T_{CSI-RS} specified later in this if the RLM-RS resource is CSI-RS.

When DRX is used, TIndication_interval is max(10ms, 1.5*DRX_cycle_length, 1.5*TRLM-RS,M) if DRX cycle_length is less than or equal to 320ms, and TIndication_interval is DRX_cycle_length if DRX cycle_length is greater than 320ms. Upon start of T310 timer as specified in TS 38.331 [2], the UE shall monitor the configured RLM-RS resources for recovery using the evaluation period and Layer 1 indication interval corresponding to the no DRX mode until the expiry or stop of T310 timer.

When the UE transitions between DRX and no DRX or when DRX cycle periodicity changes, for each RLM-RS resource, for a duration of time equal to the evaluation period corresponding to the second mode after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation period corresponding to the first mode and the second mode. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second mode for each RLM-RS resource. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

When the UE transitions from a first configuration of RLM-RS resources to a second configuration of RLM-RS resources that is different from the first configuration, for each RLM-RS resource present in the second configuration, for a duration of time equal to the evaluation period corresponding to the second configuration after the transition occurs, the UE shall use an evaluation period that is no less than the minimum of evaluation periods corresponding to the first configuration and the second configuration. Subsequent to this duration, the UE shall use an evaluation period corresponding to the second configuration for each RLM-RS resource present in the second configuration. This requirement shall be applied to both out-of-sync evaluation and in-sync evaluation of the monitored cell.

The transmitter power of the UE in the monitored cell shall be turned off within 40ms after expiry of T310 timer as specified in TS 38.331 [13].

There are no scheduling restrictions due to radio link monitoring performed with a same subcarrier spacing as PDSCH/PDCCH on FR1.

For UE which support *simultaneousRxDataSSB-DiffNumerology* [14] there are no restrictions on scheduling availability due to radio link monitoring based on SSB as RLM-RS. For UE which do not support *simultaneousRxDataSSB-DiffNumerology* [11] the following restrictions apply due to radio link monitoring based on SSB as RLM-RS.

- The UE is not expected to transmit PUCCH/PUSCH or receive PDCCH/PDSCH on SSB symbols to be measured for radio link monitoring.

The normative reference for this requirement is TS 38.133 [6] clauses 8.1.2, 8.1.4, 8.1.5, 8.1.6, 8.1.7 and A.7.5.1.

6.5.1.0.3 Minimum conformance requirements for out-of-sync and in-sync CSI-RS based RI M

[TS 38.133 clause 8.1.3.2]

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_out_CSI-RS}}$ [ms] period becomes worse than the threshold $Q_{\text{out_CSI-RS}}$ within $T_{\text{Evaluate_out_CSI-RS}}$ [ms] evaluation period.

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last $T_{\text{Evaluate_in_CSI-RS}}$ [ms] period becomes better than the threshold $Q_{\text{in_CSI-RS}}$ within $T_{\text{Evaluate_in_CSI-RS}}$ [ms] evaluation period.

- $T_{Evaluate_out_CSI-RS}$ and $T_{Evaluate_in_CSI-RS}$ are defined in Table 8.1.3.2-1 for FR1.

For FR1,

- P=1/(1 T_{CSI-RS}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

If the high layer in TS 38.331 [2] signaling of smtc2 is present, $T_{SMTCperiod}$ follows smtc2; Otherwise $T_{SMTCperiod}$ follows smtc1.

Note: The overlap between CSI-RS RLM and SMTC means that CSI-RS based RLM is within the SMTC window duration. Longer evaluation period would be expected if the combination of RLM-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The values of M_{out} and M_{in} used in Table 8.1.3.2-1 are defined as:

- M_{out} = 20 and M_{in} = 10, if the CSI-RS resource configured for RLM is transmitted with Density =3.

Table 6.5.1.0.3-1: Evaluation period $T_{\text{Evaluate_out}}$ and $T_{\text{Evaluate_in}}$ for FR1

Configuration	T _{Evaluate_out} (ms)	T _{Evaluate_in} (ms)		
no DRX	$max(200, ceil(M_{out} \times P) \times T_{CSI-RS})$	$max(100, ceil(M_{in} \times P) \times T_{CSI-RS})$		
DRX ≤ 320ms	$max(200, ceil(1.5 \times M_{out} \times P) \times max(T_{DRX},$	$max(100, ceil(1.5 \times M_{in} \times P) \times max(T_{DRX}, T_{CSI})$		
	T _{CSI-RS}))	rs))		
DRX > 320ms	$ceil(M_{out} \times P) \times T_{DRX} \qquad \qquad ceil(M_{in} \times P) \times T_{DRX}$			
NOTE: T _{CSI-RS} is the periodicity of CSI-RS resource configured for RLM. T _{DRX} is the DRX cycle length.				

[TS 38.133 clause 8.1.6]

When the downlink radio link quality on all the configured RLM-RS resources is worse than Q_{out} , Layer 1 of the UE shall send an out-of-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the out-of-sync indications as specified in TS 38.331 [2].

When the downlink radio link quality on at least one of the configured RLM-RS resources is better than Q_{in}, Layer 1 of the UE shall send an in-sync indication for the cell to the higher layers. A Layer 3 filter shall be applied to the in-sync indications as specified in TS 38.331 [2].

The out-of-sync and in-sync evaluations for the configured RLM-RS resources shall be performed as specified in clause 5 in TS 38.213 [3]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval}$.

When DRX is not used $T_{Indication_interval}$ is max(10ms, $T_{RLM-RS,M}$), where $T_{RLM,M}$ is the shortest periodicity of all configured RLM-RS resources for the monitored cell, which corresponds to T_{SSB} specified in section 8.1.2 if the RLM-RS resource is SSB, or T_{CSI-RS} specified in section 8.1.3 if the RLM-RS resource is CSI-RS.

In case DRX is used, $T_{Indication_interval}$ is max(10ms, 1.5*DRX_cycle_length, 1.5*T_{RLM-RS,M}) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms. Upon start of T310 timer as specified in TS 38.331 [2], the UE shall monitor the configured RLM-RS resources for recovery using the evaluation period and Layer 1 indication interval corresponding to the no DRX mode until the expiry or stop of T310 timer.

[TS 38.133 clause 8.1.5]

The transmitter power of the UE in the monitored cell shall be turned off within 40ms after expiry of T310 timer as specified in TS 38.331 [2].

The normative reference for this requirement is TS 38.133 [6] clause 8.1.3.2, 8.1.6 and 8.1.5.

6.5.1.1 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode

6.5.1.1.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PCell configured with SSB-based RLM RS in non-DRX mode. This test will partly verify the NR cell radio link monitoring requirements in TS 38.133 [6] section 8.1.2.

6.5.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.5.1.1.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 6.5.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.1.

6.5.1.1.4 Test description

There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 6.5.1.1.4-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

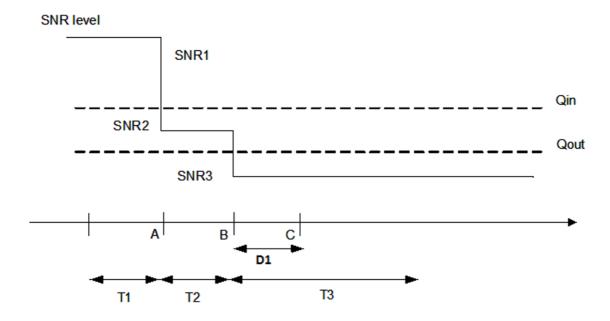


Figure 6.5.1.1.4-1: SNR variation for out-of-sync testing

6.5.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.5.1.1.4.1-1.

Table 6.5.1.1.4.1-1: NA SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode supported test configurations

Configuration	Description			
1	FDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz			
2	TDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz			
3	TDD, SSB SCS 30 KHz, data SCS 30KHz, BW 40MHz			
Note: The UE is only required to pass in one of the supported test configurations in FR1				

Configure the test equipment and the DUT according to the parameters in Table 6.5.1.1.4.1-2

Table 6.5.1.1.4.1-2: Initial conditions for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified in Annex E.1.2, Table E.4		I-1 and TS 38.508-1 [14] clause 4.3.1.	
Channel bandwidth	As specified by the test configuration selected from Table 6.5.1.1.4.1-1		on selected from Table 6.5.1.1.4.1-1	
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram	bands u	pable UEs without any 2 Rx RF se A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part		

PDCCH transmission parameters are given in Table 6.5.1.1.4.1-3.

Table 6.5.1.1.4.1-3: PDCCH transmission parameters for out-of-sync

Attribute	Value for BLER Configuration #0
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	4dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	4dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 6.5.1.1.4.3.
- 2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3.
- 3. The test parameters are given in Table 6.5.1.1.4.1-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.2 and C.1.3.
- 5. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [10] clause 4.5.

Table 6.5.1.1.4.1-4: General test parameters for FR1 out-of-sync testing in non-DRX mode

Parameter		Unit	Value	
			Test 1	
Active PCell			Cell 1	
RF Channel Number			1	
Duplex mode	Config 1		FDD	
•	Config 2, 3		TDD	
BW _{channel}	Config 1	MHz	10: N _{RB,c} = 52	
	Config 2		10: N _{RB,c} = 52	
	Config 3		40: N _{RB,c} = 106	
DL initial BWP configuration	Config 1, 2, 3		DLBWP.0.1	
DL dedicated BWP configuration	Config 1, 2, 3		DLBWP.1.1	
UL initial BWP configuration	Config 1, 2, 3		ULBWP.0.1	
UL dedicated BWP configuration	Config 1, 2, 3		ULBWP.1.1	
TDD Configuration	Config 1		Not Applicable	
	Config 2		TDDConf.1.1	
	Config 3		TDDConf.2.1	
CORESET Reference Channel	Config 1		CR.1.1 FDD	
	Config 2		CR.1.1 TDD	
	Config 3		CR.2.1 TDD	
SSB Configuration	Config 1		SSB.1 FR1	
	Config 2		SSB.1 FR1	
	Config 3		SSB.2 FR1	
SMTC Configuration	Config 1, 2		SMTC.1	
	Config 3		SMTC.1	
PDSCH/PDCCH subcarrier	Config 1, 2		15 KHz	
spacing	Config 3		30 KHz	
PRACH Configuration	Config 1, 2		Table A.3.8.2.4-1	
	Config 3		Table A.3.8.2.4-1	
SSB index assigned as RLM RS			0	

OCNG parameters				OP.1
CP length				Normal
Correlation Matrix and Antenna Configuration			2x2 Low	
Out of sync	DCI format			1-0
transmission parameters	Number of C	Number of Control OFDM symbols		2
parameters	Aggregation	level	CCE	8
		othetical PDCCH RE energy SSS RE energy	dB	4
		othetical PDCCH DMRS erage SSS RE energy	dB	4
	DMRS precoder granularity			REG bundle size
	REG bundle	size		6
DRX	•			OFF
Gap pattern ID				gp0
Layer 3 filtering			Enabled	
T310 timer			ms	0
T311 timer			ms	1000
N310				1
N311				1
CSI-RS configur	ation	Config 1, 4		CSI-RS.1.3 FDD
•		Config 2, 5		CSI-RS.1.3 TDD
		Config 3, 6		CSI-RS.2.3 TDD
CSI-RS for track	ing	Config 1, 4		TRS.1.1 FDD
	· ·	Config 2, 5		TRS.1.1 TDD
		Config 3, 6		TRS.1.2 TDD
T1		S	1	
T2		S	0.6	
Т3		S	0.6	
D1			S	0.44
		assigned to the UE prior to the s not transmitted after T1 starts		riod T1.

6.5.1.1.4.2 Test Procedure

There is one cell (Cell 1), which is the active NR cell, in the test. Prior to the start of the time duration T1, the UE shall be fully synchronized to PCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 6.5.1.1.4.1-4..

- 1. Set the parameters according to T1 in Table 6.5.1.1.4.4-1. Propagation conditions are set according to Annex C.2.2. T1 starts.
- 2. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.1.1.4.4-1. T2 starts.
- 3. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.1.1.4.4-1. T3 starts.
- 4. If the SS:
 - a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each subframe configured for CQI transmission (according to configured CQI periodicity on PUCCH [format 1]) during the period from time point A to time point B

and

- b) does not detect any uplink power higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (240 ms after the start of T3) until T3 expires, the number of successful tests is increased by one.
- 5. Otherwise the number of failed tests is increased by one.
- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 6.5.1.1.4.4-1.

- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [10] clause 4.5.
- 8. Repeat steps 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.1.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1.

Table 6.5.1.1.4.3-1: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
searchSpaceId	0	SearchSpaceId with condition CSS	CSS
controlResourceSetId	0	ControlResourceS etId	
monitoringSlotPeriodicityAndOffset CHOICE {			
si1	NULL		
}			
duration	2		
monitoringSymbolsWithinSlot	1100000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
common SEQUENCE {			CSS, SISS
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 6.5.1.1.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200			
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		
}			

Table 6.5.1.1.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	52	10 MHz (Test 1, 2)	
	106	40 MHz (Test 3)	
}			

6.5.1.1.5 Test Requirement

Table 6.5.1.1.5-1 defines the cell specific primary level settings.

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

Table 6.5.1.1.5-1: Cell specific test parameters for FR1 (Cell 2) for out-of-sync radio link monitoring tests in non-DRX mode

	Parameter	Unit		Test 1	
			T1	T2	T3
EPRE ratio o	of PDCCH DMRS to SSS	dB		4	
EPRE ratio o	of PDCCH to PDCCH DMRS	dB		0	
EPRE ratio o	of PBCH DMRS to SSS	dB			
EPRE ratio o	of PBCH to PBCH DMRS	dB			
EPRE ratio o	of PSS to SSS	dB			
EPRE ratio o	of PDSCH DMRS to SSS	dB		0	
EPRE ratio o	of PDSCH to PDSCH DMRS	dB			
EPRE ratio o	of OCNG DMRS to SSS	dB			
EPRE ratio o	of OCNG to OCNG DMRS	dB			
SNR	Config 1	dB	1.9	-6.9	-15.9
	Config 2		1.9	-6.9	-15.9
	Config 3		1.9	-6.9	-15.9
N_{oc}	Config 1	dBm/15K	·		
- 00	Config 2	Hz	·	-98	
Config 3					
Propagation	condition		TDL-C 300ns 100Hz		

Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.

Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.6.5.1.1.1-1.

Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 from D.4.1.1, is -18dB-TT = -18.9dB (including test tolerances).

Table 6.5.1.1.5-2: Measurement gap configuration for out-of-sync tests in non-DRX mode

Field	Test 1			
Field	Value			
gapOffset	0			
Note Ensure that RLM RS is partially overlapped with measurement gap				

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.5.1.2 NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in non-DRX mode

6.5.1.2.1 Test purpose

The purpose of this test is to verify that the UE properly detects in sync for the purpose of monitoring downlink radio link quality of the PCell, when DRX is not used. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1.2.

6.5.1.2.2 Test applicability

This test applies to all types of NR UEs supporting Release 15 and forwared

6.5.1.2.3 Minimum conformance requirements

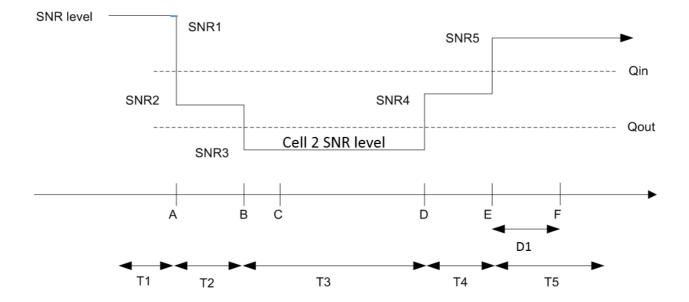
The minimum conformance requirements are specified in clause 6.5.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.2.

6.5.1.2.4 Test Description

There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.6.5.1.3.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. The UE is configured to perform interfrequency measurements using Gap Pattern ID #0 (40ms) in test 2.

Figure 6.5.1.2.4-1 - SNR variation for in-sync testing



6.5.1.2.5 Test Requirements

6.5.1.2.4.1 Initial Conditions

This test shall be tested using any of the test configurations in Table 6.5.1.2.4.1-1.

Table 6.5.1.2.4.1-1: Supported test configurations for FR1 PSCell

Configuration Description			
1	FDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz		
2	TDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz		
3	TDD, SSB SCS 30 KHz, data SCS 30KHz, BW 40MHz		
Note: The UE is only required to pass in one of the supported test configurations in FR1			

Configure the test equipment and the DUT according to the parameters in Table 6.5.1.2.4.1-2

Table 6.5.1.2.4.1-2: Initial conditions for SA FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

Parameter		Value	Comment			
Test environment	NC		Test environment NC As specified in TS 38.508-1		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As	As specified in Annex E.1.1, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1.				
Channel bandwidth		As specified by the test configuration selected from Table 6.5.1.2.5-1				
Propagation conditions		AWGN	As specified in Annex C.2.2.			
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to connection diagram		N/A				

PDCCH transmission parameters are given in Table 6.5.1.2.4.1-3

Table 6.5.1.2.4.1-3: PDCCH transmission parameters for in-sync

Attribute	Value for BLER Configuration #0
DCI payload size	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	4
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	0dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	0dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 4.5.1.3.4.3.
- 2. The power levels and settings for Cell 1 are set according to Annex A.6, Table A.6.1.1-1. Cell 2 is NR FR1 PSCell. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2

- 3. The general test parameters are given in Table 6.5.1.2.5-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.

F	Parameter	Unit	Value
			Test 1
Active PCell			Cell 1
RF Channel Number	Config 1		1 FDD
Duplex mode	Config 1 Config 2, 3		TDD
BW _{channel}	Config 1	MHz	10: N _{RB,c} = 52
D V Channel	Config 2	''''	10: N _{RB,c} = 52
	Config 3		40: N _{RB,c} = 106
DL initial BWP configuration	Config 1, 2, 3		DLBWP.0.1
DL dedicated BWP configuration	Config 1, 2, 3		DLBWP.1.1
UL initial BWP configuration	Config 1, 2, 3		ULBWP.0.1
UL dedicated BWP	Config 1, 2, 3		ULBWP.1.1
configuration	Config 1		
TDD Configuration	Config 1 Config 2		Not Applicable TDDConf.1.1
	Config 3		TDDConf.2.1
CORESET Reference	Config 1		CR.1.1 FDD
Channel	Config 2		CR.1.1 TDD
	Config 3		CR.2.1 TDD
SSB Configuration	Config 1		SSB.1 FR1
Č	Config 2		SSB.1 FR1
	Config 3		SSB.2 FR1
SMTC Configuration	Config 1, 2		SMTC.1
	Config 3		SMTC.1
PDSCH/PDCCH	Config 1, 2		15 KHz
subcarrier spacing	Config 3		30 KHz
PRACH Configuration	Config 1, 2		Table A.3.8.2.4-1
	Config 3		Table A.3.8.2.4-1
SSB index assigned as	RLM RS		0
OCNG parameters			OP.1
CP length			Normal
Correlation Matrix and			2x2 Low
In sync transmission	DCI format Number of Control OFDM		<u>1-0</u> 2
parameters	symbols	205	
	Aggregation level	CCE	4
	Ratio of hypothetical PDCCH RE energy to average SSS RE energy	dB	0
	Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	dB	0
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
Out of sync	DCI format		1-0
transmission parameters	Number of Control OFDM symbols		2
	Aggregation level	CCE	8
	Ratio of hypothetical PDCCH RE energy to average SSS RE energy	dB	4
	Ratio of hypothetical PDCCH	dB	4
	DMRS energy to average		
			REG bundle size

Gap pattern ID			N.A.	
Layer 3 filtering			Enabled	
T310 timer	T310 timer		2000	
T311 timer		ms	1000	
N310			1	
N311			1	
CSI-RS configuration	Config 1		CSI-RS.1.3 FDD	
	Config 2		CSI-RS.1.3 TDD	
	Config 3		CSI-RS.2.3 TDD	
T1		S	0.5	
T2		S	0.4	
T3		S	1.46	
T4		S	0.4	
T5		S	1	
D1		S	0.42	
Note 1: All configurations are assigned to the UE prior to the start of time period T1. Note 2: UE-specific PDCCH is not transmitted after T1 starts.				

6.5.1.2.4.2 Test Procedure

There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.6.5.1.4.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states.. Prior to the start of the time duration T1, the UE shall be fully synchronized to PCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 4.5.1.4.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* NR, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.5.1.4.4-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than the minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in the subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point F (1120 ms after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.2.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions.

Table 4.5.1.1.4.3-2: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
searchSpaceId	0	SearchSpaceId with condition CSS	CSS
controlResourceSetId	0	ControlResourceS etId	
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
duration	2		
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
common SEQUENCE {			CSS, SISS
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 4.5.1.1.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200)		
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		
}			

Table 4.5.1.1.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	52	10 MHz (Test 1, 2,	
		4, 5)	
	106	40 MHz (Test 3, 6)	
}			

6.5.1.2.5 Test Requirement

The requirements in this section apply for each SSB based RLM-RS resource configured for the PCell, provided that the SSB configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in section 6.5.1.2.3.

Table 6.5.1.2.5-1 defines the cell specific primary level settings.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence interval of 95%.

	Parameter	Unit			Test 1		
			T1	T2	T3	T4	T5
EPRE I	atio of PDCCH DMRS to SSS	dB		!	4		
EPRE I	atio of PDCCH to PDCCH DMRS	dB			0		
EPRE I	EPRE ratio of PBCH DMRS to SSS						
EPRE I	atio of PBCH to PBCH DMRS	dB	1				
EPRE I	atio of PSS to SSS	dB]				
EPRE I	atio of PDSCH DMRS to SSS	dB			0		
EPRE I	atio of PDSCH to PDSCH DMRS	dB					
	atio of OCNG DMRS to SSS	dB					
EPRE I	ratio of OCNG to OCNG DMRS	dB					
SNR	Config 1	dB	1.9	-6.1	-	-5.4	1.9
					15.		
					9		
	Config 2		1.9	-6.1	-	-5.4	1.9
					15.		
	Config 2		1.9	-6.1	9	-5.4	1.9
	Config 3		1.9	-6.1	- 15.	-5.4	1.9
					15. 9		
TA T	Config 1	dBm/			-98		
N_{oc}	Config 2	15	-98				
	Config 3	KHz	-98				
Propag	ation condition			TDI -C		100Hz	,
Note 1:		he resour					
11010 21	and a constant total transmitted						
	OFDM symbols.						
Note 2:	The signal contains PDCCH for	UEs othe	r than	the dev	ice un	der test	t as
part of OCNG.							
Note 3:	Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.						
Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1,							
l	SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.6.5.1.2.1-1.						
Note 5:							
	least one band. For testing of a						, the
	SNR during T3 and T4 is modified as specified in section D.4.1.1.						

6.5.1.3 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in DRX mode

6.5.1.3.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink radio link quality of the PCell configured with SSB-based RLM RS when DRX is used. This test will partly verify the NR cell radio link monitoring requirements in TS 38.133 [6] section 8.1.2.

6.5.1.3.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.5.1.3.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 6.5.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.3.

6.5.1.3.4 Test description

There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 6.5.1.3.4-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. The UE is configured to perform interfrequency measurements using Gap Pattern ID #0 (40ms).

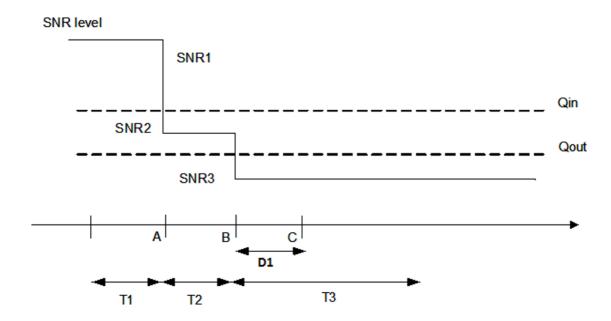


Figure 6.5.1.3.4-1: SNR variation for out-of-sync testing

6.5.1.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.5.1.3.4.1-1.

Table 6.5.1.3.4.1-1: NA SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in DRX mode supported test configurations

Configuration Description	
1	FDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz
2	TDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz
3	TDD, SSB SCS 30 KHz, data SCS 30KHz, BW 40MHz
Note: The UE is only required to pass in one of the supported test configuEFR1	

Configure the test equipment and the DUT according to the parameters in Table 6.5.1.3.4.1-2

Table 6.5.1.3.4.1-2: Initial conditions for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in DRX mode

Parameter	Value		Comment
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies			4-1 and TS 38.508-1 [14] clause 4.3.1.
Channel		As specified by the test configuration	on selected from Table 6.5.1.3.4.1-1
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part A.3.1.7.1		As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	For 4Rx capable UEs without any 2 Rx RF		
connection	bands u	se A.3.2.5.2 for DUT part and	
diagram		A.3.1.8.4 for TE Part	

PDCCH transmission parameters are given in Table 6.5.1.3.4.1-3.

Table 6.5.1.3.4.1-3: PDCCH transmission parameters for out-of-sync

Attribute	Value for BLER Configuration #0
DCI format	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	8
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	4dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	4dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 6.5.1.3.4.3.
- 2. Single Cell is used, which is NR FR1 PCell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3.
- 3. The test parameters are given in Table 6.5.1.3.4.1-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.2 and C.1.3.
- 5. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [10] clause 4.5.

Table 6.5.1.3.4.1-4: General test parameters for FR1 out-of-sync testing in DRX mode

Pa	arameter	Unit	Value
			Test 1
Active PCell	Active PCell		Cell 1
RF Channel Number			1
Duplex mode	Config 1		FDD
	Config 2, 3		TDD
BW _{channel}	Config 1	MHz	10: N _{RB,c} = 52
	Config 2		10: N _{RB,c} = 52
	Config 3		40: N _{RB,c} = 106
DL initial BWP Config 1, 2, 3 configuration			DLBWP.0.1

DL dedicated BWP configuration	Config 1, 2, 3		DLBWP.1.1
UL initial BWP	Config 1, 2, 3		ULBWP.0.1
configuration			025771.0.2
UL dedicated BWP configuration	Config 1, 2, 3		ULBWP.1.1
TDD Configuration	Config 1		Not Applicable
3	Config 2		TDDConf.1.1
	Config 3		TDDConf.2.1
CORESET Reference	Config 1		CR.1.1 FDD
Channel	Config 2		CR.1.1 TDD
Chamer			
000 0 0 0	Config 3		CR.2.1 TDD
SSB Configuration	Config 1		SSB.1 FR1
	Config 2		SSB.1 FR1
	Config 3		SSB.2 FR1
SMTC Configuration	Config 1, 2		SMTC.1
	Config 3		SMTC.1
PDSCH/PDCCH	Config 1, 2		15 KHz
subcarrier spacing	Config 3		30 KHz
DDACH Configuration	•		Table A.3.8.2.4-1
PRACH Configuration	Config 1, 2		
	Config 3		Table A.3.8.2.4-1
SSB index assigned as	RLM RS		0
OCNG parameters			OP.1
CP length			Normal
Correlation Matrix and	Antenna Configuration		2x2 Low
Out of a	DOI former		1.0
Out of sync	DCI format		1-0
transmission parameters	Number of Control OFDM symbols		2
	Aggregation level	CCE	8
	Ratio of hypothetical	dB	4
	Ratio of hypothetical PDCCH RE energy to	dB	
	Ratio of hypothetical PDCCH RE energy to average SSS RE energy	dB	
	PDCCH RE energy to average SSS RE energy		4
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical	dB dB	
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to		4
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical		4
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy		4
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder		4
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity		4 4 REG bundle size
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder		4 4 REG bundle size 6
DRX Configuration	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity		4 4 REG bundle size 6 DRX.4
Gap pattern ID	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity		4 4 REG bundle size 6 DRX.4 N.A.
	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity		4 4 REG bundle size 6 DRX.4
Gap pattern ID Layer 3 filtering	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity	dB	4 REG bundle size 6 DRX.4 N.A. Enabled
Gap pattern ID Layer 3 filtering T310 timer	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0
Gap pattern ID Layer 3 filtering T310 timer T311 timer	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311 CSI-RS configuration	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2 Config 3	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD CSI-RS.2.3 TDD
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2 Config 3 Config 1, 4	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD CSI-RS.2.3 TDD TRS.1.1 FDD
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311 CSI-RS configuration	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2 Config 3 Config 1, 4 Config 2, 5	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD CSI-RS.2.3 TDD TRS.1.1 FDD TRS.1.1 TDD
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311 CSI-RS configuration CSI-RS for tracking	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2 Config 3 Config 1, 4	dB	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD CSI-RS.2.3 TDD TRS.1.1 FDD TRS.1.1 TDD TRS.1.2 TDD
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311 CSI-RS configuration CSI-RS for tracking	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2 Config 3 Config 1, 4 Config 2, 5	ms ms	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD CSI-RS.2.3 TDD TRS.1.1 FDD TRS.1.1 TDD TRS.1.2 TDD 4
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311 CSI-RS configuration CSI-RS for tracking T1 T2	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2 Config 3 Config 1, 4 Config 2, 5	ms ms	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD CSI-RS.2.3 TDD TRS.1.1 FDD TRS.1.1 TDD TRS.1.1 TDD TRS.1.2 TDD 4 73
Gap pattern ID Layer 3 filtering T310 timer T311 timer N310 N311 CSI-RS configuration CSI-RS for tracking	PDCCH RE energy to average SSS RE energy Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy DMRS precoder granularity REG bundle size Config 1 Config 2 Config 3 Config 1, 4 Config 2, 5	ms ms	4 REG bundle size 6 DRX.4 N.A. Enabled 0 1000 1 1 CSI-RS.1.3 FDD CSI-RS.1.3 TDD CSI-RS.2.3 TDD TRS.1.1 FDD TRS.1.1 TDD TRS.1.2 TDD 4

All configurations are assigned to the UE prior to the start of time period T1. UE-specific PDCCH is not transmitted after T1 starts. Note 1:

Note 2:

6.5.1.3.4.2 Test Procedure

There is one cell (Cell 1), which is the active NR cell, in the test. Prior to the start of the time duration T1, the UE shall be fully synchronized to PCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 6.5.1.3.4.1-4.

- 1. Set the parameters according to T1 in Table 6.5.1.3.4.4-1. Propagation conditions are set according to Annex TBD. T1 starts.
- 2. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.1.3.4.4-1. T2 starts.
- 3. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.1.3.4.4-1. T3 starts.
- 4. If the SS:
 - a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each subframe configured for CQI transmission (according to configured CQI periodicity on PUCCH [format 1]) during the period from time point A to time point B

and

b) does not detect any uplink power higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (240 ms after the start of T3) until T3 expires, the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 5. When T3 expires the SS shall change the SNR value to T1 as specified in Table 6.5.1.3.4.4-1 for subtests 1 and 2.
- 6. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [10] clause 4.5.
- 7. Repeat steps 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.3.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1.

Table 6.5.1.3.4.3-1: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162				
Information Element	Value/remark	Comment	Condition	
SearchSpace ::= SEQUENCE {				
searchSpaceId	0	SearchSpaceId with condition CSS	CSS	
controlResourceSetId	0	ControlResourceS etId		
monitoringSlotPeriodicityAndOffset CHOICE {				
sl1	NULL			
}				
duration	2			
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1		
nrofCandidates SEQUENCE {				
aggregationLevel1	n0			
aggregationLevel2	n0			
aggregationLevel4	n0			
aggregationLevel8	n1	AL8		
aggregationLevel16	n0			
}				
searchSpaceType CHOICE {				
common SEQUENCE {			CSS, SISS	
ue-Specific SEQUENCE {			USS	
dci-Formats	formats0-0-And-1-0	DCI Format 1_0		
}				
}				
}				

Table 6.5.1.3.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200				
Information Element	Value/remark	Comment	Condition	
UE-TimersAndConstants ::= SEQUENCE {				
t310	ms0			
n310	n1			
t311	ms1000			
n311	n1			
}				

Table 6.5.1.3.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33			
Information Element	Value/remark	Comment	Condition
CSI-FrequencyOccupation ::= SEQUENCE {			
startingRB	0		
nrofRBs	52	10 MHz (Test 1, 2)	
	106	40 MHz (Test 3)	
}			

6.5.1.3.5 Test Requirement

Table 6.5.1.3.5-1 defines the cell specific primary level settings.

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

The rate of correct events observed during repeated tests shall be at least 90%.

Table 6.5.1.3.5-1: Cell specific test parameters for FR1 (Cell 1) for out-of-sync radio link monitoring tests in DRX mode

Parameter		Unit		Test 1	
			T1	T2	Т3
EPRE rati	io of PDCCH DMRS to SSS	dB		4	
EPRE rati	io of PDCCH to PDCCH DMRS	dB		0	
EPRE rati	io of PBCH DMRS to SSS	dB			
EPRE rati	io of PBCH to PBCH DMRS	dB			
EPRE rati	io of PSS to SSS	dB			
EPRE rati	io of PDSCH DMRS to SSS	dB		0	
EPRE rati	io of PDSCH to PDSCH DMRS	dB			
EPRE rati	io of OCNG DMRS to SSS	dB			
EPRE rati	io of OCNG to OCNG DMRS	dB			
SNR	Config 1	dB	1.9	6.1	-15.9
	Config 2		1.9	6.1	-15.9
	Config 3		1.9	6.1	-15.9
N _{oc} Config 1		dBm/15		-98	-
Config 2		KHz		-98	
Config 3				-98	
Propagation condition			T	DL-C 300ns 100	Hz
Note 1: OCNC shall be used such that the resources in Coll 1 are fully allocated and a constant total					

- Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.
- Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.6.5.1.3.1-1.
- Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 fromD.4.1.1, is -18dB-TT = -18.9dB (including test tolerances).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.5.1.4 NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in DRX mode

6.5.1.4.1 Test purpose

The purpose of this test is to verify that the UE properly detects in sync for the purpose of monitoring downlink radio link quality of the Pcell when DRX is used. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1.2.

6.5.1.4.2 Test applicability

This test applies to all types of NR UEs supporting Release 15 and forward

6.5.1.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.1.0.2.

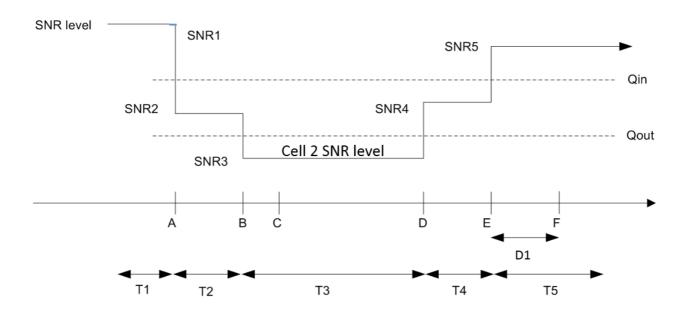
The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.4.

6.5.1.4.4 Test Description

There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.6.5.1.4.1-1 shows the variation of the downlink SNR in

the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. Editor note: whether to revise power level to be gradually changed

Figure 6.5.1.4.4-1 - SNR variation for in-sync testing



6.5.1.4.4.1 Initial Conditions

This test shall be tested using any of the test configurations in Table 4.5.1.4.4.1-1.

Table 6.5.1.4.4.1-1: Supported test configurations for NR FR1 PCell

Configuration		Description
1		FDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz
2		TDD, SSB SCS 15 KHz, data SCS 15KHz, BW 10MHz
3		TDD, SSB SCS 30 KHz, data SCS 30KHz, BW 40MHz
Note: The UE is only required to pass in one of the supported test configurations in FR1		

Configure the test equipment and the DUT according to the parameters in Table 4.5.1.4.4.1-2

Table 6.5.1.4.4.1-2: Initial conditions for SA FR1 radio link monitoring in-sync test for NR PCell configured with SSB-based RLM RS in DRX mode

Parameter	Value		Comment	
Test environment		NC	As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As	As specified in Annex E.1.2, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1.		
Channel		As specified by the test configuration selected from Table 6.5.1.4.4.1-1		
bandwidth				
Propagation		AWGN	As specified in Annex C.2.2.	
conditions				
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		

Exceptions to	For 4Rx capable UEs without any 2 Rx RF	
connection	bands use A.3.2.5.2 for DUT part and	
diagram	A.3.1.8.4 for TE Part	

PDCCH transmission parameters are given in Table 4.5.1.4.4.1-3

Table 6.5.1.4.4.1-3: PDCCH transmission parameters for in-sync

Attribute	Value for BLER Configuration #0
DCI payload size	1-0
Number of control OFDM symbols	2
Aggregation level (CCE)	4
Ratio of hypothetical PDCCH RE energy to average SSS RE energy	0dB
Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy	0dB
Bandwidth (MHz)	24
Sub-carrier spacing (kHz)	SCS of the active DL BWP
DMRS precoder granularity	REG bundle size
REG bundle size	6
CP length	Normal
Mapping from REG to CCE	Distributed

- 1. Message contents are defined in clause 6.5.1.4.4.3.
- 2. There is one cell (Cell 1), which is the active NR cell, in the test. The power levels and settings are set according to Annex TBD, Table TBD. The connection setup is done according to the settings in Annex C.1.3, and the downlink signal levels as per Annex C.1.2
- 3. The general test parameters are given in Table 6.5.1.4.5-4 below.
- 4. Downlink signals for NR cell are initially set up according to Annex C.1.

Table 6.5.1.4.4.1-4: General test parameters for FR1 in-sync testing in DRX mode

Parameter		Unit	Value Test 1	
Active DCell			0.114	
Active PCell RF Channel Number			Cell 1	
Duplex mode		Config 1		FDD
Duplex mode		Config 2, 3	 	TDD
BW _{channel}		Config 1	MHz	10: N _{RB,c} = 52
G.M. III.C.		Config 2	1	10: N _{RB,c} = 52
		Config 3		40: $N_{RB,c} = 106$
DL initial BWP configuration		Config 1, 2, 3		DLBWP.0.1
DL dedicated BWP configuration		Config 1, 2, 3		DLBWP.1.1
UL initial BWP configuration		Config 1, 2, 3		ULBWP.0.1
UL dedicated BWP configuration		Config 1, 2, 3		ULBWP.1.1
TDD Configuration		Config 1		Not Applicable
		Config 2		TDDConf.1.1
		Config 3		TDDConf.2.1
CORESET Reference Cha		Config 1	 	CR.1.1 FDD
		Config 2	<u> </u>	CR.1.1 TDD
000.0 # "		Config 3	 	CR.2.1 TDD
SSB Configuration		Config 1		SSB.1 FR1
		Config 2	 	SSB.1 FR1
OMTO O TOTAL		Config 3		SSB.2 FR1
SMTC Configuration		Config 1, 2		SMTC.1
DDCCII/DDCCII		Config 3		SMTC.1
PDSCH/PDCCH subcarrie spacing		Config 1, 2		15 KHz
		Config 3		30 KHz
PRACH Configuration		Config 1, 2		Table A.3.8.2.4-1
		Config 3		Table A.3.8.2.4-1
SSB index assigned as RI	LM RS			0
	OCNG parameters			OP.1
CP length				Normal
Correlation Matrix and Ant	tenna Coi	ntiguration		2x2 Low
In sync transmission	DCI for			1-0
parameters	symbols			2
		ation level	CCE	4
		hypothetical PDCCH rgy to average SSS rgy	dB	0
	DMRS	hypothetical PDCCH energy to average E energy	dB	0
	DMRS	DMRS precoder granularity		REG bundle size
		ındle size		6
Out of sync transmission	DCI for			1-0
parameters	Number of Control OFDM symbols			2
		ation level	CCE	8
		hypothetical PDCCH rgy to average SSS rgy	dB	4
	Ratio of DMRS SSS RE	hypothetical PDCCH energy to average energy	dB	4
	DMRS	orecoder granularity		REG bundle size
	REG bu	ındle size		6

DRX Configuration			Table A.3.3.3-1
Gap pattern ID			N.A.
Layer 3 filtering			Enabled
T310 timer		ms	2000
T311 timer		ms	1000
N310			1
N311			1
CSI-RS configuration	Config 1		CSI-RS.1.3 FDD
	Config 2		CSI-RS.1.3 TDD
	Config 3		CSI-RS.2.3 TDD
T1	*	S	4
T2		S	1.6
T3		S	1.36
T4		S	0.4
T5		S	1.4
D1		S	1

Note 1: All configurations are assigned to the UE prior to the start of time period T1.

Note 2: UE-specific PDCCH is not transmitted after T1 starts.

6.5.1.4.4.2 Test Procedure

There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.6.5.1.4.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states.. Prior to the start of the time duration T1, the UE shall be fully synchronized to PCell. The UE shall be configured for periodic CQI reporting in PUCCH [format 1] with a reporting periodicity as mentioned in the above table 4.5.1.4.4.1-4.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters *Connectivity* NR, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [6] clause 4.5.
- 2. Set the parameters according to T1 in Table 4.5.1.4.4-1 for subtest 1 and 2. Propagation conditions are set according to Annex TBD. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 4.5.1.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T3 as specified in Table 4.5.1.4.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than the minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in the On-duration part of every DRX cycle in the subframe according the configured CQI reporting mode (PUCCH 1-0) during the period from time point A to time point F (1120 ms after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.4.4.3 Message Contents

Message contents are according to TS 38.508-1 [14] clause 4.6.1 with the following exceptions.

Table 4.5.1.1.4.3-2: PDCCH Search Space

Derivation Path: TS 38.508-1 [14], Table 4.6.3-162			
Information Element	Value/remark	Comment	Condition
SearchSpace ::= SEQUENCE {			
searchSpaceId	0	SearchSpaceId with condition CSS	CSS
controlResourceSetId	0	ControlResourceS etId	
monitoringSlotPeriodicityAndOffset CHOICE {			
sl1	NULL		
}			
duration	2		
monitoringSymbolsWithinSlot	11000000000000	Symbols 0 and 1	
nrofCandidates SEQUENCE {			
aggregationLevel1	n0		
aggregationLevel2	n0		
aggregationLevel4	n0		
aggregationLevel8	n1	AL8	
aggregationLevel16	n0		
}			
searchSpaceType CHOICE {			
common SEQUENCE {			CSS, SISS
ue-Specific SEQUENCE {			USS
dci-Formats	formats0-0-And-1-0	DCI Format 1_0	
}			
}			
}			

Table 4.5.1.1.4.3-2: UE-TimersAndConstants

Derivation Path: TS 38.508-1 [14], Table 4.6.3-200)		
Information Element	Value/remark	Comment	Condition
UE-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
n310	n1		
t311	ms1000		
n311	n1		
}			

Table 4.5.1.1.4.3-3: CSI-FrequencyOccupation

Derivation Path: TS 38.508-1 [14], Table 4.6.3-33				
Information Element	Value/remark	Comment	Condition	
CSI-FrequencyOccupation ::= SEQUENCE {				
startingRB	0			
nrofRBs	52	10 MHz (Test 1, 2,		
		4, 5)		
	106	40 MHz (Test 3, 6)		
}				

6.5.1.4.5 Test Requirement

The requirements in this section apply for each SSB based RLM-RS resource configured for the PCell, provided that the SSB configured for RLM are actually transmitted within UE active DL BWP during the entire evaluation period specified in section 6.5.1.4.3.

Table 6.5.1.4.5-1 defines the cell specific primary level settings.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence interval of 95%.

Parameter	Unit			Test 1		
		T1	T2	Т3	T4	T5
EPRE ratio of PDCCH DMRS to SSS	dB			4		
EPRE ratio of PDCCH to PDCCH DMRS	dB			0		
EPRE ratio of PBCH DMRS to SSS	dB					
EPRE ratio of PBCH to PBCH DMRS	dB					
EPRE ratio of PSS to SSS	dB					
EPRE ratio of PDSCH DMRS to SSS	dB			0		
EPRE ratio of PDSCH to PDSCH DMRS	dB					
EPRE ratio of OCNG DMRS to SSS	dB					
EPRE ratio of OCNG to OCNG DMRS	dB					
SNR Config 1	dB	1.9	-6.1	-15.9	-5.4	1.9
Config 2		1.9	-6.1	-15.9	-5.4	1.9
Config 3		1.9	-6.1	-15.9	-5.4	1.9
N _{oc} Config 1	dBm/15			-98		
Config 2	KHz			-98		
Config 3				-98		
Propagation condition				-C 300ns 1		
Note 1: OCNG shall be used such that the					a constant to	otal
transmitted power spectral density						
Note 2: The signal contains PDCCH for U				•	of OCNG.	
Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.						
Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and					4 and	
SNR5 respectively in Figure A.6.5.1.4.1-1.				_		
Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For						
testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as				ıs		
specified in section A.3.6.	specified in Section A.3.6.					

6.5.1.5 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

6.5.1.5.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PCell when no DRX is used. This test will partly verify the FR1 PCell CSI-RS Out-of-sync radio link monitoring requirements in TS 38.133 [6] clause 8.1.

6.5.1.5.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting CSI-RS based RLM.

6.5.1.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.5.

6.5.1.5.4 Test description

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 6.5.1.5.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

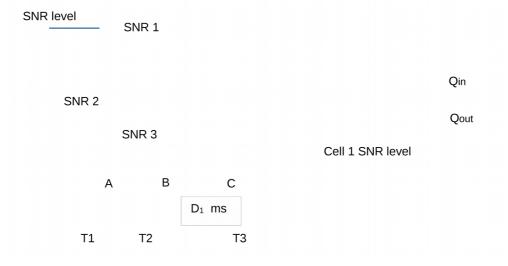


Figure 6.5.1.5.4-1: SNR variation for out-of-sync testing

6.5.1.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.5.1.5.4.1-1.

Table 6.5.1.5.4.1-1: Supported test configurations for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX

Configuration	Description	
6.5.1.5-1	FDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth	
6.5.1.5-2	TDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth	
6.5.1.5-3 TDD duplex mode, 30 kHz SSB SCS, 40MHz bandwidth		
Note: The UE is only required to pass in one of the supported test configurations in FR1		

Configure the test equirement and the DUT according to the parameters in Table 6.5.1.5.4.1-2.

Table 6.5.1.5.4.1-2: Initial conditions for NR SA radio link monitoring NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1.		
Channel	As specified	by the test configuration selected fr	om Table 6.5.1.5.4.1-1.	
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2	
conditions				
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to	N/A			
connection				
diagram				

- 1. The general test parameter settings are set up according to Table 6.5.1.5.4.1-3. The measurement gap configuration is according to Table 6.5.1.5.4.1-4.
- 2. Message contents are defined in clause 6.5.1.5.4.3.
- 3. There are one cell in the test, where Cell 1 is the NR PCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 6.5.1.5.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 6.5.1.5.4.1-3: General test parameters for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX

	Parameter	Unit	Value
	Parameter	Offic	Test 1
Active PCell			Cell 1
RF Channel Number			1
Duplex mode	Config 1		FDD
Duplex mode	Config 1 Config 2, 3		TDD
TDD Configuration			
TDD Configuration	Config 1		Not Applicable
	Config 2		TDDConf.1.1
DI 1 11 I DIVID	Config 3		TDDConf.2.1
DL initial BWP configuration	Config 1, 2, 3		DLBWP.0.1
DL dedicated BWP configuration	Config 1, 2, 3		DLBWP.1.1
UL initial BWP configuration	Config 1, 2, 3		ULBWP.0.1
UL dedicated BWP configuration	Config 1, 2, 3		ULBWP.1.1
CORESET Reference	Config 1		CR.1.1 FDD
Channel	Config 2		CR.1.1 TDD
	Config 3		CR.2.1 TDD
SSB Configuration	Config 1		SSB.1 FR1
	Config 2		SSB.1 FR1
	Config 3		SSB.2 FR1
SMTC Configuration	Config 1, 2		SMTC.1
	Config 3		SMTC.1
PDSCH/PDCCH	Config 1, 2		15 kHz
subcarrier spacing	Config 3		30 kHz
TRS configuration	Config 1		TRS.1.1 FDD
1 K3 Configuration	Config 2		TRS.1.1 TDD
	Config 2		TRS.1.1 TDD
CSI-RS for RLM			
CSI-RS IOI RLIVI	Config 1		Resource #4 in TRS.1.1 FDD
	Config 2		Resource #4 in TRS.1.1 TDD
	Config 3		Resource #4 in TRS.1.2 TDD
TCI configuration for PE	DCCH/PDSCH		TCI.State.0
OCNG parameters			OP.1
CP length Correlation Matrix and A	Antenna Configuration		Normal 2x2 Low
Out of sync	DCI format		1-0
transmission	Number of Control OFDM symbols		2
parameters	Aggregation level	CCE	8
parameters	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE	dB	4
	energy Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	4
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
DRX	•		OFF
Gap pattern ID			gp0
Layer 3 filtering			Enabled Enabled
T310 timer		ms	0
T311 timer		ms	1000
N310			1
N311			1
CSI-RS configuration	Config 1		CSI-RS.1.1 FDD
Config 2			CSI-RS.1.1 TDD
	Config 2		CSI-RS.2.1 TDD
T1	Coming 3		
T1 T2		S	0.2
		S	0.48
T3		S	0.48
D1		S	0.44

Note 1: UE-specific PDCCH is not transmitted after T1 starts.

Table 6.5.1.5.4.1-4: Measurement gap configuration for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX

Field	Test 1
Field	Value
gapOffset	0

6.5.1.5.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms) in test. In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 1 according to T1 in Table 6.5.1.5.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.1.5.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.1.5.5-1. T3 starts.
- 5. If the SS:
 - a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (D1 after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 6.5.1.5.5-1.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.5.1.5.4.3-1: Common Exception messages for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

	Default Message Contents
Common contents of system information	
blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED;
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1 and RLM for configuration 6.5.1.5-1 and 6.5.1.5-2
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.2 FR1 and RLM for
	configuration 6.5.1.5-3
	Table H.3.1-4 with a3-offset = -4.5dB;
	Table H.3.1-6 with Pattern #0
	Table H.3.1-8 with Condition CSI RLM
	Table H.3.1-9

6.5.1.5.5 Test requirement

Tables 6.5.1.5.4.1-3 and 6.5.1.5.5-1 define the primary level settings including test tolerances for Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with CSI-RS-based RLM in non-DRX mode.

Table 6.5.1.5.5-1: Cell specific test parameters for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

Parameter		Unit	Test 1		
			T1	T2	T3
PDCCH_beta		dB	4		
PDCCH_DMRS_beta		dB	4		
PBCH_beta		dB	0		
PSS_beta		dB			
SSS_beta		dB			
PDSCH_beta		dB			
OCNG_beta		dB			
SNR on RLM-RS	Config 1	dB	1.9	-6.1	-15.9
	Config 2		1.9	-6.1	-15.9
	Config 3		1.9	-6.1	-15.9
SNR on other	Config 1	dB	1		
channels and	Config 2		1		
signals	Config 3		1		
N_{oc}	Config 1	dBm/15KHz	-98		
	Config 2		-98		
	Config 3		-98		
Propagation condition			TDL-C 300ns 100Hz		

Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.

Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.

Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.

Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.

Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.

Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.6.5.1.5.1-1.

Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].

The UE behaviour during time durations T1, T2 and T3 shall be as follows:

During time durations T1, T2 and T3, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 no later than time point C (D_1 ms after the start of the time duration T3) on the PCell.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

6.5.1.6 NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

6.5.1.6.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PCell when no DRX is used. This test will partly verify the FR1 PCell CSI-RS in-sync radio link monitoring requirements in TS 38.133 [6] clause 8.1.

6.5.1.6.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting CSI-RS based RLM.

6.5.1.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.6.

6.5.1.6.4 Test description

The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 6.5.1.6.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the Pcell to emulate out-of-sync and in-sync states.

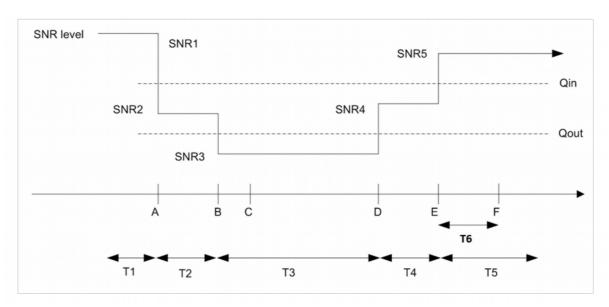


Figure 6.5.1.6.4-1: SNR variation for In-sync testing

6.5.1.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.5.1.6.4.1-1.

Table 6.5.1.6.4.1-1: Supported test configurations for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

Configuration	Description		
6.5.1.6-1	FDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth		
6.5.1.6-2	TDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth		
6.5.1.6-3	TDD duplex mode, 30 kHz SSB SCS, 40MHz bandwidth		
Note: The UE is only required to pass in one of the supported test configurations in FR1			

Configure the test equirement and the DUT according to the parameters in Table 6.5.1.6.4.1-2.

Table 6.5.1.6.4.1-2: Initial conditions for for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies		in Annex E, Table E.4-1 and TS 38.	
Channel	As specified	by the test configuration selected fr	om Table 6.5.1.6.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2
conditions			
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 6.5.1.6.4.1-3.
- 2. Message contents are defined in clause 6.5.1.6.4.3.
- 3. There is one cell in the test, where Cell 1 is the NR PCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 6.5.1.6.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 6.5.1.6.4.1-3: General test parameters for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

	Parameter	Unit	Value
			Test 1
Active PCell			Cell 1
RF Channel Number			11
Duplex mode	Config 1		FDD
	Config 2, 3		TDD
TDD Configuration	Config 1		Not Applicable
	Config 2		TDDConf.1.1
	Config 3		TDDConf.2.1
DL initial BWP .configuration	Config 1, 2, 3		DLBWP.0.1
DL dedicated BWP configuration	Config 1, 2, 3		DLBWP.1.1
UL initial BWP configuration	Config 1, 2, 3		ULBWP.0.1
UL dedicated BWP configuration	Config 1, 2, 3		ULBWP.1.1
CORESET Reference	Config 1		CR.1.1 FDD
Channel	Config 2		CR.1.1 TDD
	Config 3		CR.2.1 TDD
SSB Configuration	Config 1	<u></u>	SSB.1 FR1
	Config 2		SSB.1 FR1
	Config 3		SSB.2 FR1
SMTC Configuration	Config 1, 2		SMTC.1
-	Config 3		SMTC.1
PDSCH/PDCCH	Config 1, 2		15 kHz
subcarrier spacing	Config 3		30 kHz
TRS configuration	Config 1		TRS.1.1 FDD
	Config 2		TRS.1.1 TDD
	Config 3		TRS.1.2 TDD
CSI-RS for RLM	Config 1		Resource #4 in TRS.1.1 FDD
	Config 2		Resource #4 in TRS.1.1 TDD
	Config 3		Resource #4 in TRS.1.2 TDD
TCI configuration for PI	DCCH/PDSCH		TCI.State.0
OCNG parameters			OP.1
CP length			Normal
Correlation Matrix and			2x2 Low
Out of sync	DCI format		1-0
transmission	Number of Control OFDM symbols		2
parameters	Aggregation level	CCE	8
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	dB	4
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	4
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
In sync transmission	DCI format		1-0
parameters	Number of Control OFDM symbols		2
1	Aggregation level	CCE	4
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE	dB	0
	energy		_
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE	dB	0
	energy		
	energy DMRS precoder granularity		REG bundle size
	energy DMRS precoder granularity REG bundle size		REG bundle size

Gap pattern ID			N.A.
Layer 3 filtering			Enabled
T310 timer		ms	1000
T311 timer		ms	1000
N310			1
N311			1
CSI-RS configuration	Config 1		CSI-RS.1.1 FDD
	Config 2		CSI-RS.1.1 TDD
Config 3			CSI-RS.2.1 TDD
T1	T1		0.2
T2	T2		0.2
T3		S	0.44
T4	T4		0.2
T5		S	0.88
D1 s 0.84			0.84
Note 1: UE-specific PDCCH is not transmitted after T1 starts.			

6.5.1.6.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is not enabled. In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 1 according to T1 in Table 6.5.1.6.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.1.6.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.1.6.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 6.5.1.6.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 6.5.1.6.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point F (T6 after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 9. After T5 expires, repeat steps 2-7 for both subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.5.1.6.4.3-1: Common Exception messages for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

	Default Message Contents				
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ, L3 FILTERING NEEDED;				
·	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1 and RLM for				
	configuration 6.5.1.6-1 and 6.5.1.6-2 Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1 and RLM for configuration 6.5.1.5-3				
	Table H.3.1-4 with a3-offset = -4.5dB;				
	Table H.3.1-6 with Condition RLM;				
	Table H.3.1-7 with Condition INTRA-FREQ				
	Table H.3.1-8 with Condition CSI RLM				
	Table H.3.1-9				

6.5.1.6.5 Test requirement

Tables 6.5.1.6.4.1-3 and 6.5.1.6.5-1 define the primary level settings including test tolerances for Radio Link Monitoring In-sync Test for FR1 PCell configured with CSI-RS-based RLM in non-DRX mode.

Table 6.5.1.6.5-1: Cell specific test parameters for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode

Parameter		Unit	Test 1				
			T1	T2	T3	T4	T5
PDCCH_beta		dB			4		
PDCCH_DMR	S_beta	dB		4			
PBCH_beta		dB			0		
PSS_beta		dB	7				
SSS_beta		dB					
PDSCH_beta		dB	7				
OCNG beta		dB	1				
SNR on	Config 1	dB	1.9	-6.1	-15.9	-5.4	1.9
RLM-RS	Config 2		1.9	-6.1	-15.9	-5.4	1.9
	Config 3		1.9	-6.1	-15.9	-5.4	1.9
SNR on other	Config 1	dB		•	1		
channels and	Config 2		1				
signals	Config 3		1				
N _{oc} Config 1		dBm/15kHz	-98				
OC.	Config 2				-98		
	Config 3				-98		
Propagation co	ndition		TDL-C 300ns 100Hz			•	

- Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.
- Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.
- Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.6.5.1.6.1-1.
- Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (T6 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting on the PCell.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

6.5.1.7 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

6.5.1.7.1 Test purpose

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PCell when DRX is used. This test will partly verify the FR1 PCell CSI-RS Out-of-sync radio link monitoring requirements in TS 38.133 [6] clause 8.1.

6.5.1.7.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting CSI-RS based RLM and long DRX cycle.

6.5.1.7.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.7.

6.5.1.7.4 Test description

The test consists three successive time periods, with time duration of T1, T2 and T3 respectively. Figure 6.5.1.7.4-1 shows the three different time durations and the corresponding variation of the downlink SNR in the active cell to emulate out-of-sync states.

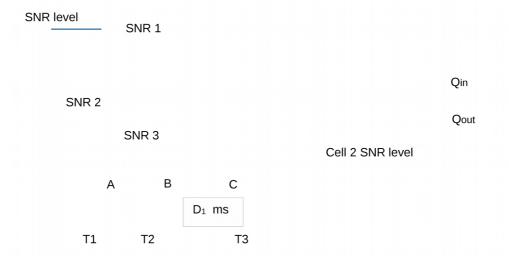


Figure 6.5.1.7.4-1: SNR variation for out-of-sync testing

6.5.1.7.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 6.5.1.7.4.1-1.

Table 6.5.1.7.4.1-1: Supported test configurations for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

Configuration	Description		
6.5.1.7-1	FDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth		
6.5.1.7-2	TDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth		
6.5.1.7-3	TDD duplex mode, 30 kHz SSB SCS, 40MHz bandwidth		
Note: The UE is only required to pass in one of the supported test configurations in FR1			

Configure the test equirement and the DUT according to the parameters in Table 6.5.1.7.4.1-2.

Table 6.5.1.7.4.1-2: Initial conditions for NR SA radio link monitoring for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1.			
Channel bandwidth	As specified by the test configuration selected from Table 6.5.1.7.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2		
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to connection diagram	N/A				

- 1. The general test parameter settings are set up according to Table 6.5.1.7.4.1-3.
- 2. Message contents are defined in clause 6.5.1.7.4.3.
- 3. There is one cell in the test, where Cell 1 is the NR PCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 6.5.1.7.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 6.5.1.7.4.1-3: General test parameters for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

	Parameter	Unit	Value
			Test 1
Active PCell			Cell 1
RF Channel Number			1
Duplex mode	Config 1		FDD
	Config 2, 3		TDD
TDD Configuration	Config 1		Not Applicable
122 comigaration	Config 2		TDDConf.1.1
	Config 3		TDDConf.2.1
DL initial BWP	Config 1, 2, 3		DLBWP.0.1
configuration			-
DL dedicated BWP configuration	Config 1, 2, 3		DLBWP.1.1
UL initial BWP configuration	Config 1, 2, 3		ULBWP.0.1
UL dedicated BWP configuration	Config 1, 2, 3		ULBWP.1.1
CORESET Reference	Config 1		CR.1.1 FDD
Channel	Config 2		CR.1.1 TDD
	Config 3		CR.2.1 TDD
SSB Configuration	Config 1		SSB.1 FR1
5	Config 2	1	SSB.1 FR1
	Config 3	1	SSB.2 FR1
SMTC Configuration	Config 1, 2		SMTC.1
	Config 3		SMTC.1
PDSCH/PDCCH	Config 1, 2		15 kHz
subcarrier spacing	Config 3		30 kHz
TRS configuration	Config 1		TRS.1.1 FDD
TNO comiguration	Config 2		TRS.1.1 TDD
	Config 3		TRS.1.2 TDD
CSI-RS for RLM	Config 1		Resource #4 in TRS.1.1 FDD
CSI-RS IOI RLIVI			
	Config 2		Resource #4 in TRS.1.1 TDD
	Config 3		Resource #4 in TRS.1.2 TDD
TCI configuration for PD	DCCH/PDSCH		TCI.State.0
OCNG parameters			OP.1
CP length Correlation Matrix and A	Antenna Configuration		Normal 2x2 Low
Out of sync	DCI format		1-0
transmission	Number of Control OFDM symbols		2
parameters	Aggregation level	CCE	8
parameters	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE	dB	4
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	4
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
DRX			DRX.3
Gap pattern ID			N.A.
Layer 3 filtering			Enabled
T310 timer		ms	0
T311 timer		ms	1000
N310			1
N311			1
CSI-RS configuration Config 1			CSI-RS.1.1 FDD
for CSI reporting Config 2		1	CSI-RS.1.1 FDD
		1	CSI-RS.1.1 TDD
T1	Config 3		
<u>T1</u>		S	0.2
T2		S	1.28
Т3		S	1.28
D1		S	1.24

Note 1: UE-specific PDCCH is not transmitted after T1 starts.

6.5.1.7.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 1 according to T1 in Table 6.5.1.7.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.1.7.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.1.7.5-1. T3 starts.
- 5. If the SS:
 - a) detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in the On-duration part of every DRX cycle in the slots configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C (D1 after the start of T3) until T3 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 6. When T3 expires the SS shall change the SNR value to T1 as specified in Table 6.5.1.7.5-1.
- 7. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 8. Repeat steps 2-7 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.7.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.5.1.7.4.3-1: Common Exception messages for NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

ault Message Contents
· ·
H.3.1-2 with Condition INTRA-FREQ, L3 FILTERING NEEDED; H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1 and RLM for guration 6.5.1.7-1 and 6.5.1.7-2 H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1 and RLM for guration 6.5.1.7-3 H.3.1-4 with a3-offset = -4.5dB; H.3.1-6 with Condition RLM; H.3.1-7 with Condition INTRA-FREQ; H.3.1-8 with Condition CSI RLM; H.3.1-9; H.3.7-1 with condition DRX.3

6.5.1.7.5 Test requirement

Tables 6.5.1.7.4.1-3 and 6.5.1.7.5-1 define the primary level settings including test tolerances for Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with CSI-RS-based RLM in DRX mode.

Table 6.5.1.7.5-1: Cell specific test parameters for FR1 for NR SA FR1 radio link monitoring out-ofsync test for PCell configured with CSI-RS-based RLM RS in DRX mode

Par	ameter	Unit		Test 1	
			T1	T2	T3
PDCCH_beta		dB		4	
PDCCH_DMRS	S_beta	dB		4	
PBCH_beta		dB		0	
PSS_beta		dB			
SSS_beta		dB			
PDSCH_beta		dB			
OCNG_beta		dB			
SNR on	Config 1	dB	1.9	-6.1	-15.9
RLM-RS	Config 2		1.9	-6.1	-15.9
	Config 3	1	1.9	-6.1	-15.9
SNR on other	Config 1	dB	1		
channels and	Config 2			1	
signals	Config 3			1	
N_{oc}	Config 1	dBm/15kHz		-98	
Config 2				-98	
	Config 3 -98				·
Propagation co	ndition		TDL-C 300ns 100Hz		
		ich that the resource is achieved for all Of	es in Cell 1 are fully alloo FDM symbols.	cated and a constant t	total transmitted
•			assigned to the UE prior	to the start of time pe	eriod T1.

- Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.
- Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.
- Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.
- Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.
- Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.
- Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.
- Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.6.5.1.7.1-1.
- Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During time durations T1, T2 and T3, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on PCell.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 (PCell) at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 (PCell) no later than time point C (D_1 ms after the start of the time duration T3) on the PCell.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

6.5.1.8 NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

6.5.1.8.1 Test purpose

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PCell when DRX is used. This test will partly verify the FR1 PCell CSI-RS insync radio link monitoring requirements in TS 38.133 [6] clause 8.1.

6.5.1.8.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting CSI-RS based RLM and long DRX cycle.

6.5.1.8.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.1.8.

6.5.1.8.4 Test description

The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 6.5.1.8.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate in-sync states.

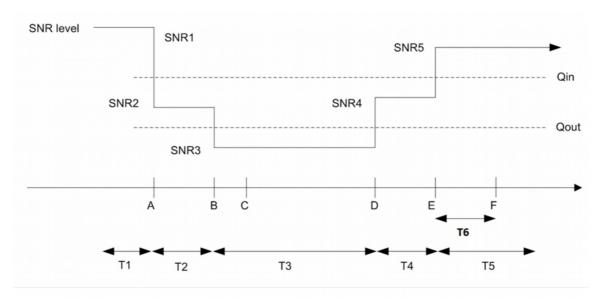


Figure 6.5.1.8.4-1: SNR variation for In-sync testing

6.5.1.8.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 6.5.1.8.4.1-1.

Table 6.5.1.8.4.1-1: Supported test configurations for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

Configuration	Description	
6.5.1.8-1	FDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth	
6.5.1.8-2	TDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth	
6.5.1.8-3	TDD duplex mode, 30 kHz SSB SCS, 40MHz bandwidth	
Note: The UE is only required to pass in one of the supported test configurations in FR1		

Configure the test equirement and the DUT according to the parameters in Table 6.5.1.8.4.1-2.

Table 6.5.1.8.4.1-2: Initial conditions for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified by the test configuration selected from Table 6.5.1.8.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4]
Exceptions to connection diagram	N/A		

- 1. The general test parameter settings are set up according to Table 6.5.1.8.4.1-3. The measurement gap configuration for subtest 2 is according to Table 6.5.1.8.4.1-4.
- 2. Message contents are defined in clause 6.5.1.8.4.3.
- 3. There are one cell in the test, where Cell 1 is the NR PCell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table A.6.1.1-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 6.5.1.8.4.1-3: General test parameters for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

	Parameter	Unit	Value
			Test 1
Active PCell			Cell 1
RF Channel Number	T		1
Duplex mode	Config 1		FDD
TDD Confinentia	Config 2, 3		TDD
TDD Configuration	Config 1		Not Applicable
	Config 2		TDDConf.1.1 TDDConf.2.1
DL initial BWP	Config 3 Config 1, 2, 3		DLBWP.0.1
configuration	-		
DL dedicated BWP configuration	Config 1, 2, 3		DLBWP.1.1
UL initial BWP configuration	Config 1, 2, 3		ULBWP.0.1
UL dedicated BWP configuration	Config 1, 2, 3		ULBWP.1.1
CORESET Reference	Config 1		CR.1.1 FDD
Channel	Config 2		CR.1.1 TDD
	Config 3		CR.2.1 TDD
SSB Configuration	Config 1		SSB.1 FR1
	Config 2		SSB.1 FR1
0.470 0 6 6	Config 3		SSB.2 FR1
SMTC Configuration	Config 1, 2		SMTC.1
77.2011/77.2011	Config 3		SMTC.1
PDSCH/PDCCH	Config 1, 2		15 kHz
subcarrier spacing	Config 3		30 kHz
TRS configuration	Config 1		TRS.1.1 FDD
	Config 2		TRS.1.1 TDD
	Config 3		TRS.1.2 TDD
CSI-RS for RLM	Config 1		Resource #4 in TRS.1.1 FDD
	Config 2		Resource #4 in TRS.1.1 TDD
	Config 3		Resource #4 in TRS.1.2 TDD
TCI configuration for PD	OCCH/PDSCH		TCI.State.0
OCNG parameters			OP.1
CP length			Normal
Correlation Matrix and A	•		2x2 Low
_	DCI format		1-0
transmission	Number of Control OFDM symbols		2
parameters	Aggregation level	CCE	8
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	dB	4
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	4
	DMRS precoder granularity		REG bundle size
	REG bundle size		6
In sync transmission	DCI format		1-0
parameters	Number of Control OFDM symbols		2
	Aggregation level	CCE	4
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	dB	0
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE	dB	0
	energy DMRS precoder granularity		REG bundle size
	REG bundle size		6
DRX	TALO DUTINIO SIZO		DRX.3
		l .	1

Gap pattern ID			gp0	
Layer 3 filtering			Enabled	
T310 timer		ms	2000	
T311 timer		ms	1000	
N310			1	
N311			1	
CSI-RS configuration	Config 1		CSI-RS.1.1 FDD	
for CSI reporting	Config 2		CSI-RS.1.1 TDD	
	Config 3		CSI-RS.2.1 TDD	
T1		S	0.2	
T2		S	0.2	
T3		S	1.24	
T4			0.2	
T5			1.88	
Т6		S	1.84	
Note 1: UE-specific PDCCH is not transmitted after T1 starts.				

Table 6.5.1.8.4.1-4: Measurement gap configuration for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

	Field	Test 1
	Fielu	Value
	gapOffset	[0]
Note 1:	Void	

6.5.1.8.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity defined in CSI-RS configuration. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms). In the test, SSB0 is configured as the BFD-RS.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of Cell 1 according to T1 in Table 6.5.1.8.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.1.8.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.1.8.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 6.5.1.8.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 6.5.1.8.5-1. T5 starts.
- 7. If the SS detects uplink power equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in the On-duration part of every DRX cycle in the configured slots for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point F (T6 after the start of time duration T5) the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. If the UE has not re-established the connection in at least 1s, the UE is switched off and then on. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, DC bearer *MCG* and *SCG*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 9. Repeat steps 2-8 for both subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.1.8.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.5.1.8.4.3-1: Common Exception messages for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED;
·	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1 and RLM for configuration 6.5.1.8-1 and 6.5.1.8-2
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.2 FR1 and RLM for configuration 6.5.1.8-3
	Table H.3.1-4 with a3-offset = -4.5dB;
	Table H.3.1-6 with Condition Pattern #0;
	Table H.3.1-8 with Condition CSI RLM
	Table H.3.1-9
	Table H.3.7-1 with condition DRX.3

6.5.1.8.5 Test requirement

Tables 6.5.1.8.4.1-3 and 6.5.1.8.5-1 define the primary level settings including test tolerances for Radio Link Monitoring In-sync Test for FR1 PCell configured with CSI-RS-based RLM in DRX mode.

Note 6:

Note 7:

Note 8:

Note 9:

Table 6.5.1.8.5-1: Cell specific test parameters for NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode

Parameter		Unit			Test 1		
			T1	T2	T3	T4	T5
PDCCH_beta		dB			4	-	
PDCCH_DMR	S_beta	dB			4		
PBCH_beta		dB					
PSS_beta		dB					
SSS_beta		dB			0		
PDSCH_beta		dB					
OCNG_beta		dB					
SNR on	Config 1	dB	1.9	-6.1	-15.9	-5.4	1.9
RLM-RS	Config 2		1.9	-6.1	-15.9	-5.4	1.9
	Config 3		1.9	-6.1	-15.9	-5.4	1.9
SNR on other Config 1		dB			1		
channels and	Config 2		1				
signals	Config 3		1				
N_{oc}	Config 1	dBm/15kHz	-98				
OC	Config 2				-98		
	Config 3				-98		
Propagation co	ndition			TDL	C 300ns 10	0Hz	
Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted							
power spectral density is achieved for all OFDM symbols.							
Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time perior Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the							
		et configuration for C	SI reporting a	re assigned t	o the UE prio	r to the start	of time
period T1.							
Note 4: Measurement gap configuration is assigned to the UE prior t						-4	
Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.							

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

SNR levels correspond to the signal to noise ratio over the SSS REs.

which supports 4RX on all bands, the SNR during T3 is [A.3.6].

During the period from time point A to time point F (T6 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting on the PCell.

The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5

The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

The signal contains PDCCH for UEs other than the device under test as part of OCNG.

6.5.2 Interruption

6.5.2.1 NR SA FR1 interruptions during measurements on deactivated NR SCC

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.

respectively in figure A.6.5.1.8.1-1.

- RAN4 dependency: There are brackets in core requirements and test parameters.
- TT analysis is missing

6.5.2.1.1 Test purpose

To verify UE's ability to complete NR PCell interruptions during the measurement on the deactivated NR SCC within the missed ACK/NACK rate in standalone NR requirements..

6.5.2.1.2 Test applicability

This test applies to all types of NR UE release 15 and forward.

6.5.2.1.3 Minimum conformance requirements

[TS 38.133, clause 8.2.2.2.3]

Interruptions on PCell due to measurements when an SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 8.2.2.2.2-1 if the PCell is not in the same band as the deactivated SCell. Each interruption shall not exceed requirement in Table 8.2.2.2.2-2 if the PCell is in the same band as the deactivated SCell.

Interruptions on active SCells due to measurements when an SCell is deactivated are allowed with up to 0.5% probability of missed ACK/NACK when the configured *measCycleSCell* [2] is 640 ms or longer. The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption shall not exceed requirement in Table 8.2.2.2.2-1 if the active SCell is not in the same band as the deactivated SCell. Each interruption shall not exceed requirement in Table 8.2.2.2.2-2 if the active SCell is in the same band as the deactivated SCell.

[TS 38.133, clause 8.2.2.2.2]

Table 8.2.2.2.2: Interruption duration for SCell activation/deactivation for inter-band CA

μ	NR Slot length (ms) of victim cell	Interruption length (slot)		
0	1		1	
1	0.5		1	
2	0.25	Aggressor cell is on FR2	2	
		Aggressor cell is on FR1	3	
3	0.125	Aggressor cell is on FR2	4	
		Aggressor cell is on FR1	5	
Note: T _{SMTC_duration} is - the longest SMTC duration among all above activated serving cells and the SCell being added when one SCell is added; - the longest SMTC duration among all activated serving cells in the same band when one SCell is released.				

Table 8.2.2.2.2: Interruption duration for SCell activation/deactivation for intra-band CA

μ	NR Slot	Interruption length			
PC	length (ms)				
0	1	1 + T _{SMTC_duration}			
1	0.5	1 + T _{SMTC_duration}			
2	0.25	2 + T _{SMTC_duration}			
3	0.125	4 + T _{SMTC_duration}			
Note: 7	Note: T _{SMTC duration} is				
-	the longest SM	ITC duration among all			
a	above activated	serving cells and the			
		vated when one SCell			
	is activated;				
- the longest SMTC duration among all					
activated serving cells in the same					
band when one SCell is deactivated.					

The normative reference for this requirement is TS 38.133 [6] clause 8.2.2.2, A.6.5.2.1.

6.5.2.1.4 Test description

6.5.2.1.4.1 Initial conditions

Test 6.5.2.1 can be run in one of the configurations defined in Table 6.5.2.1.4.1-1.

Table 6.5.2.1.4.1-1: Supported test configurations

	Config	Description
1		NR 15 kHz SSB SCS, 10MHz bandwidth, FDD – FDD duplex mode
2		NR 15 kHz SSB SCS, 10MHz bandwidth, TDD – TDD duplex mode
3		NR 15 kHz SSB SCS, 10MHz bandwidth, TDD – FDD duplex mode
4		NR 15 kHz SSB SCS, 10MHz bandwidth, FDD – TDD duplex mode
5		NR 30kHz SSB SCS, 40MHz bandwidth, TDD – TDD duplex mode
Note:	The UE is only re	equired to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 6.5.2.1.4.1-2.

Table 6.5.2.1.4.1-2: Initial conditions for NR SA FR1 interruptions during measurements on deactivated NR SCC

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.5	508-1 [14] clause 4.3.1 and 4.4.2.
Channel	As specified	by the test configuration selected fr	om Table 6.5.2.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.8.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 6.5.2.1.4.1-3
- 2. Message contents are defined in clause 6.5.2.1.4.3.
- 3. Propagation conditions are set according to Annex [C.2.1]
- 4. There are two NR carriers and two cells specified in the test. Cell 1 is the PCell on one NR carrier, Cell 2 is the SCell on the other NR carrier. Cell 1 and Cell 2 shall be configured according to Annex C.1.1 and C.1.2.

Table 6.5.2.1.4.1-3: General test parameters for NR SA FR1 interruptions during measurements on deactivated NR SCC

Parameter	Unit	Value	Comment
RF Channel Number		1, 2	Two NR RF channels
Active PCell		Cell1	PCell on NR RF channel number 1.
Configured deactivated		Cell2	Deactivated SCell on NR RF channel
SCell			number 2.
CP length		Normal	Applicable to Cell1 and Cell 2
DRX		OFF	
Measurement gap pattern		OFF	
SCell measurement cycle (measCycleSCell)	ms	640	
T1	S	10	

6.5.2.1.4.2 Test procedure

The test consists of two cells: Cell1 and Cell2. Cell1 is PCell and Cell2 is deactivated SCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE is connected to Cell1 and Cell2, Cell1 shall be configured as PCell and Cell2 shall be configured as SCell. The point in time at which the RRC message including *measCycleSCell* or *allowInterruptions* for the deactivated NR SCells is received at the UE antenna connector defines the start of time period T1. During T1, PCell is continuously scheduled in DL.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. The SS shall transmit an RRCConnectionReconfiguration message including measCycleSCell or allowInterruptions for the deactivated NR SCell.
- 3. The UE shall transmit RRCConnectionReconfigurationComplete message.
- 4. Set the parameters according to Table 6.5.2.1.5-1. Propagation conditions are set according to Annex C.2.1. T1 starts
- 5. SS schedules on PCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PCell.
- 6. If more than 99.5% of uplink transmissions are received by SS then count a success for the event "ACK/NACK". Otherwise count a fail for the event "ACK/NACK".
- 7. If no two consecutive DTX is observed by the SS, then count a success for the event "DTX". Otherwise count a fail for the event "DTX".
- 8. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 9. Repeat step 2-8 until a test verdict has been achieved.

Each of the events "ACK/NACK" and "DTX" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G.2 is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

6.5.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.5.2.1.4.3-1: Common Exception messages

Default Message Contents			
Common contents of system information			
blocks exceptions			
Default RRC messages and information	FFS		
elements contents exceptions			

6.5.2.1.5 Test requirement

Table 6.5.2.1.5-1 defines the primary level settings including test tolerances for NR SA FR1 interruptions during measurements on deactivated NR SCC.

Table 6.5.2.1.5-1: NR cell specific test parameters for NR SA FR1 interruptions during measurements on deactivated NR SCC

Parame	ter	Unit	Cell1	Cell2
Frequency Range		J	FR1	FR1
Duplex mode	Config 1		FDD	FDD
	Config 2,5	1	TDD	TDD
	Config 3	†	TDD	FDD
	Config 4	1	FDD	TDD
TDD configuration	Config 1		Not Applicable	Not Applicable
122 comgaration	Config 2	-	TDDConf.1.1	TDDConf.1.1
	Config 3	1	TDDConf.1.1	Not Applicable
	Config 4	-	Not Applicable	TDDConf.1.1
	Config 5	_	TDDConf.1.2	TDDConf.1.2
BW _{channel}	Config 1,2,3,4		10 MHz: N _{RB,C} = 52	10 MHz: N _{RB,c} = 52
Channel	Config 5	-	40 MHz: N _{RB,c} = 32	40 MHz: N _{RB,c} = 32
Initial BWP	Cornig 5		DLBWF	20 2Note6
Configuration			DEBWI	.0.2
PDSCH Reference	Config 1		SR.1.1 FDD	SR.1.1 FDD
measurement channel	Config 2	-	SR.1.1 TDD	SR.1.1 TDD
mododroment charmer	Config 3	†	SR.1.1 TDD	SR.1.1 FDD
	Config 4	†	SR.1.1 FDD	SR.1.1 FDD SR.1.1 TDD
	Config 5	1	SR.2.1 TDD	SR.1.1 TDD
RMSI CORESET	Config 1		CR.1.1 FDD	CR.1.1 FDD
parameters	Config 2	-	CR.1.1 FDD	CR.1.1 FDD
μαιαιτιετείο		-	CR.1.1 TDD	CR.1.1 FDD
	Config 3 Config 4	-		
		-	CR.1.1 FDD	CR.1.1 TDD
Dadisated CODECET	Config 5		CR.2.1 TDD	CR.2.1 TDD
Dedicated CORESET	Config 1,4	_	CCR.1.1 FDD	CCR.1.1 FDD
parameters	Config 2,5	_	CCR.1.1 TDD	CCR.1.1 TDD
	Config 3,6	_	CCR.1.1 TDD	CCR.1.1 FDD
		_	CCR.1.1 FDD	CCR.1.1 TDD
CONO Della con			CCR.2.1 TDD	CCR.2.1 TDD
OCNG Patterns			OP.1	OP.1
SMTC Configuration	0		SMTC.1	SMTC.1
SSB Configuration	Config 1,2,4,5	_	SSB.1 FR1	SSB.1 FR1
O contain Adams	Config 3,6		SSB.2 FR1	SSB.2 FR1
Correlation Matrix and A	ntenna		1x2 Low	1x2 Low
Configuration EPRE ratio of PSS to SSS				
EPRE ratio of PBCH DMRS	2 to 222	-		
EPRE ratio of PBCH to PBC		-		
EPRE ratio of PDCCH DMF		1		
EPRE ratio of PDCCH to PI		dB	0	0
EPRE ratio of PDSCH DMF	RS to SSS			
EPRE ratio of PDSCH to PI				
EPRE ratio of OCNG DMRS				
EPRE ratio of OCNG to OC	ING DMRS (Note 1)	-ID::: /4.5		
N _{oc} Note 2		dBm/15	[-104]	[-104]
CC DCDD Note ?		kHz		
SS-RSRP Note 3		dBm/15	[-87]	[-87]
Ê /I		kHz		
Ê _s /I _{ot}		dB	17	17
Ê _s /N _{oc}	0	dB	17	17
N _{oc} ^{Note 2}	Config 1,2,4,5dBm	13CS	[-104]	[-104]
Io ^{Note3}	Config 3,6	dD/	[-101]	[-101]
10	Config 1,2,4,5	dBm/	[-59]	[-59]
	<u> </u>	9.36MHz	[64 0]	[64 0]
	Config 3,6	dBm/	[-61.9]	[-61.9]
Time offset to cell1 Note 4	-	38.16MHz	22	22
		μS	33	33
Time offset to cell2 Note 5		μs	-	3
Propagation Condition			AWGN	AWGN

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modeled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.
- Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells
- Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.
- Note 6: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2 defined in TS 38.213 [3] section 12.

The UE shall be continuously scheduled on PCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on PCell.

The UE is only allowed to cause interruptions immediately before and immediately after an SMTC. Each interruption on PCell shall not exceed the value defined in Table 6.5.2.1.5-2 if the PCell is not in the same band as the deactivated SCell or Table 6.5.2.1.5-3 if the PCell is in the same band as the deactivated SCell.

Table 6.5.2.1.5-2: Interruption duration if the PCell is not in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length
0	1	1
1	0.5	1

Table 6.5.2.1.5-3: Interruption duration if the PCell is in the same band as the deactivated SCell

μ	NR Slot length (ms)	Interruption length			
0	1	1 + SMTC duration			
1	0.5	2 + SMTC duration			

The rate of correct events observed during repeated tests shall be at least 90%.

6.5.3 SCell activation and deactivation delay

6.5.4 UE UL carrier RRC reconfiguration delay

6.5.4.0 Minimum conformance requirements

6.5.4.0.1 Minimum conformance requirements for UL carrier RRC reconfiguration delay

[TS 38.133, clause 8.4.2]

When the UE receives a RRC message implying NR UL or Supplementary UL carrier configuration, the UE shall be ready to start transmission on the newly configured carrier within $T_{UL_carrier_config}$ from the end of the last slot containing the RRC command.

 $T_{UL_carrier_config}$ equals the maximum RRC procedure delay defined in clause x.y in TS 38.331 [2] plus the interruption time specified in TS 38.133 [6] section 8.2.1.2.6.

[TS 38.133, clause 8.4.3]

When the UE receives a RRC message implying NR UL or Supplementary UL carrier deconfiguration RRC signalling, the UE shall stop UL signalling on the deconfigured UL carrier within $T_{UL_carrier_deconfig}$ from the end of the last slot containing the RRC command.

T_{UL_carrier_deconfig} equals the maximum RRC procedure delay defined in clause x.y in TS 38.331 [2].

The normative reference for this requirement is TS 38.133 [6] clause 8.4.

6.5.4.1 NR SA FR1 UE UL carrier RRC reconfiguration delay

Editor's note:

- Message contents are not complete.
- Connection diagram is TBD.
- There are brackets in test requirements.
- Some parts of TC are TBDs.
- -TT is incomplete.
- Cell mapping is missing.

6.5.4.1.1 Test purpose

To verify that when the UE receives a RRC message implying NR UL or Supplementary UL carrier configuration, the UE shall be ready to start transmission on the newly configured carrier within the time limits specified in TS 38.133 [6] section 8.4.2 and 8.4.3 for configuring and deconfiguring, respectively.

6.5.4.1.2 Test applicability

This test applies to UE release 15 supporting NR standalone.

6.5.4.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.4.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.4.1.

6.5.4.1.4 Test description

6.5.4.1.4.1 Initial conditions

The Test shall be tested using any of the test configuration in Table 6.5.4.1.4.1-1.

Table 6.5.4.1.4.1-1: Supported test configurations

Configuration	PSCell (Cell 1)	SCell (Cell 2)
6.5.4.1-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	DL and UL: 15kHz SSB SCS, 10MHz bandwidth, FDD duplex mode; SUL: 15kHz SCS, 10MHz bandwidth, SUL duplex mode
6.5.4.1-2	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	DL and UL: 15kHz SSB SCS, 10MHz bandwidth, TDD duplex mode; SUL: 15kHz SCS, 10MHz bandwidth, SUL duplex mode
6.5.4.1-3	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	DL and UL: 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode; SUL: 30kHz SCS, 40MHz bandwidth, SUL duplex mode
6.5.4.1-4	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	DL and UL: 15kHz SSB SCS, 10MHz bandwidth, FDD duplex mode; SUL: 15kHz SCS, 10MHz bandwidth, SUL duplex mode
6.5.4.1-5	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	DL and UL: 15kHz SSB SCS, 10MHz bandwidth, TDD duplex mode; SUL: 15kHz SCS, 10MHz bandwidth, SUL duplex mode
6.5.4.1-6	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	DL and UL: 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode; SUL: 30kHz SCS, 40MHz bandwidth, SUL duplex mode
6.5.4.1-7	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	DL and UL: 15kHz SSB SCS, 10MHz bandwidth, FDD duplex mode; SUL: 15kHz SCS, 10MHz bandwidth, SUL duplex mode
6.5.4.1-8	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	DL and UL: 15kHz SSB SCS, 10MHz bandwidth, TDD duplex mode; SUL: 15kHz SCS, 10MHz bandwidth, SUL duplex mode
6.5.4.1-9	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	DL and UL: 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode; SUL: 30kHz SCS, 40MHz bandwidth, SUL duplex mode
Note: The U	E is only required to be tested in one of the supported to	est configurations

Configure the test equirement and the DUT according to the parameters in Table 6.5.4.1.4.1-2.

Table 6.3.4.1.4.1-2: Initial conditions for NR SA FR1 UE UL carrier RRC reconfiguration delay

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1.				
Channel bandwidth	As specified	ecified by the test configuration selected from Table 6.5.4.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.1.			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.TBD				
Exceptions to connection diagram	N/A					

- 1. The general test parameter settings are set up according to Table 6.5.4.1.4.1-3.
- 2. Message contents are defined in clause 6.5.4.1.4.3.
- 3. There are two NR FR1 carriers and two cells in the test. Cell 1 is PCell on the primary component carrier, Cell 2 is SCell on the secondary component carrier. Cell 1 is the cell used for connection setup with the power levels set according to Table A. 6.5.4.1.5-1 for this test. Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 6.5.4.1.4.1-3: General test parameters for NR standalone UE UL carrier RRC reconfiguration Delay on Pcell

Parameter	Unit	Test configuration	Value	Comment
RF Channel Number		Config 1,2,3, 4, 5, 6, 7, 8, 9	1, 2	Three radio channels are used for these two tests.
Active cell		Config 1,2,3, 4, 5, 6, 7, 8, 9	Cell 1: FR1 PCell Cell 2: FR1 SCell	E-UTRAN PCell on RF channel number 1 FR1 SCell on RF channel number 2
CP length		Config 1,2,3, 4, 5, 6, 7, 8, 9	Normal	
DRX		Config 1,2,3, 4, 5, 6, 7, 8, 9	OFF	
Measurement gap pattern Id		Config 1,2,3, 4, 5, 6, 7, 8, 9	OFF	
Filter coefficient		Config 1,2,3, 4, 5, 6, 7, 8, 9	0	L3 filtering is not used
T1	S	Config 1,2,3, 4, 5, 6, 7, 8, 9	5	
T2	S	Config 1,2,3, 4, 5, 6, 7, 8, 9	5	
Т3	S	Config 1,2,3, 4, 5, 6, 7, 8, 9	5	

6.5.4.1.4.2 Test procedure

There are two cells: FR1 PCell (cell 1) and FR1 SCell (cell 2). Both NR uplink and supplementary uplink are broadcast by *ServingCellConfigCommonSIB*. In test 1, the test consists of three time periods, with duration of T1, T2 and T3 respectively. During time duration T1, NR uplink of cell 2 is configured to UE. At the start of T2, a supplementary uplink of cell 2 is configured to UE through *RRCReconfiguration*, then UE shall start transmission both on the NR uplink and supplementary uplink. At the start of T3, the supplementary uplink is released through *RRCReconfiguration*.

In test 2, the test consists of three time periods, with duration of T1, T2 and T3 respectively. During time duration T1, supplementray uplink on cell 2 is configured to UE. At the start of T2, a NR uplink is configured to UE through *RRCReconfiguration*, then UE shall start transmission both on the NR uplink and supplementary uplink. At the start of T3, the NR uplink is released through *RRCReconfiguration*.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters according to TS 38.508-1 [14] FFS.
- 2. Both NR uplink and supplementary uplink are broadcast by *ServingCellConfigCommonSIB*. The test parameters for PCell and SCell are given in Table 6.5.4.1.5-1. Propagation conditions are set according to Annex C clause C.2.2. T1 starts.
- 3. The SS shall configure SCell (Cell 2) on the SCC as per TS 38.508-1 [14] clause FFS with the message content exceptions defined in clause 6.5.4.1.4.3.
- 4. In test 1 NR uplink of cell 2 is configured to UE then UE shall transmit data on NR UL carrier only. If UE transmits data on NR UL carrier on SCell within [20] ms from the start of T1, then count a success for the event "reconfiguration" otherwise count a failure for event "reconfiguration".
 - In test 2 supplementray uplink on cell 2 is configured to UE, then UE shall transmit data on SUL carrier only. If UE transmits data on SUL carrier on SCell within [20] ms from the start of T1, then count a success for the event "reconfiguration" otherwise count a failure for event "reconfiguration".
- 5. In test 1, at the start of T2, a supplementary uplink of cell 2 is configured to UE through RRCReconfiguration, then UE shall start transmission both on the NR uplink and supplementary uplink. If UE transmits data on both on the NR uplink and supplementary uplink from the start of T2, then count a success for the event "reconfiguration" otherwise count a failure for event "reconfiguration".

In test 2, at the start of T2, a NR uplink is configured to UE through RRCReconfiguration, then UE shall start transmission both on the NR uplink and supplementary uplink. If UE transmits data on both on the NR uplink and supplementary uplink from the start of T2, then count a success for the event "reconfiguration" otherwise count a failure for event "reconfiguration".

6. In test 1, at the start of T3, the supplementary uplink is released through RRCReconfiguration then UE shall transmit data on SUL carrier only. If UE transmits data on SUL carrier on SCell within [20]ms from the start of T3, then count a success for the event "deconfiguration" otherwise count a failure for event "deconfiguration".

In test 2, at the start of T3, the NR uplink is released through RRCReconfiguration, then UE shall transmit data on NR UL carrier only. If UE transmits data on NR UL carrier on SCell within [20]ms from the start of T3, then count a success for the event "deconfiguration" otherwise count a failure for event "deconfiguration".

7. Repeat steps 3-6 until a test verdict has been achieved.

Each of the events "reconfiguration" and "deconfiguration" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to FFS in Annex FFS is achieved. Different events may require different times for a verdict.

If all events pass, the test passes. If one event fails, the test fails.

6.5.4.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 4.6.1.5.4.3-1: Common Exception messages

Default Message Co	ntents
Common contents of system information	
blocks exceptions	
Default RRC messages and information	FFS
elements contents exceptions	

6.5.4.1.5 Test requirement

Table 6.5.4.1.5.1-1 and 6.5.4.1.5-2 define the primary level settings including test tolerances for UE UL carrier RRC reconfiguration delay test.

Table 6.5.4.1.5-1: NR Cell specific test parameters for NR standalone UE UL carrier RRC reconfiguration Delay on PCell (Cell 1)

Parameter	Unit	Test	Test 1			Test 2		
		Configuration	T1	T2	T3	T1	T2	Т3

		Conf 1, 2, 3, 4,		2	1		2	
Channel number		5, 6, 7, 8, 9		2			۷	
		Conf 1, 2, 3		N/A			N/A	
TDD configuration		Conf 4, 5, 6	TI	DD Conf.1	.1	Т	DD Conf.1.:	1
· ·		Conf 7, 8, 9	TI	DD Conf.2	.1	Т	DD Conf.2.:	1
		Conf 1, 2, 3	10	0: N _{RB,c} = 5	52	1	LO: N _{RB,c} = 52	2
BW _{channel}	MHz	Conf 4, 5, 6		0: N _{RB,c} = 5			L0: N _{RB,c} = 52	
		Conf 7, 8, 9		: N _{RB,c} = 10			0: N _{RB,c} = 100	
PDSCH reference		Conf 1, 2, 3		R.1.1 FD			SR.1.1 FDD	
measurement		Conf 4, 5, 6	5	R.1.1 TDI)		SR.1.1 TDD	
channel as defined		Conf 7, 8, 9		SR 2.1 TDI	_			
in A.3.1.1							SR 2.1 TDD	
RMSI CORESET		Conf 1, 2, 3	C	CR.1.1 FDI)		CR.1.1 FDD	
reference		Conf 4, 5, 6	C	R.1.1 TDI)		CR.1.1 TDD	
measurement		Conf 7, 8, 9						
channel as defined			CR.2.1 TDD			•	CR.2.1 TDD	
in A.3.1.2					_			
RMC CORESET		Conf 1, 2, 3		CR.1.1 FD			CR.1.1 FDD	
reference		Conf 4, 5, 6	С	CR.1.1 TD	D		CR.1.1 TDI)
measurement channel as defined in A.3.1.3		Conf 7, 8, 9	C	CCR.2.1 TDD			CCR.2.1 TDI)
OCNG Pattern Note 1		Conf 1, 2, 3, 4, 5, 6, 7, 8, 9		OP.1			OP.1	
SSB configuration		Conf 1, 2, 3, 4, 5, 6	(SSB.1 FR	L		SSB.1 FR1	
COB comigaration		Conf 7, 8, 9		SSB.2 FR	L		SSB.2 FR1	
SMTC configuration		Conf 1, 2, 3, 4, 5, 6, 7, 8, 9		SMTC.1		SMTC.1		
DL initial BWP configuration		Conf 1, 2, 3, 4, 5, 6, 7, 8, 9	Γ	DLBWP.0.1			DLBWP.0.1	
DL dedicated BWP configuration		Conf 1, 2, 3, 4, 5, 6, 7, 8, 9	Γ	DLBWP.1.2	1	DLBWP.1.1		
UL dedicated BWP configuration		Conf 1, 2, 3, 4,	ι	JLBWP.1.:	1	ULBWP.1.1		
EPRE ratio of PSS		5, 6, 7, 8, 9						
to SSS EPRE ratio of PBCH_DMRS to SSS EPRE ratio of PBCH to PBCH_DMRS EPRE ratio of PDCCH_DMRS to SSS EPRE ratio of								
PDCCH to		0						
PDCCH_DMRS	dB	Conf 1, 2, 3, 4, 5, 6, 7, 8, 9		0			0	
EPRE ratio of PDSCH_DMRS to		5, 0, 7, 0, 9						
SSS EPRE ratio of								
PDSCH to								
PDSCH_DMRS	-							
EPRE ratio of OCNG DMRS to SSS								
EPRE ratio of								
OCNG to OCNG								
DMRS								
	dBm /	Conf 1, 2, 3, 4,		-102+TT			-102+TT	
	15kHz	5, 6, 7, 8, 9		102.11			102.11	
$N_{_{oc}}$ Note 2		Conf		-102+TT			-102+TT	
OC	dBm/	1,2,3,4,5,6						
	SCS	Conf 7,8,9		-99+TT			-99+TT	
		, -, -						
\hat{E}_s/N_{oc}	dB	Conf 1, 2, 3, 4,	16+TT	16+TT	16+TT	16+TT	16+TT	16+TT

$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$ Note 3	dB	Conf 1, 2, 3, 4, 5, 6, 7, 8, 9	16+TT	16+TT	16+TT	16+TT	16+TT	16+TT
SS-RSRP Note 3	dBm/ SCS	Conf 1,2,3,4,5,6	-86+TT	-86+TT	-86+TT	-86+TT	-86+TT	-86+TT
	303	Conf 7,8,9	-83+TT	-83+TT	-83+TT	-83+TT	-83+TT	-83+TT
	dBm/	Conf	-	-	-	-	-	-57.9+TT
	9.36	1,2,3,4,5,6	57.9+T	57.9+T	57.9+T	57.9+TT	57.9+TT	
In Note 3	MHz		Т	Т	Т			
10	dBm/	Conf 7,8,9	-	-	-	-	-	-51.8+TT
	38.16		51.8+T	51.8+T	51.8+T	51.8+TT	51.8+TT	
	MHz		Т	Т	Т			
Propagation		Conf 1, 2, 3, 4,		AWGN			AWGN	
Condition		5, 6, 7, 8, 9						
Antenna configuration		Conf 1, 2, 3, 4, 5, 6, 7, 8, 9		1 x 2			1 x 2	

NOTE 1: OCNG shall be used such that both cells are fully allocated, and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 6.5.4.1.5-2 : NR Cell specific test parameters for NR standalone UE UL carrier RRC reconfiguration Delay on SCell (Cell 2)

Parameter	Unit	Test	Test 1			Test 2		
		Configuration	T1	T2	T3	T1	T2	T3

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

NOTE 3: $\hat{\mathbf{E}}_{_{\mathrm{S}}}/\mathbf{I}_{_{\mathrm{ot}}}$, Io, and SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Channel number		Conf 1, 2, 3, 4,		3			3	
Chamicinatibet		5, 6, 7, 8, 9		3			3	
		Conf 1, 4, 7		N/A			N/A	
TDD configuration		Conf 2, 5, 8		TDDConf.1	.1		TDDConf.1.1	
		Conf 3, 6, 9		TDDConf.2	.1		TDDConf.2.1	
		Conf 1, 4, 7		10: N _{RB,c} = 5	52		10: N _{RB,c} = 52	
BW _{channel}	MHz	Conf 2, 5, 8		10: N _{RB,c} = 5	52		10: N _{RB,c} = 52	
		Conf 3, 6, 9	4	0: N _{RB,c} = 10	06	4	40: N _{RB,c} = 106	
PUSCH parameters		Conf 1, 4, 7	[TBD]	[TBD]	[TBD]	N/A	[TBD]	N/A
for NR UL carrier		Conf 2, 5, 8	[TBD]	[TBD]	[TBD]	N/A	[TBD]	N/A
IOI WIN OL CAITICI		Conf 3, 6, 9	[TBD]	[TBD]	[TBD]	N/A	[TBD]	N/A
PUCCH parameters		Conf 1, 4, 7	[TBD]	[TBD]	[TBD]	N/A	[TBD]	N/A
For NR UL carrier		Conf 2, 5, 8	[TBD]	[TBD]	[TBD]	N/A	[TBD]	N/A
		Conf 3, 6, 9	[TBD]	[TBD]	[TBD]	N/A	[TBD]	N/A
PUSCH parameters		Conf 1, 4, 7	N/A	[TBD]	N/A	[TBD]	[TBD]	[TBD]
for supplementary		Conf 2, 5, 8	N/A	[TBD]	N/A	[TBD]	[TBD]	[TBD]
UL		Conf 3, 6, 9	N/A	[TBD]	N/A	[TBD]	[TBD]	[TBD]
PUCCH parameters		Conf 1, 4, 7	N/A	[TBD]	N/A	[TBD]	[TBD]	[TBD]
for supplementary UL		Conf 2, 5, 8	N/A	[TBD]	N/A	[TBD]	[TBD]	[TBD]
_		Conf 3, 6, 9	N/A	[TBD]	N/A	[TBD]	[TBD]	[TBD]
PDSCH reference		Conf 1, 4, 7		SR.1.1 FD			SR.1.1 FDD	
measurement channel as defined		Conf 2, 5, 8 Conf 3, 6, 9	;	SR.1.1 TD	ט		SR.1.1 TDD	
in A.3.1.1		Con 3, 6, 9	;	SR 2.1 TD	D		SR 2.1 TDD	
RMSI CORESET		Conf 1, 4, 7		R.1.1 FDI	<u> </u>		CR.1.1 FDD	
reference		Conf 2, 5, 8		CR.1.1 TD			CR.1.1 TDD	
measurement		Conf 3, 6, 9	`	OIX.1.1 1D		CR.I.I IDD		
channel as defined		00111 0, 0, 0	(CR.2.1 TD	D	CR.2.1 TDD		
in A.3.1.2								
RMC CORESET		Conf 1, 4, 7	C	CR.1.1 FD	D	CCR.1.1 FDD		
reference		Conf 2, 5, 8	C	CR.1.1 T	DD	CCR.1.1 TDD		
measurement		Conf 3, 6, 9						
channel as defined			C	CR.2.1 TI	DD	CCR.2.1 TDD		
in A.3.1.3						001		
OCNG Pattern Note 1		Conf 1, 2, 3		OP.1			OP.1	
CCDfirmution		Conf 1, 2, 4, 5,	9	SSB.1 FR	L		SSB.1 FR1	
SSB configuration		7,8 Conf 3, 6, 9		SSB.2 FR1			SSB.2 FR1	
		Conf 1, 2, 3, 4,	•	33D.Z FK.	L		33b.2 FK1	
SMTC configuration		5, 6, 7, 8, 9		SMTC.1			SMTC.1	
DL initial BWP		Conf 1, 2, 3, 4,						
configuration		5, 6, 7, 8, 9	DLBWP.0.1				DLBWP.0.1	
DL dedicated BWP		Conf 1, 2, 3, 4,						
configuration		5, 6, 7, 8, 9		DLBWP.1.	1		DLBWP.1.1	
UL dedicated BWP		Conf 1, 2, 3, 4,					==	
configuration		5, 6, 7, 8, 9		ULBWP.1.	1		ULBWP.1.1	
EPRE ratio of PSS	dB	Conf 1, 2, 3, 4,		0			0	
to SSS		5, 6, 7, 8, 9						
EPRE ratio of								
PBCH_DMRS to								
SSS								
EPRE ratio of PBCH								
to PBCH_DMRS								
EPRE ratio of								
PDCCH_DMRS to								
SSS EDDE votic of								
EPRE ratio of								
PDCCH DMPS								
PDCCH_DMRS								
EPRE ratio of PDSCH DMRS to								
SSS								
EPRE ratio of	1							
PDSCH to								
PDSCH DMRS								
: 3002	!							

EPRE ratio of OCNG DMRS to SSS								
EPRE ratio of OCNG to OCNG DMRS								
	dBm / 15kHz	Conf 1, 2, 3, 4, 5, 6, 7, 8, 9		-102+TT			-102+TT	
$N_{_{OC}}$ Note 2	dBm/ SCS	Conf 1, 2, 4, 5, 7,8	-102+TT -99+TT			-102+TT		
	303	Conf 3, 6, 9				-99+TT		
\hat{E}_s/N_{oc}	dB	Conf 1, 2, 3, 4, 5, 6, 7, 8, 9	16+TT	16+TT	16+TT	16+TT	16+TT	16+TT
$\mathbf{\hat{E}}_{ ext{s}}/\mathbf{I}_{ ext{ot}}$ Note 3	dB	Conf 1, 2, 3, 4, 5, 6, 7, 8, 9	16+TT	16+TT	16+TT	16+TT	16+TT	16+TT
SS-RSRP Note 3	dBm/ SCS	Conf 1, 2, 4, 5, 7,8	-86+TT	-86+TT	-86+TT	-86+TT	-86+TT	-86+TT
	303	Conf 3, 6, 9	-83+TT	-83+TT	-83+TT	-83+TT	-83+TT	-83+TT
In Note 3	dBm/ 9.36 MHz	Conf 1, 2, 4, 5, 7,8	- 57.9+T T	- 57.9+T T	- 57.9+T T	- 57.9+TT	- 57.9+TT	-57.9+TT
10	dBm/ 38.16 MHz	Conf 3, 6, 9	- 51.8+T T	- 51.8+T T	- 51.8+T T	- 51.8+TT	- 51.8+TT	-51.8+TT
Propagation Condition		Conf 1, 2, 3, 4, 5, 6, 7, 8, 9	AWGN AWGN					
Antenna configuration		Conf 1, 2, 3, 4, 5, 6, 7, 8, 9	1 x 2 1 x 2					

NOTE 1: OCNG shall be used such that both cells are fully allocated, and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

NOTE 3: $\hat{\mathbf{E}}_{_{\mathrm{S}}}/\mathbf{I}_{_{\mathrm{ot}}}$, Io, and SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

In test 1 the UE shall be ready to start transmission on the supplementary uplink carrier on SCell within [20] ms from the start of T2.

In test 1 the UE shall stop the transmission on the supplementary uplink carrier on SCell within [20] ms from the start of T3.

In test 2 the UE shall be ready to start transmission on the NR uplink carrier on SCell within [20] ms from the start of T2.

In test 2 the UE shall stop the transmission on the NR uplink carrier on SCell within [20] ms from the start of T3.

All of the above test requirements shall be fulfilled in order for the observed UE UL carrier configuration delay and UE UL carrier release delay to be counted as correct. The rate of correct observed UE UL carrier configuration delay and UE UL carrier release delay during repeated tests shall be at least 90%.

6.5.5 Link recovery procedures

6.5.5.0 Minimum conformance requirements

6.5.5.0.1 Minimum conformance requirements for SSB-based BFD and link recovery procedures

UE shall be able to evaluate whether the downlink radio link quality on the configured SSB resource in set \overline{q}_0 estimated over the last $T_{\text{Evaluate_BFD_SSB}}$ [ms] period becomes worse than the threshold $Q_{\text{out_LR_SSB}}$ within $T_{\text{Evaluate_BFD_SSB}}$ [ms] period.

The value of T_{Evaluate BFD SSB} is defined in Table 6.5.5.0.1-1 for FR1.

For FR1,

- P=1/(1 T_{SSB}/MGRP), when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the SSB; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB.

Longer evaluation period would be expected if the combination of BFD-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

Table 6.5.5.0.1-1: Evaluation period T_{Evaluate_BFD_SSB} for FR1

Configuration		T _{Evaluate_BFD_SSB} (ms)	
no DRX		max([50], ceil(5*P)*T _{SSB})	
DRX cycle ≤ 320ms		$max([50], ceil(7.5*P)*max(T_{DRX},T_{SSB}))$	
DRX cycle > 320ms		ceil(5*P)*T _{DRX}	
Note: T_{SSB} is the periodicity of SSB in the set \overline{q}_0 . T_{DRX} is the DRX cycle length.			

When the radio link quality on all the configured RS resources in set \overline{q}_0 is worse than $Q_{\text{out_LR}}$, Layer 1 of the UE shall send a beam failure instance indication to the higher layers. A Layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331 [13].

The beam failure instance evaluation for the configured RS resources in set \overline{q}_0 shall be performed as specified in section 6 in TS 38.213 [8]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval_BFD}$.

When DRX is not used, $T_{Indication_interval_BFD}$ is max(2ms, $T_{BFD-RS,M}$), where $T_{BFD-RS,M}$ is the shortest periodicity of all configured RS resources in set \overline{q}_0 for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set \overline{q}_0 or CSI-RS resource in the set \overline{q}_0 .

When DRX is used, $T_{Indication_interval_BFD}$ is max(1.5*DRX_cycle_length, 1.5* $T_{BFD-RS,M}$) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms.

UE shall be able to evaluate whether the L1-RSRP measured on the configured SSB resource in set \bar{q}_1 estimated over the last $T_{\text{Evaluate_CBD_SSB}}$ [ms] period becomes better than the threshold $Q_{\text{in_LR}}$ provided SSB_RP and SSB \hat{E} s/Iot are according to Annex Table B.2.4.1 for a corresponding band.

The value of $T_{\text{Evaluate_CBD_SSB}}$ is defined in Table 6.5.5.0.1-2 for FR1.

For FR1,

- $P=1/(1-T_{SSB}/MGRP)$, when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the SSB; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB.

In both FR1 and FR2, if different SCS is used for SSB and CSI-RS, and the UE does not support simultaneousRxDataSSB-DiffNumerology, it is assumed that the SSB configured for candidate beam detection and each CSI-RS resource shall be TDMed transmited.

Table 6.5.5.0.1-2: Evaluation period T_{Evaluate_CBD_SSB} for FR1

Configuration		T _{Evaluate_CBD_SSB} (ms)
non-DRX		ceil([3]*P) * T _{SSB}
DRX cycle ≤ 320ms		$ceil([3]*P*1.5) * max(T_{DRX},T_{SSB})$
DRX cycle > 320ms		ceil([3]*P) * T _{DRX}
Note: T_{SSB} is the periodicity of SSB in the set \overline{q}_1 . T_{DRX} is the DRX cycle length.		

The normative reference for this requirement is TS 38.133 [6] clause 8.5.2.2, 8.5.4 and 8.5.5.2.

6.5.5.0.2 Minimum conformance requirements for CSI-RS-based BFD and link recovery procedures

UE shall be able to evaluate whether the downlink radio link quality on the configured CSI-RS resource in set \overline{q}_0 estimated over the last $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period becomes worse than the threshold $Q_{\text{out_LR_CSI-RS}}$ within $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period.

The value of T_{Evaluate_BFD_CSI-RS} is defined in Table 8.5.3.2-1 for FR1.

For FR1,

- $P=1/(1-T_{CSI-RS}/MGRP)$, when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and
- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

Longer evaluation period would be expected if the combination of BFD-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The values of M_{BFD} used in Table 6.5.5.0.2-1 is defined as

- M_{BFD} = 10, if the CSI-RS resource configured for BFD is transmitted with Density = 3.

Table 6.5.5.0.2-1: Evaluation period T_{Evaluate_BFD_CSI-RS} for FR1

Configuration		T _{Evaluate_BFD_CSI-RS} (ms)
no DRX		$max([50], [M_{BFD} *P] * T_{CSI-RS})$
DRX cycle ≤ 320ms		$max([50], [1.5 \times M_{BFD} *P]*max(T_{DRX}, T_{CSI-RS}))$
DRX cycle > 320ms		$[M_{BFD}*P]*T_{DRX}$
Note: $T_{\text{CSI-RS}}$ is the periodicity of CSI-RS resource in the set \overline{q}_0 . T_{DRX} is the DRX cycle length.		

When the radio link quality on all the configured RS resources in set \overline{q}_0 is worse than $Q_{\text{out_LR}}$, Layer 1 of the UE shall send a beam failure instance indication to the higher layers. A Layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331 [13].

The beam failure instance evaluation for the configured RS resources in set \overline{q}_0 shall be performed as specified in section 6 in TS 38.213 [8]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval_BFD}$.

When DRX is not used, $T_{Indication_interval_BFD}$ is max(2ms, $T_{BFD-RS,M}$), where $T_{BFD-RS,M}$ is the shortest periodicity of all configured RS resources in set \overline{q}_0 for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set \overline{q}_0 or CSI-RS resource in the set \overline{q}_0 .

When DRX is used, $T_{Indication_interval_BFD}$ is max(1.5*DRX_cycle_length, 1.5* $T_{BFD-RS,M}$) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms.

UE shall be able to evaluate whether the L1-RSRP measured on the configured CSI-RS resource in set \overline{q}_1 estimated over the last $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period becomes better than the threshold $Q_{\text{in_LR}}$ within $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period provided CSI-RS \hat{E} s/Iot is according to Annex Table B.2.4.2 for a corresponding band.

The value of T_{Evaluate CBD CSI-RS} is defined in Table 6.5.5.0.2-2 for FR1.

For FR1,

- $P=1/(1-T_{CSI-RS}/MGRP)$, when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and

P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

In both FR1 and FR2, if different SCS is used for SSB and CSI-RS, and the UE does not support simultaneousRxDataSSB-DiffNumerology, it iss assumed that the CSI-RS configured for candidate beam detection and each SSB shall be TDMed transmitted.

The values of M_{CBD} used in Table 6.5.5.0.2-2 is defined as

- M_{CBD} = 3, if the CSI-RS resource configured in the set \overline{q}_1 is transmitted with Density = 3.

Table 6.5.5.0.2-2: Evaluation period T_{Evaluate_CBD_CSI-RS} for FR1

Configuration		T _{Evaluate_CBD_CSI-RS} (ms)	
non-DRX		$max([25], ceil(M_{CBD} *P) * T_{CSI-RS})$	
DRX cycle ≤ 320ms		ceil(M_{CBD} *P*N) * max(T_{DRX} , T_{CSI-RS})	
DRX cycle > 320ms		ceil(M _{CBD} *P) *T _{DRX}	
Note: $T_{\text{CSI-RS}}$ is the periodicity of CSI-RS resource in the set \overline{q}_1 . T_{DRX} is the DRX cycle length.			

The normative reference for this requirement is TS 38.133 [6] clause 8.5.3.2, 8.5.4 and 8.5.6.2.

6.5.5.3 NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test requirements are between brackets.
- Test tolerance is missing

6.5.5.3.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects CSI-RS-based beam failure in the set q_0 configured for a serving cell and that the UE performs correct CSI-RS-based link recovery based on beam candicate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when no DRX is used.

To partly verify the CSI-RS based beam failure detection and link recovery for an FR1 serving cell requirements in TS 38.133 [6] clause 8.5.

6.5.5.3.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.5.5.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.5.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.5.3.

6.5.5.3.4 Test description

The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 6.5.5.3.4-1 shows the five different time durations and the corresponding variation of the downlink SNR of the CSI-RS in set q0 in the active cell to emulate CSI-RS based beam failure and the variation of the downlink SNR of the CSI-RS in set q1 of the candidate beam used for link recovery.



Figure 6.5.5.3.4-1: SNR variation CSI-RS for NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX

6.5.5.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.5.5.3.4.1-1.

Table 6.5.5.3.4.1-1: Supported test configurations for NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX

Configuration	Description	
6.5.5.3-1	FDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth	
6.5.5.3-2	TDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth	
6.5.5.3-3	TDD duplex mode, 30 kHz SSB SCS, 40MHz bandwidth	
Note: The UE is only required to pass in one of the supported test configurations in FR1		

Configure the test equipment and the DUT according to the parameters in Table 6.5.5.3.4.1-2.

Table 6.5.5.3.4.1-2: Initial conditions for NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.	
Channel bandwidth	As specified by the test configuration selected from Table 6.5.5.3.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4	1	
Exceptions to connection diagram	N/A			

- 1. The general test parameter settings are set up according to Table 6.5.5.3.4.1-3.
- 2. Message contents are defined in clause 6.5.5.3.4.3.
- 3. There is one NR carrier and one NR cell specified in the test. Cell 1 is the NR cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.5.5.3.4.1-3: General test parameters for NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX

Parameter		Unit	Value	Comment
		• • • • • • • • • • • • • • • • • • • •	Test 1	
Active PCell			Cell 1	
	RF Channel Number		1	
Duplex mode	Config 1		FDD	
	Config 2, 3		TDD	
TDD	Config 1		Not Applicable	
Configuration	Config 2		TDDConf.1.1	
	Config 3		TDDConf.1.2	
CORESET	Config 1		CR.1.1 FDD	A.3.1.2
Reference	Config 2		CR.1.1 TDD	
Channel	Config 3		CR.2.1 TDD	
SSB	Config 1		SSB.1 FR1	A.3.10
Configuration	Config 2		SSB.1 FR1	
	Config 3		SSB.2 FR1	
SMTC	Config 1, 2		SMTC.1	A.3.11
Configuration	Config 3		SMTC.1	
PDSCH/PDCC	Config 1, 2		15 KHz	
H subcarrier spacing	Config 3		30 KHz	
csi-RS-Index ass detection RS in s	signed as beam failure		[0]	
OCNG paramete			OP.1	A.3.2.1
CP length	·· =		Normal	51212
Correlation Matri	x and Antenna		2x2 Low	
Configuration	7. 3.13 7			
Beam failure	DCI format		1-0	
detection	Number of Control		2	
transmission	OFDM symbols			
parameters	Aggregation level	CCE	8	
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	dB	0	
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	0	
	DMRS precoder granularity		REG bundle size	
	REG bundle size		6	
DRX			OFF	
Gap pattern ID			N.A.	
	signed as candidate		1	N
beam detection RS in set q ₁ rlmInSyncOutOfSyncThreshold			absent	When the field is absent, the UE applies the value 0. (Table 8.1.1-1).
rsrp-ThresholdS	rsrp-ThresholdSSB		[-94.5]	Threshold used for Q _{in_LR_SSB}
powerControlOffsetSS			db0	Used for deriving rsrp-ThresholdCSI-RS
beamFailureInstanceMaxCount			n2	see TS 38.321 [7], section 5.17
beamFailureDetectionTimer			pbfd4	see TS 38.321 [7], section 5.17
CSI-RS Cor	CSI-RS Config 1		CSI-RS.1.2 FDD	A.3.14
			CSI-RS.1.2 TDD	7
on Config 3			CSI-RS.2.2 TDD	
	nfig 1		TRS.1.1 FDD	
Config 2			TRS.1.1 TDD	

configurati on	Config 3		TRS.1.2 TDD	
T1		S	1	During this time the the UE shall be fully synchronized to cell
T2		S	0.4	
T3		S	[0.6]	
T4		S	[0.4]	
T5		S	[1.4]	
D1		S	[0.24]	
Note 1: UE-specific PDCCH is not transmitted after T1 starts.				

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

6.5.5.3.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements without gaps.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 6.5.5.3.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.5.3.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.5.3.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 6.5.5.3.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 6.5.5.3.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. When T5 expires the SS shall change the SNR value to T1 as specified in Table 6.5.5.3.5-1.
- 9. Wait 1s for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within 1s continue to step 11. Otherwise continue to step 10.
- 10. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

11. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.5.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.5.5.3.4.3-1: Common Exception messages for NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ and L3 FILTERING NEEDED;
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and RLM for configuration 6.5.5.3-1 and 6.5.5.3-2 Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and RLM for configuration 6.5.5.3-3
	Table H.3.1-8 with Condition CSI-RS BFD
	Table H.3.1-10 with Condition CSI-RS
	Table H.3.1-11

6.5.5.3.5 Test requirement

Tables 6.5.5.3.4.1-3 and 6.5.5.3.5-1 define the primary level settings including test tolerances for NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX.

Table 6.5.5.3.5-1: NR Cell specific test parameters for NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX

Parameter Unit Test 1												
				CS	I-RS of se	et q₀			CSI	-RS of se	et q ₁	
			T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
to SSS	tio of PSS	dB			•							
EPRE ratio of PBCH DMRS to SSS		dB										
EPRE ra to PBCH	tio of PBCH DMRS	dB										
EPRE ratio of PDCCH DMRS to SSS		dB										
EPRE ratio of PDCCH to PDCCH DMRS		dB			0					0		
EPRE ratio of PDSCH DMRS to SSS		dB			O					Ü		
EPRE ratio of PDSCH to PDSCH DMRS		dB										
EPRE ratio of OCNG DMRS to SSS(Note 1)		dB										
EPRE ra to OCNG (Note 1)	tio of OCNG DMRS	dB										
SNR_C SI-RS	Config 1	dB	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[- 12]TB D	[- 12]TB D	[-3]	[7]
	Config 2		[5]	[-3]	[-12]	[-12]	[- 12]TB D	[-12]	[-12]	[-12]	[-3]	[7]
	Config 3		[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[7]
N_{oc}	Config 1	dBm/			-98					-98		
OC.	Config 2	15K			-98					-98		
	Config 3	Hz			-98					-98		
Propagat condition				TDL-	C 300ns 1	L00Hz			TDL-0	C 300ns 1	.00Hz	
Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted					-pd							

Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 = [TBD] ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

6.5.5.4 NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test requirements are between brackets.
- Test tolerance is missing

6.5.5.4.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects CSI-RS-based beam failure in the set q_0 configured for a serving cell and that the UE performs correct CSI-RS-based link recovery based on beam candicate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when DRX is used.

To partly verify the CSI-RS based beam failure detection and link recovery for an FR1 serving cell requirements in TS 38.133 [6] clause 8.5.

6.5.5.4.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.5.5.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.5.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.5.4.

6.5.5.4.4 Test description

The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 6.5.5.4.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate CSI-RS based beam failure.



Figure 6.5.5.4.4-1: SNR variation CSI-RS for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

6.5.5.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.5.5.4.4.1-1.

Table 6.5.5.4.4.1-1: Supported test configurations for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

Configuration	Description
6.5.5.4-1	FDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth
6.5.5.4-2	TDD duplex mode, 15 kHz SSB SCS, 10MHz bandwidth
6.5.5.4-3	TDD duplex mode, 30 kHz SSB SCS, 40MHz bandwidth
Note: The UE is only	required to pass in one of the supported test configurations in FR1

Configure the test equipment and the DUT according to the parameters in Table 6.5.5.4.4.1-2.

Table 6.5.5.4.4.1-2: Initial conditions for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.5	508-1 [14] clause 4.3.1 and 4.4.2.		
Channel	As specified	by the test configuration selected fr	rom Table 6.5.5.3.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to	N/A	•			
connection					
diagram					

- 1. The general test parameter settings are set up according to Table 6.5.5.4.4.1-3. The measurement gap configuration is according to Table 6.5.5.4.4.1-4.
- 2. Message contents are defined in clause 6.5.5.4.4.3.
- 3. There is one NR carrier and one NR cells specified in the test. Cell 1 is the NR cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.5.5.4.4.1-3: General test parameters for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

P	arameter	Unit	Value	Comment
4 11 50 11			Test 1	
Active PCell			Cell 1	
RF Channel Numb			1	
Duplex mode	Config 1		FDD	
TDD	Config 2, 3		TDD	
TDD	Config 1	_	Not Applicable	
Configuration	Config 2	_	TDDConf.1.1	
CODECET	Config 3		TDDConf.1.2	A 0 1 0
CORESET	Config 1	4	CR.1.1 FDD	A.3.1.2
Reference Channel	Config 2	-	CR.1.1 TDD	-
SSB	Config 3		CR.2.1 TDD SSB.1 FR1	A 2 10
Configuration	Config 1 Config 2	-	SSB.1 FR1	A.3.10
Comiguration	Config 3		SSB.2 FR1	+
SMTC	Config 1, 2		SMTC.1	A.3.11
Configuration	Config 1, 2	_	SMTC.1	A.S.11
PDSCH/PDCCH	Config 1, 2		15 KHz	
subcarrier	•		_	
spacing	Config 3		30 KHz	
	gned as beam failure		[0]	
detection RS in se			224	
OCNG parameters	5		OP.1	A.3.2.1
CP length			Normal	
Correlation Matrix	and Antenna		2x2 Low	
Configuration			1.0	
Beam failure	DCI format		1-0	
detection	Number of Control		2	
transmission	OFDM symbols	005	0	-
parameters	Aggregation level	CCE dB	8	-
	Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy	aB	0	
	Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy	dB	0	
	DMRS precoder		REG bundle size	
	granularity			
	REG bundle size		6	
DRX			DRX.7	A.3.3.7
Gap pattern ID			*[gp0]	
csi-RS-Index assig detection RS in se	gned as candidate beam t q1		21	N
rlmInSyncOutOfSyncThreshold			absent	When the field is absent, the UE applies the value 0. (Table 8.1.1-1).
rsrp-ThresholdSSI	3	dBm	[-96]	Threshold used for Q _{in_LR_SSB}
powerControlOffse	etSS		db0	Used for deriving rsrp-ThresholdCSI-RS
beamFailureInstar	nceMaxCount		[n2]	see TS 38.321 [7], section 5.17
beamFailureDetec	ctionTimer		[pbfd4]	see TS 38.321 [7], section 5.17
CSI-RS	Config 1		CSI-RS.1.2 FDD	A.3.14
configuration	Config 2	1	CSI-RS.1.2 TDD	1
	Config 3	1	CSI-RS.2.2 TDD	1
TRS	Config 1		TRS.1.1 FDD	
configuration	Config 2		TRS.1.1 TDD	

Config 3		TRS.1.2 TDD			
T1	S	1	During this time the the UE shall be fully synchronized to cell 1		
T2	S	0.4			
T3	S	[0.6]			
T4	S	[0.4]			
T5	S	[1.4]			
D1	S	[0.44]			
Note 1: UE-specific PDCCH is not transmitted after T1 starts.					

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

Table 6.5.5.4.4.1-4: Measurement gap configuration for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

Field	Test 2
Field	Value
gapOffset	[0]

6.5.5.4.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms)

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 6.5.5.3.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 6.5.5.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 6.5.5.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 6.5.5.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 6.5.5.4.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1
 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. When T5 expires the SS shall change the SNR value to T1 as specified in Table 6.5.5.4.5-1.
- 9. Wait 1s for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within 1s continue to step 11. Otherwise continue to step 10.
- 10. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 11. Repeat steps 2-10 for all subtests until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.5.5.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.5.5.4.4.3-1: Common Exception messages for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED and GAP NEEDED;
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC.1 and RLM for configuration 6.5.5.4-1 and 6.5.5.4-2 Table H.3.1-3 with Condition INTER-FREQ MO, SSB.2 FR1, SMTC.1 and RLM for configuration 6.5.5.4-3
	Table H.3.1-4 with a3-offset = -6dB;
	Table H.3.1-6 with Condition RLM.
	Table H.3.1-8 with Condition CSI-RS BFD
	Table H.3.1-10 with Condition CSI-RS
	Table H.3.1-11;
	Table H.3.7-1 with Condition DRX.7

6.5.5.4.5 Test requirement

Tables 6.5.5.4.4.1-3 and 6.5.5.4.5-1 define the primary level settings including test tolerances for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX.

Note 2:

Table 6.5.5.4.5-1: NR Cell specific test parameters for NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX

Parameter Unit Test 1												
				CSI	-RS of se	et qo			CSI	-RS of se	et q ₁	
			T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
	tio of PSS	dB					•					
to SSS												
	tio of PBCH	dB										
DMRS to												
	tio of PBCH	dB										
to PBCH	DMRS											
EPRE ra	tio of	dB										
PDCCH	DMRS to											
SSS												
EPRE ra	tio of	dB										
PDCCH:	to PDCCH											
DMRS					0					0		
EPRE ra	tio of	dB										
PDSCH I	DMRS to											
SSS												
EPRE ra	tio of	dB										
PDSCH ₁	to PDSCH											
DMRS												
EPRE ra	tio of OCNG	dB										
DMRS to	SSS ^(Note 1)											
EPRE ra	tio of OCNG	dB										
to OCNG	DMRS (Note											
1)												
SNR_C	Config 1	dB	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[7]
SI-RS	Config 2		[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[7]
	Config 3		[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[7]
N_{oc}	Config 1	dBm/			-98					-98		
OC.	Config 2	15K			-98					-98		
Config 3		Hz			-98					-98		
Propagation				TDL-	C 300ns 1	L00Hz			TDL-	C 300ns 1	L00Hz	
condition												
Note 1:	OCNG shal	I be used	d such th	at the res	sources in	Cell 1 a	re fully all	located a	nd a cons	stant total	transmit	ted
	power spec	tral dens	sity is ach	nieved for	all OFDN	/I symbol	S.					
									_	_		

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

settable parameters themselves.

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q₁.

No later than time point F occurring no later than D1 = [TBD] ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

6.5.6 Active BWP switch delay

6.5.6.1 DCI-based and time-based active BWP switch

6.5.6.1.0 Minimum conformance requirements

FFS

6.5.6.1.1 NR SA FR1 DCI-based DL active BWP switch in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

6.5.6.1.1.1 Test purpose

FFS

6.5.6.1.1.2 Test applicability

FFS

6.5.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.6.1.1.

6.5.6.1.1.4 Test description

6.5.6.1.1.4.1 Initial conditions

FFS

6.5.6.1.1.4.2 Test procedure

FFS

6.5.6.1.1.4.3 Message contents

FFS

6.5.6.1.1.5 Test requirements

FFS

6.5.6.2 RRC-based active BWP switch

6.5.6.2.0 Minimum conformance requirements

FFS

6.5.6.2.1 NR SA FR1 RRC-based DL active BWP switch in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

6.5.6.2.1.1 Test purpose

FFS

6.5.6.2.1.2 Test applicability

FFS

6.5.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.6.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.5.6.2.1.

6.5.6.2.1.4 Test description

6.5.6.2.1.4.1 Initial conditions

FFS

6.5.6.2.1.4.2 Test procedure

FFS

6.5.6.2.1.4.3 Message contents

FFS

6.5.6.2.1.5 Test requirements

FFS

6.6 Measurement procedures

6.6.1 Intra-frequency measurements

6.6.1.0 Minimum conformance requirements

6.6.1.0.1 Minimum conformance requirements for event-triggered measurement without gap

[TS 38.133, clause 9.2.5.1 and 9.2.5.2]

The UE shall be able to identify a new detectable intra frequency cell within $T_{identify_intra_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index(reportQuantityRsIndexes) or maxNrofRSIndexesToReport is not configured), or the UE is indicated that the neighbour cell is synchronous with the

serving cell (*deriveSSB-IndexFromCell* is enabled). The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within T_{identify_intra_without_index}. It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

$$T_{identify\ intra\ without\ index} = (T_{PSS/SSS\ sync\ intra} + T_{SSB\ measurement\ period\ intra})$$
 ms

Where:

T_{PSS/SSS_sync_intra}: it is the time period used in PSS/SSS detection given in table 6.6.1.0.1-1.

T_{SSB} measurement period intra: equal to a measurement period of SSB based measurement given in table 6.6.1.0.1-2.

 $CSSF_{intra}$: it is a carrier specific scaling factor and is determined according to $CSSF_{outside_gap,i}$ in TS 38.133 [6] clause 9.1.5.1 for measurement conducted outside measurement gaps.

When intra-frequency SMTC is fully non overlapping with measurement gaps or intrafrequency SMTC is fully overlapping with MGs, Kp=1.

When intrafrequency SMTC is partially overlapping with measurent gaps, Kp = 1/(1-(SMTC period / MGRP)), where SMTC period < MGRP

Table 6.6.1.0.1-1: Time period for PSS/SSS detection (Frequency range FR1)

DRX cycle	T _{PSS/SSS_sync_intra}				
No DRX	max(600ms, ceil($5 \times K_p$) x SMTC period) ^{Note 1} x				
	CSSF _{intra}				
DRX cycle≤ 320ms	max(600ms, ceil(1.5x 5 x K _p) x max(SMTC				
-	period,DRX cycle)) x CSSF _{intra}				
DRX cycle>320ms	ceil([5] x K _p) x DRX cycle x CSSF _{intra}				
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is					
the one used by the cell being identified	1				

Table 6.6.1.0.1-2: Measurement period for intra-frequency measurements without gaps (Frequency Range FR1)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(200ms, ceil($5 \times K_p$) x SMTC period) ^{Note 1} x
	CSSF _{intra}
DRX cycle≤ 320ms	max(200ms, ceil(1.5x 5 x K _p) x max(SMTC
-	period,DRX cycle)) x CSSF _{intra}
DRX cycle > 320ms	ceil($5 \times K_p$) x DRX cycle x CSSF _{intra}
NOTE 1: If different SMTC periodicities are configured f	for different cells, the SMTC period in the requirement is
the one used by the cell being identified	

[TS 38.133, clause 9.2.4.3]

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in TS 38.133 [6] clause 10.1.2.1, 10.1.7.1 and 10.1.12.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T identify intra without index defined in TS 38.133 [6] clause 9.2.5.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period than $T_{identify\ intra\ without\ index}$ defined in TS 38.133 [6] clause 9.2.5.1 becomes undetectable for a period and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{measurement,\ Intra}$ provided the timing to that cell has not changed

more than \pm 3200 Tc while the measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used, an additional delay can be expected.

[TS 38.133, clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,
- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,
- SS-SINR related side conditions given in TS 38.133 [6] sections 10.1.12 are fulfilled for a corresponding Band,
- SSB_RP and SSB Ês/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 9.2.2, 9.2.4.3, 9.2.5.1 and 9.2.5.2.

6.6.1.0.2 Minimum conformance requirements for event-triggered measurement with gap

[TS 38.133 [6], clause 9.2.6.2, 9.2.6.3]

The UE shall be able to identify a new detectable intra frequency cell within T_{identify_intra_without_index} if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE is indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

$$T_{identify\ intra\ without\ index} = T_{PSS/SSS\ sync\ intra} + T_{SSB\ measurement\ period\ intra}$$
 ms

Where:

T_{PSS/SSS_sync_intra}: it is the time period used in PSS/SSS detection given in table 6.6.1.0.2-1.

T_{SSB_measurement_period_intra}: equal to a measurement period of SSB based measurement given in table 6.6.1.0.2-2.

 $CSSF_{intra}$: it is a carrier specific scaling factor and is determined according to $CSSF_{within_gap,i}$ in TS 38.133 [6] section 9.1.5.2.2 for measurement within outside measurement gaps.

Table 6.6.1.0.2-1: Time period for PSS/SSS detection (Frequency range FR1)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	max(600ms, 5 x max(MGRP, SMTC period)) x
	CSSF _{intra}
DRX cycle≤ 320ms	max(600ms, ceil(1.5x 5) x max(MGRP, SMTC
-	period,DRX cycle)) x CSSF _{intra}
DRX cycle > 320ms	5 x max(MGRP, DRX cycle) x CSSF _{intra}

Table 6.6.1.0.2-2: Measurement period for intra-frequency measurements with gaps (Frequency Range FR1)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(200ms, 5 x max(MGRP, SMTC period)) x
	CSSF _{intra}
DRX cycle≤ 320ms	max(200ms, ceil(1.5x 5) x max(MGRP, SMTC
-	period,DRX cycle)) x CSSF _{intra}
DRX cvcle>320ms	5 x max(MGRP, DRX cycle) x CSSF _{intra}

[TS 38.133 [6], clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,
- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,
- SS-SINR related side conditions given in TS 38.133 [6] Sections 10.1.12 are fulfilled for a corresponding Band,
- SSB_RP and SSB Ês/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

[TS 38.133 [6], clause 9.2.4.2]

The RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.2.1.2, the RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.7.1.1, and the SINR measurement accuracy for all measured cells shall be as specified in the TS 38.133 [6] clause 10.1.12.1.1.

Reported RSRP, RSRQ and SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1.1, 10.1.2.1.2, 10.1.7.1.1 and 10.1.12.1.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify_intra_without_index}$ defined in TS 38.133 [6] section 9.2.6.2. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.2, 9.2.6.2 and 9.2.6.3.

6.6.1.0.3 Minimum conformance requirements for event-triggered measurement without gap with SSB index reading

[TS 38.133 [6], clause 9.2.5.1, 9.2.5.2]

UE shall be able to identify a new detectable intra frequency cell within T_{identify_intra_with_index}.

$$T_{identify_intra_with_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} + T_{SSB_time_index_intra} \ ms$$

Where:

T_{PSS/SSS sync intra}: it is the time period used in PSS/SSS detection given in table 6.6.1.0.3-1.

T_{SSB time index intra}: it is the time period used to acquire the index of the SSB being measured given in table 6.6.1.0.3-2.

T SSB_measurement_period_intra: equal to a measurement period of SSB based measurement given in table 6.6.1.0.3-3.

CSSF_{intra}: it is a carrier specific scaling factor and is determined according to CSSF_{outside_gap,i} in TS 38.133 [6] section 9.1.5.1 for measurement conducted outside measurement gaps

When intrafrequency SMTC is fully non overlapping with measurement gaps or intrafrequency SMTC is fully overlapping with MGs, K_p =1

When intrafrequency SMTC is partially overlapping with measurent gaps, $K_p = 1/(1-(SMTC period / MGRP))$, where SMTC period < MGRP

Table 6.6.1.0.3-1: Time period for PSS/SSS detection (Frequency range FR1)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	max(600ms, ceil($5 \times K_p$) x SMTC period) ^{Note 1} x
	CSSF _{intra}
DRX cycle ≤ 320ms	max(600ms, ceil(1.5x 5 x K_p) x max(SMTC
	period,DRX cycle)) x CSSF _{intra}
DRX cycle > 320ms	ceil(5 x K_p) x DRX cycle x CSS F_{intra}
NOTE 1: If different SMTC periodicities are configured f	or different cells, the SMTC period in the requirement is
the one used by the cell being identified	

Table 6.6.1.0.3-2: Time period for time index detection (Frequency range FR1)

DRX cycle	T _{SSB_time_index_intra}
No DRX	max(120ms, ceil($3 \times K_p$) x SMTC period) ^{Note 1} x
	CSSF _{intra}
DRX cycle≤ 320ms	max(120ms, ceil (1.5 x 3 x K_p) x max(SMTC
	period,DRX cycle)] x CSSF _{intra}
DRX cycle>320ms	Ceil(3 x K _p) x DRX cycle x CSSF _{intra}
NOTE 1: If different SMTC periodicities are config	gured for different cells, the SMTC period in the requirement is
the one used by the cell being identified	1

Table 6.6.1.0.3-3: Measurement period for intra-frequency measurements with gaps (Frequency Range FR1)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(200ms, ceil($5 \times K_p$) x SMTC period) ^{Note 1} x
	CSSF _{intra}
DRX cycle≤ 320ms	max(200ms, ceil(1.5x 5 x K_p) x max(SMTC
	period,DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	ceil(5 x K _p) x DRX cycle x CSSF _{intra}
NOTE 1: If different SMTC periodicities are config	jured for different cells, the SMTC period in the requirement is
the one used by the cell being identified	

[TS 38.133 [6], clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,
- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,
- SS-SINR related side conditions given in TS 38.133 [6] Sections 10.1.12 are fulfilled for a corresponding Band,
- SSB_RP and SSB £s/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

[TS 38.133 [6], clause 9.2.4.2]

The RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.2.1.2, the RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.7.1.1, and the SINR measurement accuracy for all measured cells shall be as specified in the TS 38.133 [6] clause 10.1.12.1.1.

Reported RSRP, RSRQ and SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1.1, 10.1.2.1.2, 10.1.7.1.1 and 10.1.12.1.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that

the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify_intra_with_index}$ defined in TS 38.133 [6] section 9.2.5.1. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.2, 9.2.5.1 and 9.2.5.2.

6.6.1.0.4 Minimum conformance requirements for event-triggered measurement with gap with SSB index reading

[TS 38.133 [6], clause 9.2.6.2, 9.2.6.3]

UE shall be able to identify a new detectable intra frequency cell within $T_{identify_intra_with_index}$.

 $T_{identify_intra_with_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} + T_{SSB_time_index_intra} \ ms$

Where:

T_{PSS/SSS} sync intra: it is the time period used in PSS/SSS detection given in table 6.6.1.0.4-1.

 $T_{SSB_time_index_intra}$: it is the time period used to acquire the index of the SSB being measured given in table 6.6.1.0.4-2.

T_{SSB measurement_period_intra}: equal to a measurement period of SSB based measurement given in table 6.6.1.0.4-3.

 $CSSF_{intra}$: it is a carrier specific scaling factor and is determined according to $CSSF_{within_gap,\,i}$ in TS 38.133 section 9.1.5.2.2 for measurement conducted within measurement gaps.

When intrafrequency SMTC is fully non overlapping with measurement gaps or intrafrequency SMTC is fully overlapping with MGs, $K_p=1$

When intrafrequency SMTC is partially overlapping with measurent gaps, $K_p = 1/(1-(SMTC period / MGRP))$, where SMTC period < MGRP.

Table 6.6.1.0.4-1: Time period for PSS/SSS detection (Frequency range FR1)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	max(600ms, 5 x max(MGRP, SMTC period)) x
	CSSF _{intra}
DRX cycle≤ 320ms	max(600ms, ceil(1.5x 5) x max(MGRP, SMTC
-	period,DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	[5] x max(MGRP, DRX cycle) x CSSF _{intra}

Table 6.6.1.0.4-2: Time period for time index detection (Frequency range FR1)

DRX cycle	T _{SSB_time_index_intra}
No DRX	max(120ms, ceil(3 x K_p) x SMTC period) ^{Note 1} x
	CSSF _{intra}
DRX cycle≤ 320ms	$max(120ms, ceil (1.5 \times 3 \times K_p) \times max(SMTC)$
	period,DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	ceil(3 x K _p) x DRX cycle x CSSF _{intra}
NOTE 1: If different SMTC periodicities are configured f	for different cells, the SMTC period in the requirement is
the one used by the cell being identified	

Table 6.6.1.0.4-3: Measurement period for intra-frequency measurements with gaps (Frequency Range FR1)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(200ms, 5 x max(MGRP, SMTC period)) x
	CSSF _{intra}
DRX cycle≤ 320ms	max(200ms, ceil(1.5x 5) x max(MGRP, SMTC
_	period,DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	5 x max(MGRP, DRX cycle) x CSSF _{intra}

[TS 38.133 [6], clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,
- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,
- SS-SINR related side conditions given in TS 38.133 [6] sections 10.1.12 are fulfilled for a corresponding Band,
- SSB RP and SSB £s/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

[TS 38.133 [6], clause 9.2.4.2]

The RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.2.1.2, the RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.7.1.1, and the SINR measurement accuracy for all measured cells shall be as specified in the TS 38.133 [6] clause 10.1.12.1.1.

Reported RSRP, RSRQ and SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1.1, 10.1.2.1.2, 10.1.7.1.1 and 10.1.12.1.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than Tidentify_intra_with_index defined in TS 38.133 [6] section 9.2.6.2. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.2, 9.2.6.2 and 9.2.6.3.

6.6.1.1 NR SA FR1 event-triggered reporting without gap in non-DRX

6.6.1.1.1 Test purpose

To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search without gap under non-DRX.

6.6.1.1.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.1.

6.6.1.1.4 Test description

6.6.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.1.4.1-1.

Table 6.6.1.1.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting without gap in non-DRX

Test Case ID	Description	
6.6.1.1-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
6.6.1.1-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
6.6.1.1-3	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations.		

Configure the test requirement and the DUT according to the parameters in Table 6.6.1.1.4.1-2.

Table 6.6.1.1.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting without gap in non-DRX

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.	
Channel	As specified	by the test configuration selected fr	om Table 6.6.1.1.4.1-1.	
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2	
conditions				
Connection	TE Part A.3.1.8.2		As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part A.3.2.3.4			
Exceptions to	- Without LTE link			
connection	- For 4Rx capable UEs without any 2Rx RF			
diagram	bands use A.3.2.5.2 for DUT part and			
	A.3.1.8.4 for	TE part.		

- 1. The test parameters for PCell and neighbour cell are given in Table 6.6.1.1.4.1-3 below.
- 2. Message contents are defined in clause 6.6.1.1.4.3.
- 3. There is one carrier and two cells specified in the test. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.1.4.1-3: General test parameters for SA intra-frequency event triggered reporting tests without gap for FR1 under non-DRX

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1, 2, 3	Cell 1	
Neighbour cell		1, 2, 3	Cell 2	Cell to be identified.
RF Channel Number		1, 2, 3	1: Cell 1 and Cell 2	
SSB configuration		1	SSB.1 FR1	
		2	SSB.1 FR1	
		3	SSB.2 FR1	
SMTC configuration		1	SMTC.2	
_		2	SMTC.1	
		3	SMTC.1	
A3-Offset	dB	1, 2, 3	-4.5	
CP length		1, 2, 3	Normal	
Hysteresis	dB	1, 2, 3	0	
Time To Trigger	S	1, 2, 3	0	
Filter coefficient		1, 2, 3	0	L3 filtering is not used
DRX		1, 2, 3		OFF
Time offset between PCell and PSCell		1, 2, 3	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 2 is 3 ms later than the timing of Cell 1.
		2	3 μs	Synchronous cells
		3	3 μs	Synchronous cells
T1	S	1, 2, 3	5	
T2	S	1, 2, 3	5	

6.6.1.1.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (NR Cell 1) and a FR1 neighbour cell (NR Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.1.4.1-3 and Table 6.6.1.1.5-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR Cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.1.1.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.1.5-1. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set NR Cell 2 physical cell identity = ((current NR cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

- 9. After the RRC connection release, the SS:
 - transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.1.4.3-1: Common Exception messages SA intra frequency event triggered reporting tests without gap under non-DRX

De	fault Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
·	Table H.3.1-2 with Condition INTRA-FREQ
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 6.6.1.1-1
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.1-2
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.1-3
	Table H.3.1-4 with A3-offset = -4.5dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-7 with Condition INTRA-FREQ

6.6.1.1.5 Test requirement

Table 6.6.1.1.4.1-3 and Table 6.6.1.1.5-1 define the primary level settings including test tolerances for NR SA event triggered reporting test without gap under non-DRX.

Table 6.6.1.1.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting tests without gap under non-DRX

Parameter	Unit	Test	Cell 1 Cell 2		II 2	
		configuration	T1	T2	T1	T2
TDD configuration		1	N/A N/A		/A	
		2	TDDC	TDDConf.1.1 TDDConf.1.1		onf.1.1
		3	TDDC	onf.2.1	TDDC	onf.2.1
PDSCH RMC		1	SR.1.	1 FDD	N/	/A
configuration		2	SR.1.	1 TDD		
		3	SR.2.	1 TDD		
RMSI CORESET		1	CR.1.	1 FDD	CR.1.:	1 FDD
RMC		2	CR.1.	1 TDD	CR.1.:	1 TDD
configuration		3		1 TDD		1 TDD
Dedicated		1		.1 FDD	CCR.1	
CORESET RMC		2		.1 TDD		.1 TDD
configuration		3		.1 TDD	CCR.2	
OCNG Patterns		1, 2, 3		P.1	OF	
TRS		1		.1 FDD	N/	
Configuration		2		.1 TDD		/A
Comigaration		3		.2 TDD	N/	
Initial BWP		1, 2, 3		VP.0.1	DLBW	
configuration		1, 2, 0		VP.0.1		/P.0.1
Active DL BWP		1, 2, 3	DLBWP.1.1 DLBWP.1.1			
configuration		_, _, _				
Active UL BWP		1, 2, 3	ULBWP.1.1 ULBWP.1.1		/P.1.1	
configuration		, , -				
RLM-RS		1, 2, 3	SS	SB	SS	SB
$N_{oc}^{ m Note~2}$	dBm/SCS	1	-98			
oc oc		2	-98			
		3	-95			
Note 2	dBm/15 KHz	1	-98			
1 v oc		2	7			
		3				
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1	4	-1.46	-Infinity	-1.46
L _s /L _{ot}		2				
		3				
\hat{E}_{s}/N_{oc}	dB	1	4	4	-Infinity	4
L's / T oc		2				
		3				
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94
		2	-94	-94	-Infinity	-94
		3	-91	-91	-Infinity	-91
lo	dBm/9.36 MHz	1	-64.60	-62.25	Specified	
	dBm/9.36 MHz	2	-64.60	-62.25	colu	mns
	dBm/38.16 MHz	3	-58.50	-56.16		
Propagation Condition		1, 2, 3	AWGN			
Note 1. The meaning			Ale a LUE ve via			

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\it oc}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to NR Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_intra_without_index}$

$$T_{identify_intra_without_index} = (T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}) ms$$

$$T_{PSS/SSS_sync_intr} = max [600 \text{ ms, ceil } (5 \times K_p) \times SMTC \text{ period }] \times CSSF_{intra} = 600 \text{ ms}$$

$$T_{SSB\ measurement\ period\ intra} = max$$
 [200 ms, ceil($5 \times K_p$) \times SMTC period] \times CSSF_{intra} = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.6.1.2 NR SA FR1 event-triggered reporting without gap in DRX

6.6.1.2.1 Test purpose

To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search without gap under DRX.

6.6.1.2.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.2.

6.6.1.2.4 Test description

6.6.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.2.4.1-1.

Table 6.6.1.2.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting without gap in DRX

Test Case ID	Description	
6.6.1.2-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	
6.6.1.2-2	15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	
6.6.1.2-3	30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations.		

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.2.4.1-2.

Table 6.6.1.2.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting without gap in DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.	508-1 [14] clause 4.3.1.		
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 6.6.1.2.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to connection diagram		pable UEs without any 2Rx RF .3.2.5.2 for DUT part and			

- 1. The test parameters for PCell and neighbour cell are given in Table 6.6.1.2.4.1-3 below.
- 2. Message contents are defined in clause 6.6.1.2.4.3.
- 3. There is one carrier and two cells specified in the test. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.2.4.1-3: General test parameters for SA intra-frequency event triggered reporting tests without gap for FR1 under DRX

Parameter	Unit Test configur		Va	lue	Comment
		ation	Test 1	Test 2	
Active cell		1, 2, 3	Cell 1		
Neighbour cell		1, 2, 3	Cell 2		Cell to be identified.
RF Channel Number		1, 2, 3	1: Cell 1 and	Cell 2	
SSB configuration		1	SSB.1 FR1		
		2	SSB.1 FR1		
		3	SSB.2 FR1		
SMTC configuration		1	SMTC.2		
		2	SMTC.1		
		3	SMTC.1		
A3-Offset	dB	1, 2, 3	-4.5		
CP length		1, 2, 3	Normal		
Hysteresis	dB	1, 2, 3	0		
Time To Trigger	S	1, 2, 3	0		
Filter coefficient		1, 2, 3	0		L3 filtering is not used
DRX	ms	1, 2, 3	DRX.1	DRX.2	
Time offset between PCell and PSCell		1, 2, 3	3 us		Synchronous EN-DC
Time offset between serving		1	3 us		Synchronous cells
and neighbour cells		2	3 ms		Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		3	3 us		Synchronous cells
T1	S	1, 2, 3	5		
T2	S	1, 2, 3	5	10	

6.6.1.2.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (NR Cell 1) and a FR1 neighbour cell (NR Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.2.4.1-3 and Table 6.6.1.2.5-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR Cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.1.2.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit *RRCReconfigurationComplete* message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.2.5-1. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms for Test 1 or less than 6402 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set NR Cell 2 physical cell identity = ((current NR cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 6.6.1.2.4.1-1 as appropriate.

6.6.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.2.4.3-1: Common Exception messages for SA intra frequency event triggered reporting tests without gap under DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
	Table H.3.1-2 with Condition INTRA-FREQ
	Table H.3.1-3 with Condition INTRA-FREQ MO SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 6.6.1.2-1
	Table H.3.1-3 with Condition INTRA-FREQ MO SSB.1 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.2-2
	Table H.3.1-3 with Condition INTRA-FREQ MO SSB.2 FR1, SMTC .1 and synchronous cells for configuration 6.6.1.2-3
	Table H.3.1-4 with A3-offset = -4.5dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-7 with Condition INTRA-FREQ
	Table H.3.7-1 with Condition DRX.1 for test 1
	Table H.3.7-1 with Condition DRX.2 for test 2

6.6.1.2.5 Test requirement

Table 6.6.1.2.4.1-3 and Table 6.6.1.2.5-1 define the primary level settings including test tolerances for NR event triggered reporting in synchronous cells when DRX is used test.

Table 6.6.1.2.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting tests without gap under DRX

Parameter	Unit	Test	Cell 1		Cell 2 T1 T2		
		configuration	T1	T1 T2		T2	
TDD configuration		1	N	N/A		N/A	
		2	TDDC	TDDConf.1.1		TDDConf.1.1	
		3	TDDConf.2.1		TDDConf.2.1		
PDSCH RMC		1	SR.1.	1 FDD	N.	/A	
configuration		2	SR.1.	1 TDD			
		3	SR.2.	1 TDD]		
RMSI CORESET		1	CR.1.	1 FDD	CR.1.:	1 FDD	
RMC		2	CR.1.	1 TDD	CR.1.:	1 TDD	
configuration		3	CR.2.	1 TDD	CR.2.:	1 TDD	
Dedicated		1	CCR.1	.1 FDD	CCR.1	.1 FDD	
CORESET RMC		2		.1 TDD		.1 TDD	
configuration		3		.1 TDD	CCR.2		
OCNG Patterns		1, 2, 3		P.1	OF		
TRS		1	TRS.1	.1 FDD	N.	/A	
Configuration		2	TRS.1	.1 TDD	N,	/A	
_		3	TRS.1	.2 TDD	N.	/A	
Initial BWP		1, 2, 3	DLBV	VP.0.1	DLBWP.0.1		
configuration			ULBV	VP.0.1	ULBWP.0.1		
Active DL BWP		1, 2, 3	DLBV	VP.1.1	DLBWP.1.1		
configuration							
Active UL BWP		1, 2, 3	ULBWP.1.1		ULBW	/P.1.1	
configuration							
RLM-RS		1, 2, 3	S	SB	!	SB	
$N_{oc}^{$	dBm/SCS	1			·98		
00		2			·98		
	15 (45 (4)	3			95		
N_{oc} Note 2	dBm/15 KHz	1	4	•	-98		
		2	_				
•	dD.		4	1.40	Infinit.	1 10	
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	2	4	-1.46	-Infinity	-1.46	
37 30		3	-				
• /	dB	1	4	4	-Infinity	4	
\hat{E}_{s}/N_{oc}	ив	2	- 4	4	-inility	4	
		3	-				
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
	dbiii/000 KiiZ	2	-94	-94	-Infinity	-94	
		3	-91	-91	-Infinity	-91	
lo	dBm/9.36 MHz	1	-64.60	-62.25	Specified		
· ·	dBm/9.36 MHz	2	-64.60 -62.25 columns				
	dBm/38.16 MHz	3	-58.50 -56.16		-		
Propagation Condition	dBiiiii da da da da da da da da da da da da da	1, 2, 3	AWGN				

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\it oc}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

In Test 1 when DRX cycle length = 40 ms, the overall delay measured is defined as the time from the beginning of time period T2 to the moment the UE send one Event A3 triggered measurement report on PUSCH.

In Test 2 when DRX cycle length = 640 ms, the overall delay measured is defined as the time from the beginning of time period T2 to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to NR Cell 2 on PUSCH.

For both tests:

The overall delays measured is defined as the time from the beginning of time period T2 to the moment the UE send one Event A3 triggered measurement report to NR Cell 2.

The overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delay measured when DRX cycle length is 40 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_intra_without_index}$

$$T_{identify_intra_without_index} = (T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}) ms$$

$$T_{PSS/SSS \ sync \ intra} = max[600ms, ceil(1.5 \times 5 \ x \ K_p) \times max(SMTC \ period,DRX \ cycle)] \times CSSF_{intra} = 600ms$$

$$T_{SSB_measurement_period_intra} = max[200ms, ceil(1.5 \times 5 \times K_p) x max(SMTC period,DRX cycle)] \times CSSF_{intra} = 320ms$$

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 40 ms shall be less than a total of 922 ms.

The overall delay measured when DRX cycle length is 640 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

 $Measurement \ reporting \ delay = T_{identify_intra_without_index}$

$$T_{identify_intra_without_index} = (T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}) ms$$

$$T_{PSS/SSS_sync_intra} = ceil(5 \times K_p) \times DRX \ cycle \times CSSF_{intra} = 3200ms$$

$$T_{SSB_measurement_period_intra} = ceil(5 \times K_p) \times DRX \ cycle \times CSSF_{intra} = 3200ms$$

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 640 ms shall be less than a total of 6402 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.6.1.3 NR SA FR1 event-triggered reporting with gap in non-DRX

6.6.1.3.1 Test purpose

The purpose of this test is to verify UE's ability to make a correct reporting of an event with gaps under non-DRX within intra-frequency cell search with gaps requirements.

6.6.1.3.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.3.

6.6.1.3.4 Test description

6.6.1.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.3.4.1-1.

Table 6.6.1.3.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting with gap in non-DRX

Test Case ID	Description				
6.6.1.3-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode				
6.6.1.3-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
6.6.1.3-3 NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode					
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations				

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.3.4.1-2.

Table 6.6.1.3.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting with gap in non-DRX

Parameter		Value	Comment		
Test		NC	As specified in TS 38.508-1 [14] clause 4.1.		
environment					
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.		
Channel	As specified	by the test configuration selected fr	rom Table 6.6.1.3.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to	- Without LT	E link			
connection	- For 4Rx ca	pable UEs without any 2Rx RF			
diagram	bands use A	.3.2.5.2 for DUT part and			
	A.3.1.8.4 for	TE part.			

- 1. The general test parameter settings are set up according to Table 6.6.1.3.4.1-3.
- 2. Message contents are defined in clause 6.6.1.3.4.3.
- 3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.3.4.1-3: General test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1, 2, 3	Cell 1	
Neighbour cell		1, 2, 3	Cell 2	Cell to be identified.
RF Channel Number		1, 2, 3	1: Cell 1 and Cell 2	
Measurement gap type		1, 2, 3	Per-UE gaps	
Measurement gap repitition periodicity	ms	1, 2, 3	40	
Measurement gap length	ms	1, 2, 3	6	
Measurement gap offset	ms	1, 2, 3	39	
SSB configuration		1	SSB.1 FR1	
		2	SSB.1 FR1	
		3	SSB.2 FR1	
SMTC configuration		1	SMTC.2	
		2	SMTC.1	
		3	SMTC.1	
CSI-RS parameters		1	CSI-RS.1.2 FDD	
		2	CSI-RS.1.2 TDD	
		3	CSI-RS.2.2 TDD	
A3-Offset	dB	1, 2, 3	-4.5	
CP length		1, 2, 3	Normal	
Hysteresis	dB	1, 2, 3	0	
Time To Trigger	S	1, 2, 3	0	
Filter coefficient		1, 2, 3	0	L3 filtering is not used
DRX	ms	1, 2, 3		OFF
Time offset between PCell and PSCell		1, 2, 3	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		2	3 μs	Synchronous cells
		3	3 μs	Synchronous cells
T1	S	1, 2, 3	5	
T2	S	1, 2, 3	5	

6.6.1.3.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.3.4.1-3 and Table 6.6.1.3.5-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.1.3.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.3.5-1.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the

UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

- 7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.3.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting with gap in non-DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for Configuration 6.6.1.3-1
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and Synchronous cells for Configuration 6.6.1.3-2
	Table H.3.1-3 with ConditionINTRA-FREQ MO, SSB.2 FR1, SMTC.1 and Synchronous cells for Configuration 6.6.1.3-3
	Table H.3.1-4 with A3-offset = -4.5dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-6 with Condition Pattern #0
	Table H.3.1-7 with Condition INTRA-FREQ

6.6.1.3.5 Test requirement

Table 6.6.1.3.4.1-3 and Table 6.6.1.3.5-1 define the primary level settings including test tolerances for NR SA FR1 event-triggered reporting with gap in non-DRX test.

Table 6.6.1.3.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX

Parameter	Unit	Test	Ce	Cell 1		II 2	
		configuration	T1	T2	T1	T2	
TDD configuration		1		N/A		N/A	
		2		onf.1.1	TDDC		
		3		onf.2.1	TDDConf.2.1		
PDSCH RMC		1	_	1 FDD] N	/A	
configuration		2		1 TDD			
		3	SR.2.	1 TDD			
RMSI CORESET		1	CR.1.	1 FDD	CR.1.:	1 FDD	
RMC		2	CR.1.	1 TDD	CR.1.:	1 TDD	
configuration		3	CR.2.	1 TDD	CR.2.:	1 TDD	
Dedicated		1	CCR.1	.1 FDD	CCR.1	.1 FDD	
CORESET RMC		2	CCR.1	.1 TDD	CCR.1	.1 TDD	
configuration		3	CCR.2	.1 TDD	CCR.2	1 TDD	
OCNG Patterns		1, 2, 3		P.1		P.1	
TRS		1	_	.1 FDD	N,		
Configuration		2		.1 TDD	N.	/A	
Ü		3		.2 TDD	N.	/A	
Initial BWP		1, 2, 3		VP.0.1	DLBWP.0.1		
configuration			ULBV	VP.0.1	ULBWP.0.1		
Active DL BWP		1, 2, 3	DLBV	VP.1.2	DLBW	/P.1.1	
configuration							
Active UL BWP		1, 2, 3	ULBV	ULBWP.1.1 ULBWP.1.1		/P.1.1	
configuration							
RLM-RS		1, 2, 3	CSI	-RS	SS	SB	
$N_{oc}^{$	dBm/SCS	1			-98		
oc		2			-98		
		3			·95		
$N_{oc}^{$	dBm/15 KHz	1		-	-98		
- · oc		2					
		3		1			
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	1	4	-1.46	-Infinity	-1.46	
— _s / ⁻ ot		2					
		3					
\hat{E}_s/N_{oc}	dB	1	4	4	-Infinity	4	
-s/oc		2					
		3					
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
		2	-94	-94	-Infinity	-94	
	ID (0.00.14):	3	-91	-91	-Infinity	-91	
lo	dBm/9.36 MHz	1	-64.60	-62.25	Specified		
	dBm/9.36 MHz	2			colu	mns	
	dBm/38.16 MHz	3	-58.50	-56.16			
Propagation		1, 2, 3		AV	VGN		
Condition	aa far unlink transmis		<u> </u>				

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for

 $N_{\it oc}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = T_{identify intra without index}

 $T_{identify_intra_without_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}$

 $T_{\text{PSS/SSS_sync_intra}} = 600 \text{ ms}$

 $T_{SSB \text{ measurement period intra}} = 200 \text{ ms}$

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.6.1.4 NR SA FR1 event-triggered reporting with gap in DRX

6.6.1.4.1 Test purpose

The purpose of this test is to verify UE's ability to make a correct reporting of an event with gaps under DRX within intra-frequency cell search with gaps requirements.

6.6.1.4.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.4.

6.6.1.4.4 Test description

6.6.1.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.4.4.1-1.

Table 6.6.1.4.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting with gap in DRX

Test Case ID	Description				
6.6.1.4-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode				
6.6.1.4-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
6.6.1.4-3 NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode					
Note 1: The UE	is only required to be tested in one of the supported test configurations				

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.4.4.1-2.

Table 6.6.1.4.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting with gap in DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.		
Channel	As specified	by the test configuration selected fr	rom Table 6.6.1.4.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to	- Without LT	E link			
connection	- For 4Rx ca	pable UEs without any 2Rx RF			
diagram	bands use A	3.2.5.2 for DUT part and			
	A.3.1.8.4 for	TE part.			

- 1. The general test parameter settings are set up according to Table 6.6.1.4.4.1-3.
- 2. Message contents are defined in clause 6.6.1.4.4.3.
- 3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.4.4.1-3: General test parameters for NR SA FR1 event-triggered reporting with gap in DRX

Parameter	Unit Test		Va	lue	Comment
		configur ation	Test 1	Test 2	
Active cell		1, 2, 3	Cell 1	•	
Neighbour cell		1, 2, 3	Cell 2		Cell to be identified.
RF Channel Number		1, 2, 3	1: Cell 1 and	Cell 2	
Measurement gap type		1, 2, 3	Per-UE gaps		
Measurement gap repitition periodicity	ms	1, 2, 3	40		
Measurement gap length	ms	1, 2, 3	6		
Measurement gap offset	ms	1, 2, 3	39		
SSB configuration		1	SSB.1 FR1		
		2	SSB.1 FR1		
		3	SSB.2 FR1		
SMTC configuration		1	SMTC.2		
		2	SMTC.1		
		3	SMTC.1		
CSI-RS parameters		1	CSI-RS.1.2 FDD		
		2	CSI-RS.1.2 T	DD	
		3	CSI-RS.2.2 T	DD	
A3-Offset	dB	1, 2, 3	-4.5		
CP length		1, 2, 3	Normal		
Hysteresis	dB	1, 2, 3	0		
Time To Trigger	S	1, 2, 3	0		
Filter coefficient		1, 2, 3	0		L3 filtering is not used
DRX	ms	1, 2, 3	DRX.1	DRX.2	
Time offset between PCell and PSCell		1, 2, 3	3 μs		Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms		Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
		2	3 μs		Synchronous cells
		3	3 μs		Synchronous cells
T1	S	1, 2, 3	5		
T2	S	1, 2, 3	5	10	

6.6.1.4.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.4.4.1-3 and Table 6.6.1.4.4.2-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

In Test 1 when DRX cycle = 40 ms is used, UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle. In Test 2 when DRX = 640 ms is used, the uplink time alignment is not maintained and the UE needs to use RACH to obtain uplink allocation for measurement reporting.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.1.4.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit *RRCReconfigurationComplete* message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.4.5-1.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms for Test 1 or less than 6402 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 6.6.1.4.4.1-3 as appropriate.

6.6.1.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.4.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting with gap in DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
·	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 6.6.1.4-1
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and Asynchronous cells for configuration 2
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and Asynchronous cells for configuration 6.6.1.4-3
	,
	Table H.3.1-4 with A3-offset = -4.5dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-6 with Condition Pattern #0
	Table H.3.1-7 with Condition INTRA-FREQ
	Table H.3.7-1 with Condition DRX.1 for test 1 Table H.3.7-1 with Condition DRX.1 for test 2

6.6.1.4.5 Test requirement

Table 6.6.1.4.4.1-3 and Table 6.6.1.4.5-1 define the primary level settings including test tolerances for NR SA FR1 event-triggered reporting with gap in DRX test.

Table 6.6.1.4.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting with gap in DRX

Parameter	Unit	Test	Cell 1		Cell 2		
		configuration	T1	T2	T1	T2	
TDD configuration		1	N/A		N/A		
		2	TDDConf.1.1		TDDConf.1.1		
		3	TDDConf.2.1		TDDConf.2.1		
PDSCH RMC		1	SR.1.1 FDD		N/A		
configuration		2	SR.1.	1 TDD			
		3	SR.2.1 TDD				
RMSI CORESET		1	CR.1.1 FDD		CR.1.1 FDD		
RMC		2	CR.1.	1 TDD	CR.1.1 TDD		
configuration		3	CR.2.	CR.2.1 TDD		CR.2.1 TDD	
Dedicated		1	CCR.1	CCR.1.1 FDD		CCR.1.1 FDD	
CORESET RMC		2		.1 TDD	CCR.1.1 TDD		
configuration		3		.1 TDD	CCR.2.1 TDD		
OCNG Patterns		1, 2, 3		P.1	OP.1		
Initial BWP		1, 2, 3	DLBWP.0.1		DLBWP.0.1		
configuration		, , -	ULBWP.0.1		ULBWP.0.1		
Active DL BWP		1, 2, 3	DLBWP.1.2		DLBWP.1.1		
configuration							
Active UL BWP		1, 2, 3	ULBWP.1.1		ULBWP.1.1		
configuration							
RLM-RS		1, 2, 3	CSI-RS		SS	SB	
$N_{oc}^{$	dBm/SCS	1	-98				
oc oc		2	-98				
		3	-95				
$N_{_{OC}}^{}$ Note 2	dBm/15 KHz	1	-98				
- · oc		2					
		3					
\hat{E}_{s}/I_{ot}	dB	1	4	-1.46	-Infinity	-1.46	
-s/ Tot		2					
		3					
\hat{E}_{s}/N_{oc}	dB	1	4	4	-Infinity	4	
-s/110c		2					
		3					
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
		2	-94	-94	-Infinity	-94	
		3	-91	-91	-Infinity	-91	
lo	dBm/9.36 MHz	1	-64.60	-62.25	Specified		
	dBm/9.36 MHz	2	-64.60	-62.25	colu	mns	
	dBm/38.16 MHz	3	-58.50 -56.16				
Propagation		1, 2, 3	AWGN				
Condition		<u> </u>	the HE sixted the state of the second of TO				

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\rm oc}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

In Test 1 when DRX cycle length = 40 ms is used, the overall delay measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report on PUSCH.

In Test 2 when DRX cycle length = 640 ms is used, the overall delay measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report on PUSCH.

For both tests:

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

- NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.
- NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

 $Measurement \ reporting \ delay = T_{identify_intra_without_index}$

 $T_{identify_intra_without_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}$

 $T_{PSS/SSS_sync_intra} = 600$ ms for Test 1, and $T_{PSS/SSS_sync_intra} = 3200$ ms for Test 2

T_{SSB_measurement_period_intra} = 320 ms for Test 1, and T_{SSB_measurement_period_intra} = 3200 ms for Test 2

TTI insertion uncertainty = 2 ms

For Test 1, the overall delays measured shall be less than a total of 922 ms (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For Test 2, the overall delays measured shall be less than a total of 6402 ms (note: this gives a total of 6400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.6.1.5 NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

6.6.1.5.1 Test purpose

The purpose of this test is to verify UE's ability to make a correct reporting of an event within intra-frequency cell search without gaps requirements.

6.6.1.5.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.5.

6.6.1.5.4 Test description

6.6.1.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.5.4.1-1.

Table 6.6.1.5.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

Configuration	Description		
6.6.1.5-1	15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode		
Note: The UE is only required to be tested in one of the supported test configurations.			

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.5.4.1-2.

Table 6.6.1.5.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

Parameter	Value		Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.			
Channel bandwidth	As specified by the test configuration selected from Table 6.6.1.5.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.	
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.4		
Exceptions to connection diagram	- Without LTE link - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part.			

- 1. The general test parameter settings are set up according to Table 6.6.1.5.4.1-3.
- 2. Message contents are defined in clause 6.6.1.5.4.3.
- 3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.5.4.1-3: General test parameters for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1	Cell 1	
Neighbour cell		1	Cell 2	Cell to be identified.
RF Channel Number		1	1: Cell 1 and Cell 2	
SSB configuration		1	SSB.1 FR1	
SMTC configuration		1	SMTC.2	
A3-Offset	dB	1	-4.5	
CP length		1	Normal	
Hysteresis	dB	1	0	
Time To Trigger	S	1	0	
Filter coefficient		1	0	L3 filtering is not used
DRX	ms	1		OFF
Time offset between PCell and PSCell		1	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
T1	S	1	5	
T2	S	1	5	

6.6.1.5.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.5.4.1-3 and Table 6.6.1.5.5-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.1.5.5-1. T1 starts.

- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.5.5-1.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.5.4.3 Message contents

Message contents are according to TS 38.508-1 clause 4.6 with the following exceptions:

Table 6.6.1.5.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
·	Table H.3.1-2 with Condition INTRA-FREQ
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for Configuration 6.6.1.5-1
	Table H.3.1-4 with A3-offset = -4.5 dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-7 with Condition INTRA-FREQ

6.6.1.5.5 Test requirement

Table 6.6.1.5.4.1-3 and Table 6.6.1.5.5-1 define the primary level settings including test tolerances for SA event triggered reporting without gap under non-DRX with SSB index reading test.

Table 6.6.1.5.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

Parameter	Unit	Test	Cell 1		Cell 2	
		configuration	T1	T2	T1	T2
TDD configuration		1	N/A		N/A	
PDSCH RMC		1	SR.1.	1 FDD	N/A	
configuration						
RMSI CORESET		1	CR.1.	1 FDD	CR.1.	1 FDD
RMC						
configuration						
Dedicated		1	CCR.1	1 FDD	CCR.1	.1 FDD
CORESET RMC						
configuration						
OCNG Patterns		1	OI	P.1	OI	P.1
Initial BWP		1		VP.0.1	DLBWP.0.1	
configuration			ULBV	VP.0.1	ULBWP.0.1	
Active DL BWP		1	DLBV	VP.1.1	DLBWP.1.1	
configuration						
Active UL BWP		1	ULBV	VP.1.1	ULBWP.1.1	
configuration						
RLM-RS		1	S:	SB	SSB	
$N_{_{OC}}^{}$ Note 2	dBm/SCS	1		-	-98	
$N_{_{OC}}^{}$ Note 2	dBm/15 KHz	1		-	-98	
$\hat{\mathrm{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1	4	4 -1.46		-1.46
\hat{E}_s/N_{oc}	dB	1	4 4		-Infinity	4
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94
lo	dBm/9.36 MHz	1	-64.60 -62.25		Specified in Cell 1	
			columns			mns
Propagation Condition		1	AWGN			

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_intra_with_index}$

 $T_{identify_intra_with_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} + T_{SSB_time_index_intra}$

 $T_{PSS/SSS_sync_intra} = 600 \text{ ms}$

 $T_{SSB_time_index_intra} = 120 \text{ ms}$

 $T_{SSB_measurement_period_intra} = 200 \text{ ms}$

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms in this test case (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.6.1.6 NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

6.6.1.6.1 Test purpose

The purpose of this test is to verify UE's ability to make a correct reporting of an event within intra-frequency cell search with gaps requirements.

6.6.1.6.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.6.

6.6.1.6.4 Test description

6.6.1.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.6.4.1-1.

Table 6.6.1.6.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

Cor	nfiguration	Description
6.6.1.6-1		15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode
Note:	The UE is only red	quired to be tested in one of the supported test configurations.

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.3.4.1-2.

Table 6.6.1.6.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.5	508-1 [14] clause 4.3.1 and 4.4.2.			
Channel	As specified	by the test configuration selected fr	om Table 6.6.1.6.4.1-1.			
bandwidth						
Propagation	AWGN		As specified in Annex C.2.2.			
conditions						
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to	- Without LTI	E link				
connection	- For 4Rx ca	pable UEs without any 2Rx RF				
diagram	bands use A	.3.2.5.2 for DUT part and				
	A.3.1.8.4 for	TE part.				

- 1. The general test parameter settings are set up according to Table 6.6.1.6.4.1-3.
- 2. Message contents are defined in clause 6.6.1.6.4.3.

3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.6.4.1-3: General test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

Parameter	Unit	Test configur ation	Value	Comment
Active cell		1	Cell 1	
Neighbour cell		1	Cell 2	Cell to be identified.
RF Channel Number		1	1: Cell 1 and Cell 2	
Measurement gap type		1	Per-UE gaps	
Measurement gap repitition periodicity	ms	1	40	
Measurement gap length	ms	1	6	
Measurement gap offset	ms	1	39	
SSB configuration		1	SSB.1 FR1	
SMTC configuration		1	SMTC.2	
CSI-RS parameters		1	CSI-RS.1.2 FDD	
A3-Offset	dB	1	-4.5	
CP length		1	Normal	
Hysteresis	dB	1	0	
Time To Trigger	S	1	0	
Filter coefficient		1	0	L3 filtering is not used
DRX	ms	1		OFF
Time offset between PCell and PSCell		1	3 μs	Synchronous EN-DC
Time offset between serving and neighbour cells		1	3 ms	Asynchronous cells. The timing of Cell 3 is 3ms later than the timing of Cell 2.
T1	S	1	5	
T2	S	1	5	

6.6.1.6.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.6.4.1-3 and Table 6.6.1.6.5-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.1.6.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.3.5-1.
- 6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

- 7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.6.4.3 Message contents

Message contents are according to TS 38.508-1 clause 4.6 with the following exceptions:

Table 6.6.1.6.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
ciements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and Asynchronous cells for Configuration 6.6.1.6-1
	Table H.3.1-4 with A3-offset = -4.5dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-6 with Condition Pattern #0
	Table H.3.1-7 with Condition INTRA-FREQ

6.6.1.6.5 Test requirement

Table 6.6.1.6.4.1-3 and Table 6.6.1.6.5-1 define the primary level settings including test tolerances for SA event triggered reporting tests with per-UE gaps under non-DRX with SSB index reading test.

Table 6.6.1.6.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

Parameter	Unit	Test	Cell 1		Cell 2		
		configuration	T1	T2	T1	T2	
TDD configuration		1	N/A		N/A		
PDSCH RMC		1	SR.1.1 FDD		N/A		
configuration							
RMSI CORESET		1	CR.1.	1 FDD	CR.1.	1 FDD	
RMC							
configuration							
Dedicated		1	CCR.1	.1 FDD	CCR.1	.1 FDD	
CORESET RMC							
configuration							
OCNG Patterns		1	-	P.1		P.1	
Initial BWP		1		VP.0.1	DLBWP.0.1		
configuration				VP.0.1	ULBWP.0.1		
Active DL BWP		1	DLBV	VP.1.2	DLBWP.1.1		
configuration							
Active UL BWP		1	ULBV	VP.1.1	ULBWP.1.1		
configuration							
RLM-RS		1	CSI	-RS	SSB		
$N_{oc}^{$	dBm/SCS	1		-	-98		
$N_{oc}^{ m Note 2}$	dBm/15 KHz	1		-	-98		
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	1	4	4 -1.46		-1.46	
\hat{E}_s/N_{oc}	dB	1	4 4		-Infinity	4	
SS-RSRP Note 3	dBm/SCS KHz	1	-94	-94	-Infinity	-94	
lo	dBm/9.36 MHz	1	-64.60 -62.25		Specified in Cell 1		
			columns				
Propagation		1	AWGN				
Condition							

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report.

The overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_intra_with_index}$

 $T_{identify_intra_with_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} + T_{SSB_time_index_intra}$

 $T_{PSS/SSS_sync_intra} = 600 \text{ ms}$

 $T_{SSB_time_index_intra} = 120 \text{ ms}$

 $T_{SSB_measurement_period_intra} = 200 ms$

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms in this test case (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

6.6.2 Inter-frequency measurements

6.6.2.0 Minimum conformance requirements for Inter-frequency measurements

Same as clause 4.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause 9.3.2, 9.3.4, 9.3.5, 9.3.6.3.

6.6.2.1 NR SA FR1-FR1 event-triggered reporting in non-DRX

6.6.2.1.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within inter-frequency NR cell search requirements without SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.1.

6.6.2.1.4 Test description

6.6.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.1.4.1-2. Test environment parameters are given in Table 6.6.2.1.4.1-3.

Table 6.6.2.1.4.1-1: SA FR1-FR1 event triggered reporting tests in non-DRX supported test configurations

Test Case ID	Description				
6.6.2.1-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode				
6.6.2.1-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
6.6.2.1-3 NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode					
Note 1: The UE is only required to be tested in one of the supported test configurations					
Note 2: target N	R cell has the same SCS, BW and duplex mode as NR serving cell				

Table 6.6.2.1.4.1-2: SA FR1-FR1 general test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in non DRX

Parameter	Unit	Test	Va	lue	Comment
		configurati on	Test 1	Test 2	
NR RF Channel Number		Config 1,2,3	1, 2		Two FR1 NR carrier frequencies is used.
Active cell		Config 1,2,3	NR cell 1 (Pcell)		NR Cell 1 is on NR RF channel number 1.
Neighbour cell		Config 1,2,3	NR cell2		NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3	0	4	As specified in TS 38.133 clause 9.1.2-1.
Measurement gap offset		Config 1,2,3	39	19	
SMTC-SSB parameters		Config 1	SSB.1 FR1		As specified in clause A.3
		Config 2	SSB.1 FR1		As specified in clause A.3
		Config 3	SSB.2 FR1		As specified in clause A.3
A3-Offset	dB	Config 1,2,3	-6		
Hysteresis	dB	Config 1,2,3	0		
CP length		Config 1,2,3	Normal		
TimeToTrigger	S	Config 1,2,3	0		
Filter coefficient		Config 1,2,3	0		L3 filtering is not used
DRX		Config 1,2,3	OFF		DRX is not used
Time offset between serving and neighbour cells		Config 1	3ms		Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		Config 2,3	3μs		Synchronous cells.
T1	S	Config 1,2,3	5		
T2	S	Config 1,2,3	1	1	

Table 6.6.2.1.4-3: Test Environment parameters for SA inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Value		Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38	.508-1 [14] clause 4.3.1 and 4.4.2.		
Channel bandwidth	As specified	rom Table 4.6.2.1.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4	1		
Exceptions to connection diagram		pable UEs without any 2Rx RF .3.2.5.1 for DUT part and			

^{1.} Message contents are defined in clause 6.6.2.1.4.3.

^{2.} There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

6.6.2.1.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 6.6.2.1.4-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table 6.6.2.1.4-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.2.1.4-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.1.4-2. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 920 ms for Test 1 and 760 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.), or:
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 6.6.2.1.4-2 as appropriate.

6.6.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.1.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

De	fault Message Contents
Common contents of system information blocks	
exceptions	
Default RRC messages and information	Table H.3.1-1
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC pattern 2 and Asynchronous cells for configuration 6.6.2.1-1
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC pattern 1 and synchronous cells for configuration 6.6.2.1-2
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1,
	SMTC pattern 1 and synchronous cells for configuration 6.6.2.1-3
	Table H.3.1-4 with A3-offset = -6dB
	Table H.3.1-5 with Condition INTER-FREQ
	Table H.3.1-6 with Conditions gapUE and Pattern #0 for Test 1
	Table H.3.1-6 with Conditions gapFR1 and Pattern #4 for Test 2
	Table H.3.1-7 with Condition INTER-FREQ

6.6.2.1.5 Test requirement

Table 6.6.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.2.1.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in non-DRX

Parameter		Unit	Test	Cel	II 1	Cell 2			
			configuratio n	T1	T2	T1	T2		
NR RF Cha	nnel Number		Config 1,2,3	1		2			
Duplex mod	le		Config 1	FDD					
			Config 2,3	TDD					
TDD configuration			Config 1		Not Applicable				
			Config 2		TDDConf.1.1				
BW _{channel}		NAL I-	Config 3 Config 1,2			Conf.2.1			
DVV channel		MHz	Config 1,2		10. N	$I_{RB,c} = 52$ $R_{B,c} = 106$			
BWP BW		MHz	Config 1,2			$I_{RB,c} = 100$ $I_{RB,c} = 52$			
DWI DW		1411.12	Config 3			RB,c = 106			
BWP configurati	Initial DL BWP		January 1	DLBW		(5),0	NA		
on	Initial UL BWP		Config 1, 2,	ULBW	/P.0.1		NA		
	Dedicated DL BWP		3	DLBW	/P.1.1		NA		
	Dedicated UL BWP			ULBW	/P.1.1		NA		
TRS configu	uration		Config 1	TRS.1.	1 FDD		NA		
			Config 2	TRS.1.1 TDD		NA			
			Config 3	TRS.1.2 TDD		NA			
OCNG Patte A.3.2.1.1 (C	erns defined in P.1)		Config 1,2,3	OP.1		OP.1			
PDSCH Ref			Config 1	SR.1.1	. FDD		-		
measureme	nt channel		Config 2	SR.1.1	L TDD	-			
			Config 3	SR2.1					
CORESET	Reference		Config 1	CR.1.1 FDD -		-			
Channel			Config 2	CR.1.1					
01.470 "			Config 3	CR2.1	. TDD				
	guration defined and A.3.11. 2		Config 1	SMTC.2					
			Config 2, 3	SMTC.1					
	CCH subcarrier	kHz	Config 1,2			15			
spacing	of DCC to CCC		Config 3			30			
	of PSS to SSS of PBCH DMRS								
	of PBCH to PBCH								
	of PDCCH DMRS								
PDCCH DN			Config 1,2,3	C)		0		
EPRE ratio of PDSCH DMRS to SSS									
EPRE ratio of PDSCH to PDSCH									
EPRE ratio of OCNG DMRS to SSS(Note 1)									
EPRE ratio of OCNG to OCNG DMRS (Note 1)									
$N_{\scriptscriptstyle oc}$ Note2		dBm/15 kHz		-9			-98		
		dBm/S	Config 1,2	-9	8		-98		

$N_{_{OC}}$ Note2	CS	Config 3	-95		-95	
SS-RSRP Note 3	dBm/S	Config 1,2	-94	-94	-Infinity	-91
	CS	Config 3	-91	-91	-Infinity	-88
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	Config	4	4	-Infinity	7
s / ot		1,2,3,4,5,6				
\hat{E}_s/N_{oc}	dB	Config 1,2,3	4	4	-Infinity	7
Io ^{Note3}	dBm/9.3	Config 1,2	-64.59	-64.59	-70.05	-62.26
	6MHz					
	dBm/38.	Config 3	-58.49	-58.49	-63.94	-56.15
	16MHz					
Day and Carallina		0	0.00			NON.
Propagation Condition		Config 1,2,3	AW	GN	A\	WGN

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 920 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%, with a confidence level of 95%

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 760 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1 and 2 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

6.6.2.2 NR SA FR1-FR1 event-triggered reporting in DRX

6.6.2.2.1 Test purpose

To verify that the UE makes correct reporting of an event in DRX within inter-frequency NR cell search requirements without SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.6.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.2.

6.6.2.2.4 Test description

6.6.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.2.4.1-2. Test environment parameters are given in Table 6.6.2.2.4.1-3.

Table 6.6.2.2.4.1-1: SA FR1-FR1 event triggered reporting tests in DRX supported test configurations

Test Case ID	Description			
6.6.2.2-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
6.6.2.2-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
6.6.2.2-3	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations			
Note 2: target NI	R cell has the same SCS, BW and duplex mode as NR serving cell			

Table 6.6.2.2.4-2: General test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in DRX

Parameter	Unit	Test		Va	lue		Comment
		configurati	Test	Test	Test	Test	
		on	1	2	3	4	
NR RF Channel Number		Config 1,2,3		1,	2		Two FR1 NR carrier frequencies is used
Active cell		Config 1,2,3	NR ce	ll 1 (Pce	·II)		NR Cell 1 is on NR RF channel number 1
Neighbour cell		Config 1,2,3	NR ce	II2			NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3	0		2		As specified in TS 38.133 clause 9.1.2-1
Measurement gap offset		Config 1,2,3	39		39		
SMTC-SSB parameters		Config 1	SSB.1	FR1			As specified in clause A.3
		Config 2	SSB.1	FR1			As specified in clause A.3
		Config 3	SSB.2	FR1			As specified in clause A.3
A3-Offset	dB	Config 1,2,3	-6				
Hysteresis	dB	Config 1,2,3	0				
CP length		Config 1,2,3	Norma	ıl			
TimeToTrigger	S	Config 1,2,3	0				
Filter coefficient		Config 1,2,3	0				L3 filtering is not used
DRX		Config 1,2,3	DRX .1	DRX .2	DRX .1	DRX .2	As specified in clause A.5
Time offset between serving and neighbour cells		Config 1	3ms				Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		Config 2,3	3µs				Synchronous cells
T1	S	Config 1,2,3	5				
T2	S	Config 1,2,3	1.1	11	1.1	11	

Table 6.6.2.2.4-3: Test Environment parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in DRX

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.			
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 4.6.2.1.4.1-1.			
Propagation conditions	AWGN		As specified in Annex C.2.2.			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.2.3.4				
Exceptions to connection diagram		pable UEs without any 2Rx RF .3.2.5.1 for DUT part and				

- 1. Message contents are defined in clause 6.6.2.2.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

6.6.2.2.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 6.6.2.2.4-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table 6.6.2.2.4-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.2.2.4-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.2.4-2. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1080 ms for Test 1, 10240 ms for Test 2, 1080 ms for Test 3 and 10240 ms for Test 4 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.), or:
- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 6.6.2.2.4-2 as appropriate.

6.6.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.2.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

De	efault Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1, SMTC.2 and Asynchronous cells for configuration 6.6.2.2 -1 Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1, SMTC.1 and Synchronous cells for configuration 6.6.2.2 -2 Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1, SMTC.1 and Synchronous cells for configuration 6.6.2.2 -3 Table H.3.1-4 with A3-offset = -6dB Table H.3.1-5 with Condition INTER-FREQ Table H.3.1-6 with Conditions gapUE and Pattern #0 for Test 1 and Test 2 Table H.3.1-6 with Conditions gapFR1 and Pattern #2 for Test 3 an Test 4 Table H.3.1-7 with Condition INTER-FREQ Table H.3.7-1 with Condition DRX.1 for Test 1 and Test 3 Table H.3.7-1 with Condition DRX.2 for Test 2 and Test 4

6.6.2.2.5 Test requirement

Table 6.6.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.2.2.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

Para	ameter	Unit	Test		ll 1	Cell 2	
			configuratio n	T1	T2	T1	T2
NR RF Chanr	nel Number		Config 1,2,3	1			2
Duplex mode			Config 1		F	-DD	
•			Config 2,3		TDD		
TDD configura	ation		Config 1	Not Applicable			
			Config 2		TDDConf.1.1		
			Config 3			Conf.2.1	
BW _{channel}		MHz	Config 1,2			$I_{RB,c} = 52$	
BWP BW		MHz	Config 3		40: N _F	$I_{RB,c} = 106$ $I_{RB,c} = 52$	
DVVP DVV		IVITZ	Config 1,2 Config 3		40: N	$R_{B,c} = 32$ $R_{B,c} = 106$	
BWP	Initial DL BWP		Config 1, 2,	DLBWP.0.1			NA
configuratio	I IIII BE BWI		3	DLD.	VI .O.1		107
n	Initial UL BWP			ULBV	VP.0.1		NA
	Dedicated DL			DLBV	VP.1.1		NA
	BWP						
	Dedicated UL BWP			ULBV	VP.1.1		NA
TRS configura			Config 1	TRS.1	.1 FDD		NA
			Config 2	TRS.1	.1 TDD		NA
			Config 3		.2 TDD		NA
			Config 1		.1 FDD		NA
OCNG Patter A.3.2.1.1 (OP			Config 1,2,3	OP.1		OP.1	
PDSCH Refei			Config 1	SR.1.1	L FDD	-	
measurement	channel		Config 2		1 TDD		
			Config 3		SR2.1 TDD		
CORESET RE	eference		Config 1	CR.1.1			-
Channel			Config 2	CR.1.	1 TDD		
			Config 3	CR2.1 TDD			
SMTC configu in A.3.11.1 an	ıration defined d A.3.11. 2		Config 1	SMTC.2			
			Config 2, 3		SN	MTC.1	
	CH subcarrier	kHz	Config 1,2			15	
spacing			Config 3	3		30	
EPRE ratio of	PSS to SSS						
EPRE ratio of to SSS	PBCH DMRS						
DMRS	PBCH to PBCH						
to SSS	PDCCH DMRS						
EPRE ratio of PDCCH DMR	S		Config 1,2,3	0		0	
to SSS	PDSCH DMRS						
EPRE ratio of PDSCH to PDSCH							
EPRE ratio of OCNG DMRS to SSS(Note 1)							
	PRE ratio of OCNG to						
$rac{OCNG\;DMRS}{N_{oc}}$	(NOTE 1)	dBm/15 kHz	Config 1,2,3	-98		-98	
$N_{_{oc}}$ Note2		dBm/S	Config 1,2	-6	98		-98
		CS	Config 3		95		-95
SS-RSRP Note:	3	dBm/S	Config 1,2	-94	-94	-Infinity	-91
		CS	Config 3	-91	-91	-Infinity	-88

$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	Config	4	4	-Infinity	7
—s / -ot		1,2,3,4,5,6				
\hat{E}_s/N_{oc}	dB	Config 1,2,3	4	4	-Infinity	7
Io ^{Note3}	dBm/9.	Config 1,2	-64.59	-64.59	-70.05	-62.2
	36MHz					
	dBm/38	Config 3	-58.49	-58.49	-63.94	-56.15
	.16MHz					
Propagation Condition		Config 1,2,3	AW	GN	A۱	WGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1080 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 10240 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1080 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 10240 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

6.6.2.3 Void

6.6.2.4 Void

6.6.2.5 NR SA FR1-FR1 event-triggered reporting in non-DRX with SSB time index detection

6.6.2.5.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within inter-frequency NR cell search requirements with SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.5.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.6.2.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A. 6.6.2.5.

6.6.2.5.4 Test description

6.6.2.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.3.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.3.4.1-2. Test environment parameters are given in Table 6.6.2.3.4.1-3.

Table 6.6.2.5.4.1-1: SA FR1-FR1 event triggered reporting tests in non-DRX with SSB time index detection supported test configurations

Test Case ID	Description			
6.6.2.5-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode			
6.6.2.5-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode			
6.6.2.5-3	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode			
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations			
Note 2: target N	R cell has the same SCS, BW and duplex mode as NR serving cell			

Table 6.6.2.5.4-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with SSB time index detection in non-DRX

Parameter	Unit	Test	Va	lue	Comment		
		configurati on	Test 1	Test 2			
NR RF Channel Number		Config 1,2,3	1	, 2	Two FR1 NR carrier frequencies is used		
Active cell		Config 1,2,3	NR cell 1 (Pce	ell)	NR Cell 1 is on NR RF channel number 1		
Neighbour cell		Config 1,2,3	NR cell2		NR cell 2 is on NR RF channel number 2		
Gap Pattern Id		Config 1,2,3	0	2	As specified in TS 38.133 clause 9.1.2-1		
Measurement gap offset		Config 1,2,3	39	39			
SMTC-SSB parameters		Config 1	SSB.1 FR1		As specified in clause A.3.		
		Config 2	SSB.1 FR1		As specified in clause A.3		
		Config 3	SSB.2 FR1		As specified in TS 38.133 clause A.3		
A3-Offset	dB	Config 1,2,3	-6				
Hysteresis	dB	Config 1,2,3	0				
CP length		Config 1,2,3	Normal				
TimeToTrigger	S	Config 1,2,3	0				
Filter coefficient		Config 1,2,3	0		L3 filtering is not used		
DRX		Config 1,2,3	OFF		DRX is not used		
Time offset between serving and neighbour		Config 1	3ms		Asynchronous cells. The timing of Cell 2 is 3ms later		
cells		Config 2,3	Зµѕ		than the timing of Cell 1. Synchronous cells		
T1	S	Config 1,2,3	5				
T2	S	Config 1,2,3	1.1	1			

Table 6.6.2.5.4-3: Environment test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in non-DRX

Parameter	Value		Comment				
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38	.508-1 [14] clause 4.3.1 and 4.4.2.				
Channel bandwidth	As specified	by the test configuration selected f	rom Table 4.6.2.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.				
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.2.3.4	1				
Exceptions to connection diagram		upable UEs without any 2Rx RF v.3.2.5.1 for DUT part and					

- 1. Message contents are defined in clause 6.6.2.5.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

6.6.2.5.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 6.6.2.5.4-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table 6.6.2.5.4-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.2.4.4-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.4.4-2. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1040 ms for Test 1 and 880 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without

release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.), or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 6.6.2.1.4-2 as appropriate.

6.6.2.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.5.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

De	fault Message Contents
Common contents of system information blocks	
exceptions	
Default RRC messages and information	Table H.3.1-1
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.2 and Asynchronous cells for configuration 6.6.2.5-1
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.1 and Synchronous cells for configuration 6.6.2.5-2
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1,
	SMTC.1 and Synchronous cells for configuration 6.6.2.3-3
	Table H.3.1-4 with A3-offset = -6dB and Condition SSB Index
	Table H.3.1-5 with Condition INTER-FREQ
	Table H.3.1-6 with Conditions gapUE and Pattern #0 for Test 1
	Table H.3.1-6 with Conditions gapFR1 and Pattern #2 for Test 2
	Table H.3.1-7 with Conditions INTER-FREQ and SSB Index

6.6.2.5.5 Test requirement

Table 6.6.2.4.5-1 defines the primary level settings including test tolerances for all tests.

Table A. 6.6.2.5.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with SSB time index detection

Parameter		Unit	Test	Cell 1		Cell 2	
			configuratio n	T1	T2	T1	T2
NR RF Channe	el Number		Config 1,2,3	-	L		2
Duplex mode			Config 1			-DD	
•			Config 2,3	TDD			
TDD configurat	tion		Config 1	Not Applicable			
			Config 2			Conf.1.1	
5144			Config 3			Conf.2.1	
BW _{channel}		MHz	Config 1,2			$I_{RB,c} = 52$	
BWP BW		MHz	Config 3			RB,c = 106	
BAAL BAA		IVITZ	Config 1,2 Config 3			$I_{RB,c} = 52$ $R_{RB,c} = 106$	
BWP	Initial DL		Cornig 5	DLBV	/P.0.1	RB,C - 100	NA
configuration	BWP						
· ·	Initial UL		1 [ULBV	/P.0.1		NA
	BWP		Config 1, 2,				
	Dedicated DL BWP		3	DLBV	VP.1.1		NA
	Dedicated UL BWP			ULBV	VP.1.1		NA
TRS configurat			Config 1	TRS.1	1 FDD		NA
3 · ···			Config 2		1 TDD		NA
			Config 3	TRS.1	.2 TDD		NA
OCNG Pattern A.3.2.1.1 (OP.1			Config 1,2,3	OP.1 OP.1			OP.1
PDSCH Refere			Config 1	SR.1.1 FDD -		-	
measurement (channel		Config 2	SR.1.1 TDD			
			Config 3	SR2.1 TDD			
CORESET Ref	ference		Config 1	CR.1.1 FDD -		-	
Channel			Config 2		1 TDD	1	
			Config 3	CR2.1 TDD			
SMTC configur in A.3.11.1 and			Config 1	SMTC.2			
			Config 2, 3		SI	MTC.1	
PDSCH/PDCC	H subcarrier	kHz	Config 1,2			15	
spacing			Config 3			30	
EPRE ratio of I	PSS to SSS						
EPRE ratio of I	PBCH DMRS						
to SSS							
	PBCH to PBCH]				
DMRS							
EPRE ratio of I to SSS	PDCCH DMRS						
EPRE ratio of F	PDCCH to		1				
PDCCH DMRS			Config 1,2,3	()		0
	PDSCH DMRS		<u> </u>				
to SSS]				
EPRE ratio of PDSCH to							
PDSCH	0010 -::						
EPRE ratio of OCNG DMRS to SSS(Note 1)							
EPRE ratio of OCNG to OCNG DMRS (Note 1)							
	(INOIG T)	dBm/15		-00			-08
$N_{\scriptscriptstyle oc}$ Note2		kHz		-98		-30	
⊼ T Note?		dBm/S	Config 1,2	_0	98		-98
$N_{_{oc}}$ Note2		CS	Config 3)5		-95
SS-RSRP Note 3		dBm/S	Config 1,2	-94	-94	-Infinity	-91
		CS	Config 3	-91	-91	-Infinity	-88

$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	Config 1,2,3	4	4	-Infinity	7
\hat{E}_s/N_{oc}	dB	Config 1,2,3	4	4	-Infinity	7
IO ^{Note3}	dBm/9.3 6MHz	Config 1,2	-64.59	-64.59	-70.05	-62.2
	dBm/38. 16MHz	Config 3	-58.4	-58.49	-63.94	-56.15
Propagation Condition		Config 1,2,3	AWGN AWGN		WGN	

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1040 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 880 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1 and 2 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

6.6.2.6 NR SA FR1-FR1 event-triggered reporting in DRX with SSB time index detection

6.6.2.6.1 Test purpose

To verify that the UE makes correct reporting of an event in DRX within inter-frequency NR cell search requirements with SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.6.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.6.2.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.6.

6.6.2.6.4 Test description

6.6.2.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.6.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.6.4.1-2. Test environment parameters are given in Table 6.6.2.6.4.1-3.

Table 6.6.2.6.4.1-1: SA FR1-FR1 event triggered reporting tests in DRX with SSB time index detection supported test configurations

Test Case ID	Description				
6.6.2.6-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode				
6.6.2.64-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode				
6.6.2.6-3	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode				
Note 1: The UE is only required to be tested in one of the supported test configurations					
Note 2: target NI	R cell has the same SCS, BW and duplex mode as NR serving cell				

Table 6.6.2.6.4-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with SSB time index detection

Parameter	Unit	Test		Va	lue		Comment
		configurati	Test	Test	Test	Test	
		on	1	2	3	4	
NR RF Channel Number		Config 1,2,3		1,	2		Two FR1 NR carrier frequencies is used
Active cell		Config 1,2,3	NR ce	ll 1 (Pce	·II)		NR Cell 1 is on NR RF channel number 1
Neighbour cell		Config 1,2,3	NR ce	II2			NR cell 2 is on NR RF channel number 2
Gap Pattern Id		Config 1,2,3	0		2		As specified in TS 38.133 clause 9.1.2-1
Measurement gap offset		Config 1,2,3	39		39		
SMTC-SSB parameters		Config 1	SSB.1	FR1			As specified in clause A.3
		Config 2	SSB.1	FR1			As specified in clause A.3
		Config 3	SSB.2	FR1			As specified in clause A.3
A3-Offset	dB	Config 1,2,3	-6				
Hysteresis	dB	Config 1,2,3	0				
CP length		Config 1,2,3	Norma	ıl			
TimeToTrigger	S	Config 1,2,3	0				
Filter coefficient		Config 1,2,3	0				L3 filtering is not used
DRX		Config 1,2,3	DRX .1	DRX .2	DRX .1	DRX .2	As specified in clause A.5
Time offset between serving and neighbour cells		Config 1	3ms			Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.	
		Config 2,3	3 μs				Synchronous cells
T1	S	Config 1,2,3	5				
T2	S	Config 1,2,3	1.3	13.5	1.3	13.5	

Table 6.6.2.6.4-3: Test Environment parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38	.508-1 [14] clause 4.3.1 and 4.4.2.
Channel	As specified	by the test configuration selected f	rom Table 4.6.2.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.1.8.2	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	7
Exceptions to	- Without LT	E link	
connection	- For 4Rx capable UEs without any 2Rx RF		
diagram	bands use A	3.2.5.1 for DUT part and	
	A.3.1.8.4 for	TE part.	

- 1. Message contents are defined in clause 6.6.2.6.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Table Annex C.1.2.

6.6.2.6.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.6.6.2.6.4-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table. 6.6.2.6.4-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.2.6.4-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit *RRCReconfigurationComplete* message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.6.4-2. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1280 ms for Test 1, 13440 ms for Test 2, 1280 ms for Test 3 and 13440 ms for Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures

the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.), or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 6.6.2.1.4-2 as appropriate.

6.6.2.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.6.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

De	fault Message Contents
Common contents of system information blocks	
exceptions	
Default RRC messages and information	Table H.3.1-1
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ
·	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.2 and Asynchronous cells for configuration 6.6.2.6-1
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.1 FR1,
	SMTC.1 and synchronous cells for configuration 6.6.2.6-2
	Table H.3.1-3 with Conditions INTER-FREQ MO and SSB.2 FR1,
	SMTC.1 and synchronous cells for configuration 6.6.2.6-3
	Table H.3.1-4 with A3-offset = -6dB and Condition SSB Index
	Table H.3.1-5 with Condition INTER-FREQ
	Table H.3.1-6 with Conditions gapUE and Pattern #0 for Test 1 and
	Test 2
	Table H.3.1-6 with Conditions gapFR1 and Pattern #2 for Test 3 and
	Test 4
	Table H.3.1-7 with Conditions INTER-FREQ and SSB Index
	Table H.3.7-1 with Condition DRX.1 for Test 1 and Test 3
	Table H.3.7-1 with Condition DRX.2 for Test 2 and Test 4

6.6.2.6.5 Test requirement

Table 6.6.2.6.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.2.6.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with SSB time index detection

Par	rameter	Unit	Test	Ce	II 1	С	Cell 2	
			configuratio n	T1	T2	T1	T2	
NR RF Chan	nel Number		Config 1,2,3	1			2	
Duplex mode)		Config 1	FDD				
•			Config 2,3	TDD				
TDD configu	ration		Config 1			pplicable		
			Config 2			Conf.1.1		
			Config 3			Conf.2.1		
$BW_{channel}$		MHz	Config 1,2			$I_{RB,c} = 52$		
			Config 3			RB,c = 106		
BWP BW		MHz	Config 1,2			$I_{RB,c} = 52$		
BWP	Initial DL BWP		Config 3	DLBW		_{RB,c} = 106	NA	
configurati	Initial UL BWP		-	ULBW			NA NA	
on	Dedicated DL		Config 1, 2,					
	BWP		3	DLBW	/P.1.1		NA	
	Dedicated UL BWP			ULBW	/P.1.1		NA	
TRS configur	ration		Config 1	TRS.1.	1 FDD	TRS.	1.1 TDD	
Ü			Config 2	TRS.1.	1 TDD	TRS.	1.2 TDD	
			Config 3	TRS.1.			WP.0.1	
OCNG Patte A.3.2.1.1 (OF	rns defined in P.1)		Config 1,2,3	OF	2.1		DP.1	
PDSCH Refe			Config 1	SR.1.1	FDD		-	
measuremen	it channel		Config 2	SR.1.2		1		
			Config 3		TDD	1		
CORESET R	eference		Config 1	CR.1.1			_	
Channel	.0.0.000		Config 2	CR.1.1 TDD		1		
			Config 3	CR2.1				
SMTC config in A.3.11.1 aı	uration defined nd A.3.11. 2		Config 1	SMTC.2				
			Config 2, 3		SM	MTC.1		
PDSCH/PDC	CH subcarrier	kHz	Config 1,2			15		
spacing	•••••••••••••		Config 3			30		
	f PSS to SSS							
	f PBCH DMRS		-					
	f PBCH to PBCH		-					
DMRS]					
EPRE ratio o to SSS	f PDCCH DMRS							
EPRE ratio o PDCCH DMF			Config 1,2,3	()		0	
EPRE ratio o	f PDSCH DMRS							
to SSS EPRE ratio o	f PDSCH to							
PDSCH]					
EPRE ratio o to SSS(Note	f OCNG DMRS 1)							
EPRE ratio o	f OCNG to							
N_{oc} Note2	O (INOIG T)	dBm/15		-98 -98		-98		
$\overline{N_{oc}}^{ ext{Note2}}$		kHz dBm/S	Config 1,2	-98 -98		-98		
1 V OC		CS	Config 3	-95		+	-95	
SS-RSRP Note	2 3	dBm/S	Config 1,2	-94	-94	-Infinity	-91	
		CS	Config 3	-91	-91	-Infinity	-88	
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		dB	Config	4	4	-Infinity	7	
s / ot			1,2,3,4,5,6					

\hat{E}_s/N_{oc}	dB	Config 1,2,3	4	4	-Infinity	7
IO ^{Note3}	dBm/9.3 6MHz	Config 1,2	-64.59	-64.59	-70.05	-62.26
	dBm/38. 16MHz	Config 3	-58.49	-58.49	-63.94	-56.15
Propagation Condition		Config 1,2,3	AWGN AWGN		WGN	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1280 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 13440 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1280 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 13440 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

- 6.6.2.7 Void
- 6.6.2.8 Void

6.6.3 Inter-RAT Measurements

- 6.6.3.0 Minimum conformance requirements
- 6.6.3.0.1 Minimum conformance requirements for inter-RAT event triggered reporting to E-UTRAN FDD

The requirements are applicable for NR-E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements.

In the requirements, an E-UTRAN FDD cell is considered to be detectable when:

- RSRP related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],
- RSRQ related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],
- RS-SINR related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.19 of TS 36.133 [23].

6.6.3.0.1.1 Requirements when no DRX is used

When the UE requires measurement gaps to identify and measure inter-RAT cells and an appropriate measurement gap pattern is scheduled, the UE shall be able to identify a new detectable FDD cell within $T_{Identify, E-UTRAN FDD}$ according to the following expression:

$$T_{Identify,E-UTRAN\,FDD} = T_{BasicIdentify} * \frac{480}{T_{Inter1}} * CSSF_{interRAT} \quad ms$$

where:

 $T_{\text{BasicIdentify}} = 480 \text{ ms},$

 T_{Inter1} is defined in TS 38.133 [6] section 9.4.1,

 $CSSF_{interRAT} = CSSF_{within_gap_i_}$ is the scaling factor for the measured inter-RAT E-UTRA carrier i which is calculated as specified in TS 38.133 [6] section 9.1.5.2.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{\text{Measure, E-UTRAN FDD}}$ defined in Table 6.6.3.0.1.1-1.

Table 6.6.3.0.1.1-1: Measurement period and measurement bandwidth

Configuration	Physical Layer Measurement period: T _{Measure,} _{E-UTRAN FDD} [ms]	Measurement bandwidth [RB]				
0	480 x CSSF _{interRAT}	6				
1 (note 1)	240 x CSSF _{interRAT}	50				
NOTE 1: This co	NOTE 1: This configuration is optional.					

The UE shall be capable of identifying and performing NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements of at least 4 E-UTRAN FDD cells per E-UTRA FDD carrier frequency layer for up to 7 E-UTRA FDD carrier frequency layers.

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN FDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.2. The NR – E-UTRAN FDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.3. The NR – E-UTRAN FDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.5.

6.6.3.0.1.2 Requirements when DRX is used

When DRX is in use and measurement gaps are configured, the UE shall be able to identify a new detectable E-UTRAN FDD cell within $T_{Identify, E-UTRAN FDD}$ specified in Table 6.6.3.0.1.2-1.

Table 6.6.3.0.1.2-1: Requirement to identify a newly detectable E-UTRAN FDD cell

DRX cycle length (s)	T _{Identify, E-UTRAN FDD} (s) (DRX cycles)				
	Gap period = 40 ms, 20 ms	Gap period = 80 ms			
≤0.16	Non-DRX requirements in	Non-DRX requirements in			
	Section 6.6.3.0.1.1 apply	Section 6.6.3.0.1.1 apply			
0.256	5.12*K (20*CSSF _{interRAT})	7.68*K (30*CSSF _{interRAT})			
0.32	6.4*K (20*CSSF _{interRAT})	7.68*K (24*CSSF _{interRAT})			
0.32< DRX-cycle ≤10.24	Note1 (20*CSSF _{interRAT})	Note1 (20*CSSF _{interRAT})			
NOTE 1: The time depends on the DRX cycle length.					
NOTE 2: CSSF _{interRAT} is a	s defined in Section 6.6.3.0.1.1.				

When DRX is in use, the UE shall be capable of performing NR - E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements of at least 4 identified E-UTRAN FDD cells per E-UTRA FDD frequency layer during each layer 1 measurement period, for up to 7 E-UTRA FDD carrier frequency layers, and the UE physical layer shall be capable of reporting NR - E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period $T_{\text{measure}, E-UTRAN FDD}$ specified in Table 6.6.3.0.1.2-2.

Table 6.6.3.0.1.2-2: Requirement to measure E-UTRAN FDD cells

DRX cycle length (s)	T _{measure, E-UTRAN FDD} (s) (DRX cycles)				
≤0.08	Non-DRX requirements in Section 6.6.3.0.1.1 apply				
0< DRX-cycle ≤10.24	Note1 (5* CSSF _{interRAT})				
NOTE 1: The time depends on the DRX cycle length.					
NOTE 2: CSSF _{interRAT} is as defined in Section 6.6.3.0.1.1.					

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN FDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.2. The NR – E-UTRAN FDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.3. The NR – E-UTRAN FDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.5.

6.6.3.0.1.3 Measurement reporting requirements for Event-Triggered Reporting

The reported NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements contained in event-triggered measurement reports shall meet the requirements in TS 38.133 [6] sections 10.2.2, 10.2.3, and 10.2.5, respectively.

The UE shall not send any event-triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times \text{TTI}_{\text{DCCH}}$ where TTI_{DCCH} is the duration of subframe or slot or subslot when the measurement report is transmitted on the PUSCH with subframe or slot or subslot duration. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T $_{\text{Identify, E-UTRAN FDD}}$ defined in sections 6.6.3.0.1.1 and 6.6.3.0.1.2 without DRX and with DRX, respectively. When L3 filtering is used, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{Identify, E-UTRAN FDD}}$ becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event as per TS 38.331 [13], the event triggered measurement reporting delay shall be less than $T_{\text{Measure, E-UTRAN FDD}}$ provided the timing to that cell has not changed more than \pm 50 Ts while measurement gap has not been available and the L3 filter has not been used.

The normative reference for this requirement is TS 38.133 [6] clause 9.4.2.

6.6.3.0.2 Minimum conformance requirements for inter-RAT event triggered reporting to E-UTRAN TDD

The requirements are applicable for NR-E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements.

In the requirements, an E-UTRAN TDD cell is considered to be detectable when:

- RSRP related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],
- RSRQ related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],
- RS-SINR related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.19 of TS 36.133 [23].

6.6.3.0.2.1 Requirements when no DRX is used

When the UE requires measurement gaps to identify and measure inter-RAT cells and an appropriate measurement gap pattern is scheduled, the UE shall be able to identify a new detectable TDD cell within $T_{\text{Identify, E-UTRAN TDD}}$ according to the following expression:

- When configuration 0 or configuration 1 in Table 6.6.3.0.2-1 is applied,

$$T_{Identify,E-UTRAN\,TDD} = T_{BasicIdentify} * \frac{490}{T_{Inter1}} * CSSF_{interRAT} \quad ms$$
 ,

- When configuration 2 or configuration 3 in Table 6.6.3.0.2-1 is applied,

$$T_{Identify,E-UTRANTDD} = (T_{BasicIdentify} * \frac{480}{T_{Inter1}} + 240) * CSSF_{interRAT} ms$$

where:

 $T_{\text{BasicIdentify}} = 480 \text{ ms},$

 T_{Inter1} is defined in TS 38.133 [6] section 9.4.1,

 $CSSF_{interRAT} = CSSF_{within_gap_i_}$ is the scaling factor for the measured inter-RAT E-UTRA carrier i which is calculated as specified in TS 38.133 [6] section 9.1.5.2.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of $T_{\text{Measure, E-UTRAN TDD}}$ defined in Table 6.6.3.0.2.1-1.

Table 6.6.3.0.2.1-1: T_{Measure, E-UTRAN TDD} for different configurations

Configuration	Measurement bandwidth	Number of UL/DL sub- frames per half frame (5 ms)		DwPTS		T _{Measure, E-UTRAN TDD} [ms]		
	[RB]	DL	UL	Normal CP	Extende d CP			
0	6	2	2	19760 ·T _s	20480 ·T _s	480 x CSSF _{interRAT}		
1 (note 1)	50	2	2	19760 ·T _s	20480 ·T _s	240 x CSSF _{interRAT}		
NOTE 1: This c	NOTE 1: This configuration is optional.							

The UE shall be capable of identifying and performing NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements of at least 4 E-UTRAN TDD cells per E-UTRA TDD carrier frequency layer for up to 7 E-UTRA TDD carrier frequency layers.

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN TDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.2. The NR – E-UTRAN TDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.3. The NR – E-UTRAN TDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.5.

6.6.3.0.2.1 Requirements when DRX is used

When DRX is in use and measurement gaps are configured, the UE shall be able to identify a new detectable E-UTRAN TDD cell within $T_{Identify, E-UTRAN TDD}$ specified in Table 6.6.3.0.2.1-1.

Table 6.6.3.0.2.1-1: Requirement to identify a newly detectable E-UTRAN TDD cell

DRX cycle length (s)	T _{Identify, E-UTRAN TDD} (s) (DRX cycles)						
	Gap period = 40 ms, 20 ms	Gap period = 80 ms					
≤0.16	Non-DRX requirements in	Non-DRX requirements in					
	Section 6.6.3.0.2.1 apply	Section 6.6.3.0.2.1 apply					
0.256	5.12*K (20*CSSF _{interRAT})	7.68*K (30*CSSF _{interRAT})					
0.32	6.4*K (20*CSSF _{interRAT})	7.68*K (24*CSSF _{interRAT})					
0.32< DRX-cycle <10.24 Note1 (20*CSSF _{interRAT}) Note1 (20*CSSF _{interRAT})							
NOTE 1: The time depends on the DRX cycle length.							
NOTE 2: CSSF _{interRAT} is as	NOTE 2: CSSF _{interRAT} is as defined in Section 6.6.3.0.2.1.						

When DRX is in use, the UE shall be capable of performing NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements of at least 4 identified E-UTRAN TDD cells per E-UTRA TDD frequency layer during each layer 1 measurement period, for up to 7 E-UTRA TDD carrier frequency layers, and the UE physical layer shall be capable of reporting NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period $T_{\text{measure}, E-UTRAN TDD}$ specified in Table 6.6.3.0.2.1-2.

Table 6.6.3.0.2.1-2: Requirement to measure E-UTRAN TDD cells

DRX cycle length (s)	T _{measure, E-UTRAN TDD} (s) (DRX cycles)			
≤0.08	Non-DRX Requirements in Section 6.6.3.0.2.1			
	apply			
0.128	For configuration 2, non-DRX requirements in			
	section 6.6.3.0.2.1 apply,			
	Otherwise: Note1 (5*CSSF _{interRAT})			
0.128 <drx-cycle≤10.24< td=""><td>Note1 (5*CSSF_{interRAT})</td></drx-cycle≤10.24<>	Note1 (5*CSSF _{interRAT})			
NOTE 1: The time depends on the DRX cycle length.				
NOTE 2: CSSF _{interRAT} is as defined in Section 6.6.3.0.2.1.				

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR - E-UTRAN TDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.2. The NR - E-UTRAN TDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.3. The NR - E-UTRAN TDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.5.

6.6.3.0.2.3 Measurement reporting requirements for Event-Triggered Reporting

The reported NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements contained in event-triggered measurement reports shall meet the requirements in TS 38.133 [6] sections 10.2.2, 10.2.3, and 10.2.5, respectively.

The UE shall not send any event-triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times \text{TTI}_{\text{DCCH}}$ where TTI_{DCCH} is the duration of subframe or slot or subslot when the measurement report is transmitted on the PUSCH with subframe or slot or subslot duration. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T Identify, E-UTRAN TDD defined in sections 6.6.3.0.2.1 and 6.6.3.0.2.2 without DRX and with DRX, respectively. When L3 filtering is used, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{\text{Identify, E-UTRAN TDD}}$ becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event as per TS 38.331 [13], the event triggered measurement reporting delay shall be less than $T_{\text{Measure, E-UTRAN TDD}}$ provided the timing to that cell has not changed more than \pm 50 Ts while measurement gap has not been available and the L3 filter has not been used.

The normative reference for this requirement is TS 38.133 [6] clause 9.4.3.

6.6.3.1 NR SA FR1 – E-UTRAN event-triggered reporting in non-DRX

Editor's notes: This test case is incomplete. The following aspects are either missing or TBD.

- Test tolerance analysis is missing.

6.6.3.1.1 Test purpose

This test is to verify that the UE makes correct event-triggered reporting of inter-RAT E-UTRAN measurements when operating in standalone (SA) operation with PCell in FR1 under the cell search and measurement requirements.

6.6.3.1.2 Test applicability

This test applies to all types of NR UE supporting SA FR1 from Release 15 onwards.

6.6.3.1.3 Minimum conformance requirements

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.3.1.

6.6.3.1.3.1 NR – E-UTRAN FDD requirement

The minimum conformance requirements are specified in clause 6.6.3.0.1.

6.6.3.1.3.2 NR – E-UTRAN TDD requirement

The minimum conformance requirements are specified in clause 6.6.3.0.2.

6.6.3.1.4 Test description

6.6.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.3.1.4.1-1.

Table 6.6.3.1.4.1-1: supported test configurations

Test Case ID	Description			
6.6.3.1-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD			
6.6.3.1-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD			
6.6.3.1-3	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD			
6.6.3.1-4	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD			
6.6.3.1-5	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD			
6.6.3.1-6	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD			
NOTE: The U	NOTE: The UE is only required to be tested in one of the supported test configurations			

Configure the test equipment and the DUT according to the parameters in Table 6.6.3.1.4.1-2 and Table 6.6.3.1.4.1-3.

Table 6.6.3.1.4.1-2: Initial conditions for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell in FR1

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] sclause 4.3.1.			
Channel	As specified by the test configuration selected from Table 6.6.3.1.5-1 and Table 6.6.3.1.5-2			
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2.	
conditions				
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	A.3.2.3.1		
Exceptions to	N/A			
connection				
diagram				

Table 6.6.3.1.4.1-3: General test parameters for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell in FR1

Parameter	Unit	Value	Comment
NR RF Channel Number		1	1 NR carrier frequency is used in the test
LTE RF Channel Number		1	1 LTE carrier frequency is used in the test
Channel Bandwidth	MHz	As specified in Tables	
		6.6.3.1.5-1 and	
		6.6.3.1.5-2.	
Active cell		Cell 1	Cell 1 is on RF channel number 1
Neighbour cell		Cell 2	Cell 2 is on RF channel number 2
Gap Pattern Id		0	As specified in Clause TS 38.133 [6] Table
			9.1.2-1. Per-UE gap pattern.
NR measurement quantity		SS-RSRP	Measurement quantity for Cell 1
Inter-RAT E-UTRAN		RSRP	Measurement quantity for Cell 2
measurement quantity			
b2-Threshold1	dBm	Note 1	SS-RSRP threshold for SS-RSRP
			measurement on cell1 for event B2
b2-Threshold2EUTRA	dBm	-95	E-UTRAN RSRP threshold for SS-RSRP
			measurement on cell1 for event B2
Hysteresis	dB	0	
TimeToTrigger	S	0	
Filter coefficient		0	L3 filtering is not used
DRX		OFF	OFF
T1	S	5	
T2	S	5	
NOTE 1: Values are define	ed in Table 6	.6.3.1.5-1	

- 1. Message contents are defined in clause 6.6.3.1.4.3.
- 2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.6.3.1.4.2 Test procedure

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. Gap pattern configuration is configured before T2 begins to enable inter-frequency monitoring.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.3.1.5-1 and 6.6.3.1.5-2. Propagation conditions are set according to Annex C clause C.2.2.T1 starts.
- 3. SS shall transmit an *RRCReconfiguration* message.

- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.3.1.5-1 and 6.6.3.1.5-2.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2. If the measurement reporting delay from the beginning of time period T2 is less than 3842ms the number of successful tests is increased by one. If the UE fails to report the event within the measurement reporting delay requirement then the number of failure tests is increased by one.
- 7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall transmit a *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED according to TS 38.508-1 [14] clause 4.5.4 (if the paging fails, switches off and on the UE and ensures the UE is in the state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5, or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10.Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.3.1.4.3-1: Common Exception messages NR SA FR1 – E-UTRAN event-triggered reporting in non-DRX

Default Message Contents				
Common contents of system information blocks				
exceptions				
Default RRC messages and information	Table H.3.1-1			
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-RAT			
	Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 1 and			
	Asynchronous cells cells for configuration 6.6.3.1-1, 6.6.3.1-2, 6.6.3.1-			
	4, 6.6.3.1-5			
	Table H.3.1-3 with Condition SSB.1 FR2, SMTC pattern 1 and			
	Asynchronous cells cells for configuration 6.6.2.1-3, 6.6.3.1-6			
	Table H.3.1-3A			
	Table H.3.1-4A			
	Table H.3.1-5 with Condition INTER-RAT			
	Table H.3.1-6 with Condition Pattern #0			
	Table H.3.1-7 with Condition INTER-RAT			

6.6.3.1.5 Test requirement

Table 6.6.3.1.5-1 and Table 6.6.3.1.5-2 defines the primary level settings including test tolerances for all tests.

Table 6.6.3.1.5-1: PCell specific test parameters for SA inter-RAT E-UTRA event triggered reporting in non-DRX with PCell in FR1

Parameter		Unit	Configuration	Cell 1	
			100150	T1	T2
RF channel number			1, 2, 3, 4, 5, 6		1
Duplex mode			1, 2, 3		FDD
TDD 055 200 45.00			4, 5, 6		TDD
TDD Configuration SCS=15 KHz			2, 5		Conf.1.1
DIM	SCS=30 KHz		3, 6		Conf.2.1
BW _{channel}		MHz	1, 4		c = 52 (FDD)
			2, 5		c = 52 (TDD)
DD 0011 /			3, 6		= 106 (TDD)
PDSCH reference	measurement		1, 4		1.1 FDD
channel			2, 5	SR.1.1 TDD	
			3, 6		2.1 TDD
CORSET reference	ce channel		1, 4		1.1 FDD
			2, 5	CR.1.1 TDD CR.2.1 TDD	
			3, 6		
BWP	Initial DL BWP		1, 2, 3, 4, 5, 6		BWP.0.1
configurations	Dedicated DL BWP		1, 2, 3, 4, 5, 6		BWP.1.1
	Initial UL BWP		1, 2, 3, 4, 5, 6		BWP.0.1
	UL BWP		1, 2, 3, 4, 5, 6	ULI	BWP.1.1
OCNG pattern notes	<u> </u>		1, 2, 3, 4, 5, 6		OP.1
SMTC configuration			1, 2, 3, 4, 5, 6	S	MTC.1
SSB configuration			1, 2, 4, 5	SS	B.1 FR1
			3, 6	SS	B.2 FR1
b2-Threshold1		dBm	1, 2, 4, 5	-96	
		UDIII	3, 6	-93	
EPRE ratio of PSS	S to SSS		1, 2, 3, 4, 5, 6		
EPRE ratio of PB0	CH_DMRS to SSS				
EPRE ratio of PB0	CH to PBCH_DMRS				
EPRE ratio of PD0	CCH_DMRS to SSS				
EPRE ratio of PD0	CCH to				
PDCCH_DMRS		dB		0	
EPRE ratio of PDS	SCH_DMRS to SSS				
EPRE ratio of PDS	SCH to				
PDSCH_DMRS					
EPRE ratio of OCNG DMRS to SSS					
EPRE ratio of OC	NG to OCNG DMRS				
N _{oc} note2		dBm/15 KHz	1, 2, 3, 4, 5, 6	-104+TT	
N _{oc} note2	<u> </u>	dBm/SCS	1, 2, 4, 5	-1	.04+TT
			3, 6	-1	.01+TT
Ê _s /N _{oc}		dB	1, 2, 3, 4, 5, 6	16+TT	0+TT
Ê _s /I _{ot} note3		dB	1, 2, 3, 4, 5, 6	16+TT	0+TT
SS-RSRP note3	<u> </u>	dBm/SCS	1, 2, 4, 5	-88+TT	-104+TT
			3, 6	-85+TT	-101+TT
SSB_RP note3		dBm/SCS	1, 2, 4, 5	-88+TT	-104+TT
_			3, 6	-85+TT	-101+TT
		dBm/9.36 MHz	1, 2, 4, 5	-59.94+TT	-73.04+TT
lo note3		dBm/38.16 MHz	3, 6	-53.84+TT	-66.93+TT
Propagation condi	ition		1, 2, 3, 4, 5, 6	TDLA30	
	ation and Correlation		1, 2, 3, 4, 5, 6		
Matrix	and Corrolation		±, =, 0, ¬, 0, 0	1,	

NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

NOTE 3: \hat{E}_s/I_{ot} , SS-RSRP, SSB_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.6.3.1.5-2: E-UTRAN neighbour cell specific test parameters for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell in FR1

Parameter	Unit	Configuratio	Cell 2		
		n	T1 T2		
RF channel number		1, 2, 3, 4, 5, 6	2	12	
Duplex mode		1, 2, 3	FDD		
4, 5, 6 TDD					
TDD special subframe		4, 5, 6	6		
configuration note1		1, 0, 0	G		
TDD uplink-downlink configuration	า	4, 5, 6	1		
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5MHz: N _{RB,c} = 25		
			10MHz: N _{RB}		
			20MHz: N _{RB,}		
PDSCH parameters:		1, 2, 3	5MHz: R.7		
DL Reference Measurement			10MHz: R.3	B FDD	
Channel note2			20MHz: R.6 FDD		
		4, 5, 6	5MHz: R.4 TDD		
			10MHz: R.0) TDD	
			20MHz: R.3 TDD		
PCFICH/PDCCH/PHICH		1, 2, 3	5MHz: R.11	. FDD	
parameters:			10MHz: R.6	S FDD	
DL Reference Measurement			20MHz: R.1	0 FDD	
Channel note2		4, 5, 6	5MHz: R.11	LTDD	
			10MHz: R.6	S TDD	
			20MHz: R.1	0 TDD	
OCNG Patterns note2		1, 2, 3	5MHz: OP.2	0 FDD	
			10MHz: OP.1	LO FDD	
			20MHz: OP.17 FDD 5MHz: OP.9 TDD 10MHz: OP.1 TDD		
		4, 5, 6			
			20MHz: OP.	7 TDD	
PBCH_RA		1, 2, 3, 4, 5, 6			
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB	dB		0		
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA note3					
OCNG_RB note3					
N _{oc} note4	dBm/15kHz	1, 2, 3, 4, 5, 6	-104+TT		
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	17+TT	
Ê _s /I _{ot} note5	dB	1, 2, 3, 4, 5, 6	-Infinity	17+TT	
RSRP note5	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87+TT	
SCH_RP note5	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87+TT	
lo ^{note5}	dBm/9MHz	1, 2, 3, 4, 5, 6	-76.22+10log (N _{RB,c} /50) +TT	-59.13+10log (N _{RB,}	
Propagation Condition not 6		1, 2, 3, 4, 5, 6	ETU70		
Antenna Configuration and		1, 2, 3, 4, 5, 6	1x2 Low		
Afficilia Cofficulation and			INE LOW		

NOTE 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].

NOTE 2: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 [23] respectively.

- NOTE 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- NOTE 5: Ê₃/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- NOTE 6: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27].

NOTE 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

The UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 3842ms from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event-triggered measurement reports as long as the reporting criteria is not fulfilled.

The overall delays measured test requirement is expressed as:

```
\begin{split} &T_{identify,E\text{-}UTRAN\,FDD} = T_{BasicIdentify} *480 \ / \ T_{Inter1} *CSSF_{interRAT} \ ms \\ &Which: \\ &T_{BasicIdentify} = 480, \\ &T_{Inter1} = 60, \\ &CSSF_{interRAT} = 1 \end{split}
```

TTI insertion uncertainty = TTI_{DCCH} = 1 ms; $2xTTI_{DCCH}$ = 2 ms

The overall delays measured shall be less than a total of 3842 ms in this test case (note: this gives a total of 3840 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The rate of correct events observed during repeated tests shall be at least 90% with confidence level of 95%.

6.6.3.2 NR SA FR1 – E-UTRAN event-triggered reporting in DRX

6.6.3.2.1 Test purpose

This test is to verify that the UE makes correct event-triggered reporting of inter-RAT E-UTRAN measurements when operating in standalone (SA) operation with PCell in FR1 when DRX is used under the cell search and measurement requirements.

6.6.3.2.2 Test applicability

This test applies to all types of NR UE supporting SA FR1 from Release 15 onwards.

6.6.3.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clauses 6.6.3.0.3 and 6.6.3.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.3.2.

6.6.3.2.4 Test description

6.6.3.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.3.2.4.1-1.

Table 6.6.3.2.4.1-1: Supported test configurations in SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

Test Case ID	Description
6.6.3.2-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD
6.6.3.2-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD
6.6.3.2-3	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD
6.6.3.2-4	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD
6.6.3.2-5	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD
6.6.3.2-6	NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD
NOTE: The U	JE is only required to be tested in one of the supported test configurations

Configure the test equipment and the DUT according to the parameters in Table 6.6.3.2.4.1-2 and Table 6.6.3.2.4.1-3.

Table 6.6.3.2.4.1-2: Initial conditions for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.1-1 and TS 38.	508-1 [14] sclause 4.3.1.
Channel bandwidth	As specified	rom Table 6.6.3.2.4.1-1.	
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.1	
Exceptions to connection diagram	N/A		

Table 6.6.3.2.4.1-3: General test parameters for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

Parameter	Unit	Va	lue	Comment
NR RF Channel Number		1		1 NR carrier frequency is used in the test
LTE RF Channel Number		2		1 LTE carrier frequency is used in the test
Channel Bandwidth	MHz	As specified in Tables 6.6.3.2.5-1 and 6.6.3.2.5-2.		
Active cell		Cell 1		Cell 1 is on RF channel number 1
Neighbour cell		Cell 2		Cell 2 is on RF channel number 2
Gap Pattern Id		0		As specified in Clause TS 38.133 [6] Table 9.1.2-1. Per-UE gap pattern.
NR measurement quantity		SS-RSRP		Measurement quantity for Cell 1
Inter-RAT E-UTRAN measurement quantity		RSRP		Measurement quantity for Cell 2
b2-Threshold1	dBm	note 1		SS-RSRP threshold for SS-RSRP measurement on cell1 for event B2
b2-Threshold2EUTRA	dBm	-97		E-UTRAN RSRP threshold for SS-RSRP measurement on cell1 for event B2
Hysteresis	dB	0		
TimeToTrigger	S	0		
Filter coefficient		0		L3 filtering is not used
DRX		DRX.1	DRX.2	DRX cycle configurations DRX.1 and DRX.2 are defined in Table A.3.3.1-1 and Table A.3.3.2-1 respectively.
T1	S	5		
T2	S	5	15	
NOTE 1: Values are define	ed in Table 6	6.3.2.5-1		

1. Message contents are defined in clause 6.6.3.2.4.3.

2. There are two cells: Cell 1 and Cell 2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2, Cell 2 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

6.6.3.2.4.2 Test procedure

In each test there are two cells: Cell 1 and Cell 2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. In the measurement control information from the PCell it is indictated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) is to be used. Each test consists of two consecutive time periods, with durations T1 and T2, respectively. Prior to the start of time duration T1, the UE shall be fully synchronized to Cell 1. During T1, the UE shall not have any information on Cell 2.

In each test the UE shall be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore the UE shall be allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 6.6.3.2.5-1 and 6.6.3.2.5-2. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 6.6.3.2.5-1 and 6.6.3.2.5-2. T2 starts.
- 6. UE shall transmit a MeasurementReport message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than 3.48 s for Test 1 or less than 12.8 s for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. The SS shall set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code 50) mod 200 + 100) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.3.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.3.2.4.3-1: Common Exception messages NR SA FR1 – E-UTRAN event-triggered reporting in DRX

De	Default Message Contents				
Common contents of system information blocks					
exceptions					
Default RRC messages and information	Table H.3.1-1				
elements contents exceptions	Table H.3.1-2 with Conditions GAP NEEDED and INTER-RAT				
	Table H.3.1-3 with Condition SSB.1 FR1 and Asynchronous cells cells				
	for configuration 6.6.3.2-1, 6.6.3.2-2, 6.6.3.2-4, 6.6.3.2-5				
	Table H.3.1-3 with Condition SSB.1 FR2 and Asynchronous cells cells				
	for configuration 6.6.2.2-3, 6.6.3.2-6				
	Table H.3.1-3A				
	Table H.3.1-4A				
	Table H.3.1-5 with Condition INTER-RAT				
	Table H.3.1-6 with Condition Pattern #0				
	Table H.3.1-7 with Condition INTER-RAT				
	Table H.3.7-1 with Condition DRX.1 for Test 1				
	Table H.3.7-1 with Condition DRX.2 for Test 2				

FFS

6.6.3.2.5 Test requirement

Table 6.6.3.2.5-1 and Table 6.6.3.2.5-2 defines the primary level settings including test tolerances for all tests.

Table 6.6.3.2.5-1: PCell specific test parameters for SA inter-RAT E-UTRA event triggered reporting in DRX with PCell in FR1

Parameter	Unit	Configuration	(Cell 1
			T1	T2

RF channel number			1, 2, 3, 4, 5, 6		1
Duplex mode			1, 2, 3	F	DD
			4, 5, 6	Т	DD
TDD Configuration	SCS=15 KHz		2, 5	TDDO	Conf.1.1
· ·	SCS=30 KHz		3, 6	TDDC	Conf.2.1
BW _{channel}	'	MHz	1, 4	10: N _{RB.c}	= 52 (FDD)
			2, 5		= 52 (TDD)
			3, 6		= 106 (TDD)
PDSCH reference	measurement		1, 4		.1 FDD
channel			2, 5		.1 TDD
			3, 6		.1 TDD
CORSET reference	channel		1, 4		.1 FDD
CONSET Telefolice	Cilamici		2, 5		.1 TDD
			3, 6		.1 TDD
BWP	Initial DL BWP		1, 2, 3, 4, 5, 6		WP.0.1
configurations					
comigurations	Dedicated DL BWP		1, 2, 3, 4, 5, 6		WP.1.1
-	Initial UL BWP		1, 2, 3, 4, 5, 6		WP.0.1
OONIC U Note1	Dedicated UL BWP		1, 2, 3, 4, 5, 6		WP.1.1
OCNG pattern ^{Note1}			1, 2, 3, 4, 5, 6		P.1
SMTC configuration	n		1, 2, 3, 4, 5, 6		ITC.1
SSB configuration			1, 2, 4, 5		.1 FR1
			3, 6		.2 FR1
b2-Threshold1		dBm	1, 2, 4, 5		·98
		abiii	3, 6	-	·95
EPRE ratio of PSS to SSS			1, 2, 3, 4, 5, 6		
EPRE ratio of PBC	H_DMRS to SSS				
EPRE ratio of PBC	H to PBCH_DMRS				
EPRE ratio of PDC	CH_DMRS to SSS				
EPRE ratio of PDC	CH to				
PDCCH DMRS		dB			0
EPRE ratio of PDS	CH DMRS to SSS				
EPRE ratio of PDS					
PDSCH DMRS					
EPRE ratio of OCN	IG DMRS to SSS				
	IG to OCNG DMRS	_			
N _{oc} ^{Note2}		dBm/15 KHz	1, 2, 3, 4, 5, 6		106
		dBm/SCS	1, 2, 4, 5		106
N_{oc}^{Note2}		ubiii/000	3, 6	-103	
Ê _s /N _{oc}		dB	1, 2, 3, 4, 5, 6	19.65	-3.65
Ê _s /I _{ot} Note3		dB	1, 2, 3, 4, 5, 6	19.65	-3.65
SS-RSRP ^{Note3}		dBm/SCS	1, 2, 3, 4, 5, 0	-86.35	-109.65
JJ-NJNF		ubiii/3C3	3, 6	-83.35	-109.65
SSB_RP ^{Note3}		dPm/CCC			
22R_Kh		dBm/SCS	1, 2, 4, 5	-86.35	-109.65
		-ID /O CC	3, 6	-83.35	-106.65
lo ^{Note3}		dBm/9.36 MHz	1, 2, 4, 5	-58.35	-76.49
10		dBm/38.16 MHz	3, 6	-52.25	-70.39
Propagation condit	ion	1411 17	1, 2, 3, 4, 5, 6	TD	Ι Δ30
	tion and Correlation			TDLA30 1x2 Low	
Matrix			1, 2, 3, 4, 5, 6		
Note 1: OCNIC o	خمطه طمييم لمممير مطالمط	both calle are fully	vallageted and a ser	actant total trans	asitta d. m. a a

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: \hat{E}_s/I_{ot} , SS-RSRP, SSB_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 6.6.3.2.5-2: E-UTRAN neighbour cell specific test parameters for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

Parameter	Unit	Configuratio n	Cell 2	
		••	T1	T2

55		1 2 2 4 5 2			
RF channel number		1, 2, 3, 4, 5, 6	2		
Duplex mode	Duplex mode 1		FDD		
		4, 5, 6	TDD		
TDD special subframe	ecial subframe		6		
configuration ^{Note1}		4, 5, 6			
TDD uplink-downlink		4, 5, 6	1		
configuration ^{Note1}		., 0, 0	_		
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5MHz: N _{rb,c}	- 25	
Channel	IVII IZ	1, 2, 3, 4, 3, 0	10MHz: N _{RB,c}		
DDCCII		1.0.0	20MHz: N _{RB,c} 5MHz: R.7		
PDSCH parameters:		1, 2, 3	• • • • • • • • • • • • • • • • • • • •		
DL Reference Measurement			10MHz: R.3		
Channel ^{Note2}			20MHz: R.6		
		4, 5, 6	5MHz: R.4		
			10MHz: R.0	TDD	
			20MHz: R.3	TDD	
PCFICH/PDCCH/PHICH		1, 2, 3	5MHz: R.11	FDD	
parameters:			10MHz: R.6	FDD	
DL Reference Measurement			20MHz: R.10) FDD	
Channel ^{Note2}		4, 5, 6	5MHz: R.11		
		1, 0, 0	10MHz: R.6		
			20MHz: R.10		
OCNG Patterns ^{Note2}		1, 2, 3	5MHz: OP.20		
OCING Patterns		1, 2, 3			
			10MHz: OP.1		
			20MHz: OP.1		
		4, 5, 6	5MHz: OP.9		
			10MHz: OP.:		
			20MHz: OP.	7 TDD	
PBCH_RA		1, 2, 3, 4, 5, 6			
PBCH_RB					
PSS RA					
SSS RA					
PCFICH RB					
PHICH RA					
PHICH RB	dB		0		
	ub		0		
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA ^{Note3}					
OCNG_RB ^{Note3}					
N _{oc} Note4	dBm/15kHz	1, 2, 3, 4, 5, 6	-106		
Ês/Noc	dB	1, 2, 3, 4, 5, 6	-Infinity	20.65	
Ê _s /I _{ot} ^{Note5}	dB	1, 2, 3, 4, 5, 6	-Infinity	20.65	
RSRP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-85.35	
SCH RP ^{Note5}					
	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-85.35	
IO ^{Note5}	dBm/9MHz	1, 2, 3, 4, 5, 6	-78.22+10log (N _{RB,c} /50)	-57.53+10log (N _{RB,c} /50)	
Propagation Condition Note6		1, 2, 3, 4, 5, 6	ETU70		
Antenna Configuration and		1, 2, 3, 4, 5, 6	1x2 Low		
Correlation Matrix Note6		, , , , , , , , ,			
		L			

Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211.

Note 2: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 respectively.

Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 5: Ê_s/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 6: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27].

In test 1, the UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 3.84s from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

In test 2, the UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 12.8s from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

The UE shall not send event-triggered measurement reports as long as the reporting criteria is not fulfilled.

The rate of correct events observed during repeated tests shall be at least 90%.

6.6.4 L1-RSRP measurement for beam reporting

6.6.4.0 Minimum conformance requirements

TBD

6.6.4.1 NR SA FR1 SSB-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Message content is TBD
- Test procedure is TBD
- Minimum conformance requirements are TBD

6.6.4.1.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.1.2 Test applicability

This test applies to all types of NR UE release 15 and forward.

6.6.4.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause TBD

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.1.

6.6.4.1.4 Test description

6.6.4.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.1.4.1-2. Test environment parameters are given in Table 6.6.4.1.4.1-3.

Table 6.6.4.1.4.1-1: NR SA SSB based L1-RSRP measurement supported test configurations

Test Case ID	Description	
6.6.4.1-1	NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode	
6.6.4.1-2	NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode	
6.6.4.1-3	NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations		

Table 6.6.4.1.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Config	Unit	Value
SSB GSCN	1~3		freq1
	1		FDD
Duplex mode	2		TDD
	3		TDD
	1		N/A
TDD Configuration	2		TDDConf.1.1
	3		TDDConf.2.1
	1		10: N _{RB,c} = 52
BW _{channel}	2	MHz	10: N _{RB,c} = 52
	3		40: N _{RB,c} = 106
PDSCH Reference measurement	1		SR.1.1 FDD
channel	2		SR.1.1 TDD
chamer	3		SR.2.1 TDD
RMSI CORESET Reference	1		CR.1.1 FDD
Channel	2		CR.1.1 TDD
Charlie	3		CR.2.1 TDD
Dedicated CORESET Reference	1		CCR.1.1 FDD
Channel	2		CCR.1.1 TDD
Channel	3		CCR.2.1 TDD
	1		SSB.3 FR1
SSB configuration	2		SSB.3 FR1
•	3		SSB.4 FR1
OCNG Patterns	1~3		OP.1
			DLBWP.0.1
Initial BWP Configuration	1~3		ULBWP.0.1
_ , , , , _ , , , , , , , , , , , , , ,			DLBWP.1.1
Dedicated BWP configuration	1~3		ULBWP.1.1
SMTC configuration	1~3		SMTC.1
Civi C coringulation	1		TRS.1.1 FDD
TRS Configuration	2		TRS.1.1 TDD
The Comgaration	3		TRS.1.2 TDD
DRX configuration	1~3		DRX.3
reportConfigType	1~3		periodic
reportQuantity	1~3		ssb-Index-RSRP
Number of reported RS	1~3		2
		olot	
L1-RSRP reporting period	1~3	slot	80
T1	1~3	S	5
T2	1~3	S	1
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS	-		
EPRE ratio of PDCCH DMRS to SSS			
EPRE ratio of PDCCH to PDCCH DMRS	1.2	dD.	0
EPRE ratio of PDSCH DMRS to SSS	1~3	dB	0
EPRE ratio of PDSCH to PDSCH DMRS			
EPRE ratio of OCNG DMRS to SSS ^{Note 1}			
EPRE ratio of OCNG to OCNG DMRS Note 1			
Propagation condition	1~3		AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 6.6.4.1.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified by the test configuration selected from Table 4.6.3.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	For 4Rx capable UEs without any 2 Rx RF		
connection	bands use A.3.2.5.2 for DUT part and		
diagram	A.3.1.8.4 for	TE Part	

- 1. Message contents are defined in clause 6.6.4.1.4.3.
- 2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.1.4.1-2 and 6.6.4.1.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.4.1.4.2 Test procedure

TBD

6.6.4.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.4.1.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

Default Message Contents		
Common contents of system information blocks		
exceptions		
Default RRC messages and information	TBD	
elements contents exceptions		

6.6.4.1.5 Test requirement

Table 6.6.4.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.1.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Parameter Config		Config Unit		SSI	SSB#0		SSB#1	
Farameter	Coming	Offic	T1	T2	T1	T2			
$N_{_{OC}}$ Note2	1~3	dBm/15kHz	-94.65+TT						
N_{oc} Note2	1,2	dBm/SSB SCS		-94.65	+TT				
1V oc	3	ubiii/33b 3C3		-91.65	+TT				
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	1~3	dB	0+TT	0+TT	-Infinity	3+TT			
SSB RSRP Note3	1,2	dBm/SSB SCS	-94.65+TT	-94.65+TT	-Infinity	-91.65+TT			
SSB RSRP	3	UBIII/55B 5C5	-91.65+TT	-91.65+TT	-Infinity	-88.65+TT			
	1,2	dBm/9.36 MHz	-63.69+TT	-63.69+TT	-66.70+TT	-61.93+TT			
Io Note3	3	dBm/38.16 MHz	-57.59+TT	-57.59+TT	-60.61+TT	-55.84+TT			

$\int \hat{E}_s/N_{oc}$:	1~3	dB	0+TT	0+TT	-Infinity	3+TT
Note 1:	Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period						
	T2.						
Note 2:	Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for						
	$oldsymbol{N}_{oc}$ to be fulfilled.						
Note 3:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.						

The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the accuracy requirements as defined in Section 10.1.19.1. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

6.6.4.2 NR SA FR1 SSB-based L1-RSRP measurement in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Message content is TBD
- Test procedure is TBD
- Minimum conformance requirements are TBD

6.6.4.2.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.2.2 Test applicability

This test applies to all types of NR UE release 15 and forward.

6.6.4.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause TBD

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.2.

6.6.4.2.4 Test description

6.6.4.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.2.4.1-2. Test environment parameters are given in Table 6.6.4.2.4.1-3.

Table 6.6.4.2.4.1-1: SA SSB based L1-RSRP measurement supported test configurations

Test Case ID	Description
6.6.4.2-1	NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
6.6.4.2-2	NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
6.6.4.2-3	NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
Note: The UE is only re	quired to be tested in one of the supported test configurations

Table 6.6.4.2.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Config	Unit	Value
SSB GSCN	1~3		freq1
	1		FDD
Duplex mode	2		TDD
Bupiex mode	3		TDD
	1		N/A
TDD Configuration	2		TDDConf.1.1
TDD Configuration	3		
			TDDConf.2.1
DIA	1	N 41 1-	10: N _{RB,c} = 52
BW _{channel}	2	MHz	10: N _{RB,c} = 52
	3		40: N _{RB,c} = 106
PDSCH Reference measurement	1		SR.1.1 FDD
channel	2		SR.1.1 TDD
- CHAINEI	3		SR.2.1 TDD
RMSI CORESET Reference	1		CR.1.1 FDD
	2		CR.1.1 TDD
Channel	3		CR.2.1 TDD
	1		CCR.1.1 FDD
Dedicated CORESET Reference	2		CCR.1.1 TDD
Channel	3		CCR.2.1 TDD
	1		SSB.3 FR1
CCP configuration	2		SSB.3 FR1
SSB configuration			
0010 5 11 11	3		SSB.4 FR1
OCNG Patterns	1~3		OP.1
Initial BWP Configuration	1~3		DLBWP.0.1
			ULBWP.0.1
Dedicated BWP configuration	1~3		DLBWP.1.1
			ULBWP.1.1
SMTC configuration	1~3		SMTC.1
	1		TRS.1.1 FDD
TRS Configuration	2		TRS.1.1 TDD
	3		TRS.1.2 TDD
DRX configuration	1~3		DRX.3
reportConfigType	1~3		periodic
reportQuantity	1~3		ssb-Index-RSRP
Number of reported RS	1~3		2
L1-RSRP reporting period	1~3	slot	80
T1	1~3	S	5
T2	1~3	S	1
EPRE ratio of PSS to SSS	1-3	3	
EPRE ratio of PBCH DMRS to SSS	-		
	-		
EPRE ratio of PBCH to PBCH			
DMRS	4		
EPRE ratio of PDCCH DMRS to			
SSS]		
EPRE ratio of PDCCH to PDCCH			
DMRS	1.2	40	_
EPRE ratio of PDSCH DMRS to	1~3	dB	0
SSS			
EPRE ratio of PDSCH to PDSCH	1		
DMRS			
EPRE ratio of OCNG DMRS to	1		
SSS ^{Note 1}			
EPRE ratio of OCNG to OCNG	1		
DMRS Note 1	1	I	i
Propagation condition	1~3		AWGN

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 6.6.4.2.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified by the test configuration selected from Table 4.6.3.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	For 4Rx capable UEs without any 2 Rx RF		
connection	bands use A	.3.2.5.2 for DUT part and	
diagram	A.3.1.8.4 for	TE Part	

- 1. Message contents are defined in clause 6.6.4.2.4.3.
- 2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.2.4.1-2 and 6.6.4.2.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.4.2.4.2 Test procedure

TBD

6.6.4.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.4.2.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

Default Message Contents				
Common contents of system information blocks				
exceptions				
Default RRC messages and information	TBD			
elements contents exceptions				

6.6.4.2.5 Test requirement

Table 6.6.4.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.2.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Config	Unit	SSI	B#0	SSI	B#1
Parameter	Coming	Offic	T1	T2	T1	T2
$N_{oc}^{ m Note2}$	1~3	dBm/15kHz		-94.65·	+TT	
N_{oc} Note2	1,2	dBm/SSB SCS		-94.65	+TT	
1 voc	3	ubiii/33B 3C3		-91.65·	+TT	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	1~3	dB	0+TT	0+TT	-Infinity	3+TT
SSB RSRP Note3	1,2	dBm/SSB SCS	-94.65+TT	-94.65+TT	-Infinity	-91.65+TT
JOB KOKI	3	ubiii/335 303	-91.65+TT	-91.65+TT	-Infinity	-88.65+TT
lo Note3	1,2	dBm/9.36 MHz	-63.69+TT	-63.69+TT	-66.70+TT	-61.93+TT
10	3	dBm/38.16 MHz	-57.59+TT	-57.59+TT	-60.61+TT	-55.84+TT

\hat{E}_s/N_c	ос	1~3	dB	0+TT	0+TT	-Infinity	3+TT
Note 1: Note 2:	3 · · · · · · · · · · · · · · · · · · ·						
Note 2.	over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{ m ec}$ to be						
	fulfilled.						
Note 3:	SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.						
	are not	i settable para	meters tnemseives.	•			

The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the accuracy requirements as defined in Section 10.1.19.1. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

6.6.4.3 NR SA FR1 CSI-RS-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Message content is TBD
- Test procedure is TBD
- Minimum conformance requirements are TBD

6.6.4.3.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.3.2 Test applicability

This test applies to all types of NR UE release 15 and forward.

6.6.4.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause TBD

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.3.

6.6.4.3.4 Test description

6.6.4.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.3.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.3.4.1-2. Test environment parameters are given in Table 6.6.4.3.4.1-3.

Table 6.6.4.3.4.1-1:NR SA SSB based L1-RSRP measurement supported test configurations

Test Case ID	Description	
6.6.4.3-1	NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode	
6.6.4.3-2	NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode	
6.6.4.3-3	NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations		

Table 6.6.4.3.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Config	Unit	Value
SSB GSCN	1~3		freq1
	1		FDD
Duplex mode	2		TDD
	3	1	TDD
	1		N/A
TDD Configuration	2	1	TDDConf.1.1
	3	1	TDDConf.2.1
	1		10: N _{RB,c} = 52
BW _{channel}	2	MHz	10: N _{RB,c} = 52
	3		40: N _{RB,c} = 106
DDSCH Deference measurement	1		SR.1.1 FDD
PDSCH Reference measurement	2	1	SR.1.1 TDD
channel	3	1	SR.2.1 TDD
	1		CR.1.1 FDD
RMSI CORESET Reference Channel	2	1	CR.1.1 TDD
	3	1	CR.2.1 TDD
	1		CCR.1.1 FDD
Dedicated CORESET Reference	2	1	CCR.1.1 TDD
Channel	3	1	CCR.2.1 TDD
	1		SSB.3 FR1
SSB configuration	2	1	SSB.3 FR1
33B configuration	3		SSB.4 FR1
	1		CSI-RS 1.3 FDD
CSI-RS configuration	2	-	CSI-RS 1.3 TDD
CSI-RS Corniguration	3	-	CSI-RS 2.3 TDD
OCNG Patterns	1~3		OP.1
OCING Patterns			TRS.1.1 FDD
TDC Configuration	1		
TRS Configuration	3		TRS.1.1 TDD
	3		TRS.1.2 TDD
Initial BWP Configuration	1~3		DLBWP.0.1 ULBWP.0.1
Dedicated BWP configuration	1~3		DLBWP.1.1
	1.0		ULBWP.1.1
SMTC configuration	1~3		SMTC.1
DRX configuration	1~3		Off
reportConfigType	1~3		aperiodic
reportQuantity	1~3		cri-RSRP
Number of reported RS	1~3		2
qcl-Info	1~3		SSB#0 for resource#0
•			SSB#1 for resource#1
reportSlotOffsetList	1~3	slots	26
T1	1~3	S	5
EPRE ratio of PSS to SSS	_		
EPRE ratio of PBCH DMRS to SSS			
EPRE ratio of PBCH to PBCH DMRS			
EPRE ratio of PDCCH DMRS to SSS	_		
EPRE ratio of PDCCH to PDCCH			
DMRS]		
EPRE ratio of PDSCH DMRS to SSS	1~3	dB	0
EPRE ratio of PDSCH to PDSCH			
DMRS			
EPRE ratio of OCNG DMRS to SSSNote 1			
	-		
EPRE ratio of OCNG to OCNG DMRS Note 1			
Propagation condition	1~3		AWGN
Note 1: OCNG shall be used such that	at both cells	are fully allo	cated and a constant

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 6.6.4.3.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified by the test configuration selected from Table 4.6.3.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to	For 4Rx capable UEs without any 2 Rx RF		
connection	bands use A	.3.2.5.2 for DUT part and	
diagram	A.3.1.8.4 for	TE Part	

- 1. Message contents are defined in clause 6.6.4.3.4.3.
- 2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.3.4.1-2 and 6.6.4.3.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.4.3.4.2 Test procedure

TBD

6.6.4.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.4.3.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

Default Message Contents			
Common contents of system information blocks			
exceptions			
Default RRC messages and information	TBD		
elements contents exceptions			
·			

6.6.4.3.5 Test requirement

Table 6.6.4.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.3.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Config	Unit	CSI-RS#0	CSI-RS#1
N_{oc} Note1	1~3	dBm/15kHz	-94.65+TT	
N Note1	1,2	dBm/SSB SCS	-94.65+TT	
$N_{oc}^{ m Note1}$	3	UBIII/33B 3C3	-91.65+TT	
$\hat{ ext{E}}_{ ext{s}}/ ext{I}_{ ext{ot}}$	1~3	dB	0+TT	3+TT
CSI-RS RSRP	1,2	dBm/SSB SCS —	-94.65+TT	-91.65+TT
Note2	3		-91.65+TT	-88.65+TT
lo Note2	1,2	dBm/9.36 MHz	-63.69+TT	-61.93+TT
10	3	dBm/38.16 MHz	-57.59+TT	-55.84+TT

\hat{E}_s/N_{oc}		1~3	dB	0+TT	3+TT
Note 1:	Void				
consta			ells and noise sources no s and time and shall be m		
Note 3:			vels have been derived fro settable parameters thems		or information

After 80ms from the beginning of the test, the UE shall send L1-RSRP report at slot 26 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in 10.1.20.1.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

6.6.4.4 NR SA FR1 CSI-RS-based L1-RSRP measurement in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Message content is TBD
- Test procedure is TBD
- Minimum conformance requirements are TBD

6.6.4.4.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.4.2 Test applicability

This test applies to all types of NR UE release 15 and forward.

6.6.4.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause TBD

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.4.

6.6.4.4.4 Test description

6.6.4.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.4.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.4.4.1-2. Test environment parameters are given in Table 6.6.4.4.4.1-3.

Table 6.6.4.4.4.1-1: NR SA SSB based L1-RSRP measurement supported test configurations

Test Case ID	Description
6.6.4.4-1	NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
6.6.4.4-2	NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
6.6.4.4-3	NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
Note: The UE is only	required to be tested in one of the supported test configurations

Table 6.6.4.4.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Config	Unit	Value
SSB GSCN	1~3		freq1
Duplex mode	1		FDD
·	2	1	TDD
	3	İ	TDD
TDD Configuration	1		N/A
3	2	1	TDDConf.1.1
	3	1	TDDConf.2.1
BW _{channel}	1	MHz	10: N _{RB,c} = 52
Chamer	2		10: N _{RB,c} = 52
	3	1	40: N _{RB,c} = 106
PDSCH Reference measurement	1		SR.1.1 FDD
channel	2	1	SR.1.1 TDD
	3	1	SR.2.1 TDD
RMSI CORESET Reference Channel	1		CR.1.1 FDD
TAMOR GOTALGET TREFERENCE GHARMEN	2	1	CR.1.1 TDD
	3	1	CR.2.1 TDD
Dedicated CORESET Reference	1		CCR.1.1 FDD
Channel	2	-	CCR.1.1 TDD
Channel	3		
CCD configuration			CCR.2.1 TDD
SSB configuration	1		SSB.3 FR1
	2		SSB.3 FR1
001.00	3		SSB.4 FR1
CSI-RS configuration	1	ļ	CSI-RS 1.3 FDD
	2		CSI-RS 1.3 TDD
	3		CSI-RS 2.3 TDD
OCNG Patterns	1~3		OP.1
TRS Configuration	1		TRS.1.1 FDD
	2		TRS.1.1 TDD
	3		TRS.1.2 TDD
Initial BWP Configuration	1~3		DLBWP.0.1
			ULBWP.0.1
Dedicated BWP configuration	1~3		DLBWP.1.1
			ULBWP.1.1
SMTC configuration	1~3		SMTC.1
DRX configuration	1~3		DRX.3
reportConfigType	1~3		aperiodic
reportQuantity	1~3		cri-RSRP
Number of reported RS	1~3		2
gcl-Info	1~3		SSB#0 for resource#0
			SSB#1 for resource#1
reportSlotOffsetList	1~3	slots	26
T1	1~3	S	5
EPRE ratio of PSS to SSS	1~3	dB	0
EPRE ratio of PBCH DMRS to SSS	1		
EPRE ratio of PBCH to PBCH DMRS	1		
EPRE ratio of PDCCH DMRS to SSS	1		
EPRE ratio of PDCCH to PDCCH	†		
DMRS			
EPRE ratio of PDSCH DMRS to SSS	†		
EPRE ratio of PDSCH to PDSCH	†		
DMRS			
EPRE ratio of OCNG DMRS to	1		
SSSNote 1	4		
EPRE ratio of OCNG to OCNG DMRS Note 1			
Propagation condition	1~3		AWGN
Note 1: OCNG shall be used such the	at both cells	are fully allo	ocated and a constant

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 6.6.4.4.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.		
Channel bandwidth	As specified by the test configuration selected from Table 4.6.3.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.7.1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to	For 4Rx cap	able UEs without any 2 Rx RF			
connection	bands use A	.3.2.5.2 for DUT part and			
diagram	A.3.1.8.4 for	TE Part			

- 1. Message contents are defined in clause 6.6.4.4.4.3.
- 2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.4.1-2 and 6.6.4.4.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.4.4.4.2 Test procedure

TBD

6.6.4.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.4.4.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

Default Message Contents						
Common contents of system information blocks						
exceptions						
Default RRC messages and information	TBD					
elements contents exceptions						
·						

6.6.4.4.5 Test requirement

Table 6.6.4.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.4.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

Parameter	Config	Unit	CSI-RS#0	CSI-RS#1
N _{oc} Note1	1~3	dBm/15kHz	-94.65+TT	
N_{oc} Note1	1,2	dBm/SSB SCS	-94.65+TT -91.65+TT	
1 oc	3			
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	1~3	dB	0+TT	3+TT
CSI-RS RSRP	1,2	dBm/SSB SCS	-94.65+TT	-91.65+TT
Note2	3		-91.65+TT	-88.65+TT
Io Note2	1,2	dBm/9.36 MHz	-63.69+TT	-61.93+TT
	3	dBm/38.16 MHz	-57.59+TT	-55.84+TT

\hat{E}_s/N_{oc}		1~3	dB	0+TT	3+TT
Note 1:	Void				
Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power N_{ac} to be fulfilled.					
Note 3:	CSI-RS	S RSRP and Io lev	vels have been derived fro settable parameters thems	•	or information

After 80ms from the beginning of the test, the UE shall send L1-RSRP report at slot 26 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in 10.1.20.1.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

6.7 Measurement performance requirements

6.7.1 SS-RSRP

6.7.1.0 Minimum conformance requirements

6.7.1.0.1 Intra-frequency absolute SS-RSRP measurement accuracy requirements Same as in clause 4.7.1.0.1.

6.7.1.0.2 Intra-frequency relative SS-RSRP measurement accuracy requirements Same as in clause 4.7.1.0.2.

6.7.1.0.3 Inter-frequency absolute SS-RSRP measurement accuracy requirements Same as in clause 4.7.1.0.3.

6.7.1.0.4 Inter-frequency relative SS-RSRP measurement accuracy requirements Same as in clause 4.7.1.0.4.

6.7.1.1 Intra-frequency measurements

6.7.1.1.1 NR SA FR1 SS-RSRP absolute measurement accuracy

6.7.1.1.1.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.1.

6.7.1.1.4 Test description

6.7.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.1.4.1-1.

Table 6.7.1.1.1.4.1-1: NR SA FR1 SS-RSRP measurement accuracy supported test configurations

Test Case ID	Description						
6.7.1.1.1-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD						
6.7.1.1.1-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD						
6.7.1.1.1-3 NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD							
Note	Note: The UE is only required to be tested in one of the supported test configurations						

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.1.1.4.1-2.

Table 6.7.1.1.4.1-2: Initial conditions for SS-RSRP intra frequency absolute accuracy in FR1

Parameter	Value			Comment
Test environment	NC, T	_/VL, TL	/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies		As speci	fied in Annex E, Table E.4-2	1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	ļ .	s specif	ied by the test configuration	n selected from Table 6.7.1.1.1.4.1-1.
Propagation conditions		Δ	WGN	As specified in Annex C.2.2.
Connection Diagram	TE Part	2Rx	A.3.1.8.2 with n = 2 and φ_1 = 5 Hz	As specified in TS 38.508-1 [14] Annex A.
		4Rx	A.3.1.8.5 with n = 2 and $\phi_{1,1}$ = 5 Hz, $\phi_{1,2}$ = 10 Hz, $\phi_{1,3}$ = 15 Hz	
	DUT Part		A.3.2.3.4	
Exceptions to connection diagram	- Without LTE	Elink		

- 1. Message contents are defined in clause 6.7.1.1.1.4.3.
- 2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in the same frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.1.4.2 Test procedure

- 1. Ensure the UE is in state RRC_CONNECTED CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to Table 6.7.1.1.1.5-1 as appropriate.
- 3. The SS shall transmit an RRCReconfiguration message on Cell 1.
- ${\bf 4.\ The\ UE\ shall\ transmit\ an\ RRCReconfiguration Complete\ message.}$
- 5. The UE shall transmit periodically MeasurementReport messages.
- 6. After 10s wait from Step 3, the SS shall check the SS-RSRP reported values in the periodic MeasurementReport. The SS-RSRP value of Cell 2 reported by the UE is compared to the expected SS-RSRP. If the value is outside the limits in Table 6.7.1.1.1.5-2 or the UE fails to report the measurement value for Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.
- 7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.
- 8. Repeat steps 1-7 for each sub-test in Table 6.7.1.1.1.5-1 as appropriate.

6.7.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.7.1.1.4.3-1: Common Exception messages for NR SA FR1 SS-RSRP absolute measurement accuracy

De	Default Message Contents						
Common contents of system information blocks exceptions							
Default RRC messages and information elements contents exceptions	Table H.3.1-1 Table H.3.1-2 Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 2 and Asynchronous cells for configuration 6.7.1.1.1-1 Table H.3.1-3 with Condition SSB.1 FR1, SMTC pattern 1 and synchronous cells for configuration 6.7.1.1.1-2 Table H.3.1-3 with Condition SSB.2 FR1, SMTC pattern 1 and synchronous cells for configuration 6.7.1.1.1-3 Table H.3.1-7 Table H.3.4-1 Table H.3.4-2						

Table 6.7.1.1.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for NR SA FR1 SS-RSRP Accuracy

Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition PERIODICAL							
Information Element	Value/remark	Comment	Condition				
ReportConfigNR::= SEQUENCE {							
reportType CHOICE {							
periodical SEQUENCE {			PERIODICAL				
reportQuantityCell SEQUENCE {							
rsrq	false						
}							
maxReportCells	2						
}							
}							
}							

6.7.1.1.5 Test requirement

Table 6.7.1.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 6.7.1.1.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.1.1.1.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.1.1.1.5-3 for test configuration 3.

Table 6.7.1.1.1.5-1: NR SA FR1 SS-RSRP measurement accuracy test parameters

			Tes	st 1	Tes	st 2	Tes	st 3
Parar	neter	Unit	Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
Physical cell ID					489	0		
SSB ARFCN	Config 1		fre	q1	fre		fre	q1
Duplex mode	Config 1 Config 2,3		FDD TDD					
	Config 1		Not Applicable					
TDD configuration	Config 2		TDDConf.1.1					
. 22 comgaration	Config 3				TDDC			
	Config 1				10: N _R			
BW _{channel}	Config 2	MHz			10: N _R	_{B,c} = 52		
	Config 3				40: N _{RB}	_c = 106		
	Config 1				10: N _R	_{B,c} = 52		
BWP BW	Config 2				10: N _R	_{3,c} = 52		
	Config 3				40: N _{RB}	_c = 106		
Downlink initial BWP c	onfiguration				DLBW			
Downlink dedicated BV					DLBW	/P.1.1		
Uplink initial BWP conf					ULBW			
Uplink dedicated BWP					ULBW			
DRx Cycle	- comgaration	ms			Not App			
- ,			TRS.1.1		TRS.1.		TRS.1.	
	Config 1		FDD		1 FDD		1 FDD	
TRS Configuration	Config 2		TRS.1.1 TDD	-	TRS.1. 1 TDD	-	TRS.1. 1 TDD	-
	Config 3		TRS.1.2 TDD		TRS.1. 2 TDD		TRS.1. 2 TDD	
DD0011D1	Config 1		SR.1.1 FDD		SR.1.1 FDD		SR.1.1 FDD	
PDSCH Reference measurement channel	Config 2		SR.1.1 TDD	-	SR.1.1 TDD	-	SR.1.1 TDD	-
	Config 3		SR2.1 TDD		SR2.1 TDD		SR2.1 TDD	
	Config 1		CR.1.1 FDD		CR.1.1 FDD		CR.1.1 FDD	
RMSI CORESET Reference Channel	Config 2		CR.1.1 TDD	-	CR.1.1 TDD	-	CR.1.1 TDD	-
	Config 3		CR2.1 TDD		CR2.1 TDD		CR2.1 TDD	
	Config 1		CCR.1. 1 FDD		CCR.1. 1 FDD		CCR.1. 1 FDD	
Control Channel RMC	Config 2		CCR.1. 1 TDD	-	CCR.1. 1 TDD	-	CCR.1. 1 TDD	-
	Config 3		CR2.1 TDD		CCR2. 1 TDD		CCR2.1 TDD	
	Config 1		SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1
SSB configuration	Config 2		SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1	SSB 1.FR1	SSB.1 FR1
	Config 3		SSB 2.FR1	SSB.2 FR1	SSB 2.FR1	SSB.2 FR1	SSB 2.FR1	SSB.2 FR1
Time offset with Cell	Config 1	ms	-	3	-	3	-	3
2	Config 2,3	μs	-	3	-	3	-	3
SMTC Configuration	Config 1				SMT	ГС.2		

Config 2,3				SMTC.1						
OCNG Pat	terns					OF	P.1			
PDSCH/PI	DCCH	Config 1,2	1.1.1-	15 kHz						
subcarrier	bcarrier spacing Config 3		kHz			30	кНz			
EPRE ratio	of PSS to SSS of PBCH DMF	S to SSS								
EPRE ratio EPRE ratio	of PBCH to PE of PDCCH DN of PDCCH to of PDSCH DN	IRS to SSS PDCCH DMRS	dB	0	0	0	0	0	0	
EPRE ratio	of PDSCH to I									
$N_{oc}^{$	Config 1,2	Depending on band group	dBm/15Kh	-10	7.5	-88		-116 + Δ _{BG_offset}		
2	Config 3	Depending on band group	Z	N/A	Note 6	-94		116 + ∆ _{BG_offset}		
$N_{_{oc}}$ Note	Config 1,2		dBm/SCS	-107.4		-88		Same as Noc/15kHz		
2	Config 3	Depending on band group	ing on band		N/A ^{Note 6}		-91		-113 + Δ _{BG_offset}	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$			dB	1.88	-4.97	1.88	-4.97	0.09	-4.96	
\hat{E}_s/N_{oc}			dB	6	2	6	2	3	-0.2	
SS- RSRP ^{Note}	Config 1,2	Depending on band group	dBm/SCS	-101.5	-105.5	-82	-86	-113 + Δ _{BG_offse} t	-116.2 + Δ _{BG_offse}	
3	Config 3	Depending on band group	ubiii/303	N/A ^{Note}	N/A ^{Note}	-85	-89	$\begin{array}{c} \text{-110+} \\ \Delta_{\text{BG_offse}} \\ \text{t} \end{array}$	$\begin{array}{c} -\\ 113.6+\\ \Delta_{BG_offse}\\ t \end{array}$	
Io ^{Note3}	Config 1,2	Depending on band group	dBm/ 9.36MHz	-71	.55	-52.05		-82.25+ Δ _{BG_offset}		
	Config 3	Depending on band group	dBm/ 38.16MHz	N/A	Note 6	-51.77		-75.98 + Δ _{BG_offset}		
	n condition		-		AWGN					
Antenna co	onfiguration			1x2						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Note 5: $\Delta_{BG \text{ offset}}$ is defined in clause 3A.4, Table 3A.4.1-2.

Note 6: Subtest 1 is not used when testing with 30kHz SSB SCS.

Table 6.7.1.1.1.5-2: SS-RSRP Intra frequency absolute accuracy requirements for the reported values for test configurations 1 and 2

Normal Conditions	Test 1	Test 2	Test 3	
Normal Conditions	All bands	All bands	lest 3	
			Bands NR_FDD_FR1_A,	34
			NR_TDD_FR1_A	
			Bands NR_FDD_FR1_B	35
			Bands NR_TDD_FR1_C	35
Lowest reported value (Cell 2)	45	61	Bands NR_FDD_FR1_D,	36
Lowest reported value (Cell 2)	45	01	NR_TDD_FR1_D	
			Bands NR_FDD_FR1_E,	36
			Bands NR_TDD_FR1_E	
			Bands NR_FDD_FR1_G	37
			Bands NR_FDD_FR1_H	38
	57	80	NR_FDD_FR1_A,	47
			NR_TDD_FR1_A	
			NR_FDD_FR1_B	47
			NR_TDD_FR1_C	48
Highest reported value (Cell 2)			NR_FDD_FR1_D,	48
l lightest reported value (con 2)			NR_TDD_FR1_D	
			NR_FDD_FR1_E,	49
			NR_TDD_FR1_E	
			NR_FDD_FR1_G	50
			NR_FDD_FR1_H	50
Extreme Conditions	Test 1	Test 2	Test 3	
Extreme Conditions	All bands	All bands		30
Extreme Conditions			Bands NR_FDD_FR1_A,	30
Extreme Conditions	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A	
Extreme Conditions	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B	30
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C	30 31
Extreme Conditions Lowest reported value (Cell 2)	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D,	30
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	30 31
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	30 31 31
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E	30 31 31
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G	30 31 31 32
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E	30 31 31 32 33
	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H	30 31 31 32 33 33
	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A,	30 31 31 32 33 33
	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A	30 31 31 32 33 33 52
Lowest reported value (Cell 2)	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C	30 31 31 32 33 33 52 52
	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B	30 31 31 32 33 33 52 52 52 53
Lowest reported value (Cell 2)	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C	30 31 31 32 33 33 52 52 52 53
Lowest reported value (Cell 2)	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	30 31 31 32 33 33 52 52 52 53 53
Lowest reported value (Cell 2)	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	30 31 31 32 33 33 52 52 52 53 53
Lowest reported value (Cell 2)	All bands 41	58	Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E Bands NR_FDD_FR1_B Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E, Bands NR_TDD_FR1_E	30 31 31 32 33 33 52 52 52 53 53

Table 6.7.1.1.1.5-3: SS-RSRP Intra frequency absolute accuracy requirements for the reported values for test configuration 3

Normal Conditions	Test 1 All bands	Test 2 All bands	Test 3	
			Bands NR_FDD_FR1_A, NR_TDD_FR1_A	37
			Bands NR FDD FR1 B	38
			Bands NR TDD FR1 C	38
			Bands NR FDD FR1 D,	39
Lowest reported value (Cell 2)	42	58	NR_TDD_FR1_D	
			Bands NR FDD FR1 E,	39
			Bands NR_TDD_FR1_E	
			Bands NR_FDD_FR1_G	40
			Bands NR_FDD_FR1_H	41
			Bands NR_FDD_FR1_A,	50
			NR_TDD_FR1_A	
			Bands NR_FDD_FR1_B	50
			Bands NR_TDD_FR1_C	51
Highest reported value (Cell 2)	54	77	Bands NR_FDD_FR1_D,	51
l lighest reported value (Geli 2)	54	''	NR_TDD_FR1_D	
			Bands NR_FDD_FR1_E,	52
			Bands NR_TDD_FR1_E	
			Bands NR_FDD_FR1_G	53
			Bands NR_FDD_FR1_H	53
Extreme Conditions	Test 1 All bands	Test 2 All bands	Test 3	
	All bands	All bands		
	All bands	All bands	Bands NR_FDD_FR1_A,	33
	All bands	All bands	Bands NR_FDD_FR1_A, NR_TDD_FR1_A	33
	All bands	All bands	NR_TDD_FR1_A Bands NR_FDD_FR1_B	33
	All bands	All bands	NR_TDD_FR1_A	
Lowest reported value (Call 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D,	33
Lowest reported value (Cell 2)	37	53	NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	33 34
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	33 34
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E	33 34 34
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G	33 34 34
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H	33 34 34 35
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A,	33 34 34 35 36
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A	33 34 34 35 36 36
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B	33 34 34 35 36 36
Lowest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C	33 34 34 35 36 36 54 55 55
	37	53	NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_TDD_FR1_C	33 34 34 35 36 36 54
Lowest reported value (Cell 2) Highest reported value (Cell 2)			NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D	33 34 34 35 36 36 54 55 55 56
	37	53	NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E,	33 34 34 35 36 36 54 55 55
	37	53	NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_TDD_FR1_E, Bands NR_TDD_FR1_E	33 34 34 35 36 36 54 55 55 56
	37	53	NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E Bands NR_FDD_FR1_B Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E Bands NR_FDD_FR1_G	33 34 34 35 36 36 54 55 55 56 56
	37 58	53 82	NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_TDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_G Bands NR_FDD_FR1_H Bands NR_FDD_FR1_A, NR_TDD_FR1_A Bands NR_FDD_FR1_B Bands NR_FDD_FR1_B Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_C Bands NR_FDD_FR1_D, NR_TDD_FR1_D Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_E, Bands NR_FDD_FR1_G Bands NR_FDD_FR1_G Bands NR_FDD_FR1_G Bands NR_FDD_FR1_G	33 34 34 35 36 36 54 55 55 56

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

6.7.1.1.2 NR SA FR1 SS-RSRP relative measurement accuracy

6.7.1.1.2.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRP relative measurement accuracy is within the specified limits for all bands.

6.7.1.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.1.

6.7.1.1.2.4 Test description

6.7.1.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.1.2.4.1-1.

Table 6.7.1.1.2.4.1-1: NR SA FR1 SS-RSRP measurement accuracy supported test configurations

Test Case ID	Description				
6.7.1.1.2-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD				
6.7.1.1.2-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD				
6.7.1.1.2-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD				
Note	Note: The UE is only required to be tested in one of the supported test configurations				

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.1.2.4.1-2.

Table 6.7.1.1.2.4.1-2: Initial conditions for SS-RSRP intra frequency relative accuracy in FR1

Parameter	Value			Comment
Test environment	NC, TI	_/VL, TL	/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies		As speci	fied in Annex E, Table E.4-3	1 and TS 38.508-1 [14] clause 4.3.1.
Channel bandwidth	ļ ,	As specif	ied by the test configuration	n selected from Table 6.7.1.1.2.4.1-1.
Propagation conditions	AWGN			As specified in Annex C.2.2.
Connection Diagram	TE Part	2Rx 4Rx	A.3.1.8.2 with n = 2 and φ_1 = 5 Hz A.3.1.8.5 with n = 2 and	As specified in TS 38.508-1 [14] Annex A.
	DUT Part		$\phi_{1,1} = 5 \text{ Hz}, \ \phi_{1,2} = 10$ $\text{Hz}, \ \phi_{1,3} = 15 \text{ Hz}$ A.3.2.3.4	
Exceptions to connection diagram	- Without LTE	E link		

- 1. Message contents are defined in clause 6.7.1.1.2.4.3.
- 2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in the same frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.1.2.4.2 Test procedure

- 1. Ensure the UE is in state RRC_CONNECTED CONNECTED with generic procedure parameters Connectivity *NR* Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to Table 6.7.1.1.2.5-1 as appropriate.
- 3. The SS shall transmit an RRCReconfiguration message on Cell 1.
- 4. The UE shall transmit an RRCReconfigurationComplete message.
- 5. The UE shall transmit periodically MeasurementReport messages.
- 6. After 10s wait from Step 3, the SS shall check the SS-RSRP reported values of Cell 1 and Cell 2 in the periodic MeasurementReport. The SS-RSRP value of Cell 2 reported by the UE is compared to the reported SS-RSRP of Cell 1. If the resulting value is outside the limits in Table 6.7.1.1.2.5-2 or the UE fails to report the measurement

value for Cell 1 or Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

- 7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.
- 8. Repeat steps 1-7 for each sub-test in Table 6.7.1.1.2.5-1 as appropriate.

6.7.1.1.2.4.3 Message contents

Message contents are same as in clause 6.7.1.1.4.3.

6.7.1.1.2.5 Test requirement

Table 6.7.1.1.2.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 6.7.1.1.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.1.1.2.5-2.

Table 6.7.1.1.2.5-1: Same as Table 6.7.1.1.1.5-1 with the following exceptions:

	Paran	antor	Unit	Tes	st 1	Test 2		Test 3	
	Palali	iletei	Oilit	Cell 2	Cell 3	Cell 2	Cell 3	Cell 2	Cell 3
$N_{_{OC}}$ Note	Config 1,2	Depending on band group	dBm/15Kh	-106		-88		-116 + Δ _{BG_offset}	
2	Config 3	Depending on band group	Z	N/A	Note 6	-6	94	-116 + Δ _{BG_offset}	
$N_{_{oc}}$ Note	Config 1,2	9 ·			ie as L5kHz	Same as Noc/15kHz			
2	Config 3,6	Depending on band group	dBm/SCS	N/A	Note 6	-91		-113 + ∆ _{BG_offset}	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	1.88	-4.97	1.88	-4.97	-0.01	-4.76
\hat{E}_s/N_{oc}			dB	6	2	6	2	3	0
SS-	Config 1,2	Depending on band group	dDm /CCC	-100	-104	-82	-86	$\begin{array}{c} -113 + \\ \Delta_{BG_offse} \\ t \end{array}$	-116 + Δ _{BG_offse}
RSRP ^{Note}	Config 3	Depending on band group	dBm/SCS	N/A ^{Note}	N/A ^{Note}	-85	-89	$\begin{array}{c} -110 + \\ \Delta_{BG_offse} \\ t \end{array}$	-113 + Δ _{BG_offse}
Io ^{Note3}	Config 1,2	Depending on band group	dBm/ 9.36MHz	-70.05 -52.05		.05	-82.20+	Δ_{BG_offset}	
	Config 3	Depending on hand		N/A ^{Note 6}		-51.77		-75.93 + Δ _{BG_offset}	

Table 6.7.1.1.2.5-2: SS-RSRP Intra frequency relative accuracy requirements for the reported values

	Test 1	Test 2	Test 3
	All bands	All bands	All bands
Normal Conditions			
Lowest reported value (Cell 2)	RSRP_x - 9	RSRP_x - 9	RSRP_x - 8
Highest reported value (Cell 2)	RSRP_x + 1	RSRP_x + 1	RSRP_x + 2
Extreme Conditions			
Lowest reported value (Cell 2)	RSRP_x - 9	RSRP_x - 9	RSRP_x - 8
Highest reported value (Cell 2)	RSRP_x + 1	RSRP_x + 1	RSRP_x + 2
RSRP_x is the reported value of	Cell 1		

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

6.7.1.2 Inter-frequency measurements

6.7.1.2.1 NR SA FR1-FR1 SS-RSRP absolute measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.1.2.1.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.1.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.2.

6.7.1.2.1.4 Test description

6.7.1.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.2.1.4.1-1.

Table 6.7.1.2.1.4.1-1: NR SA FR1-FR1 SS-RSRP measurement accuracy supported test configurations

Test Case ID	Test Case ID Description					
6.7.1.2.1-1 NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD						
6.7.1.2.1-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD					
6.7.1.2.1-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD					
Note	Note: The UE is only required to be tested in one of the supported test configurations					

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.2.1.4.1-2.

Table 6.7.1.2.1.4.1-2: Initial conditions for SS-RSRP inter frequency absolute accuracy in FR1

Parameter	Value		Comment		
Test environment		L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	A	As specified in Annex E, Table E.1-1	1 and TS 38.508-1 [14] sclause 4.3.1.		
Channel bandwidth	Į.	As specified by the test configuration	n selected from Table 6.7.1.2.1.4.1-1.		
Propagation conditions		AWGN	As specified in Annex C.2.2.		
Connection Diagram	TE Part	A.3.1.8.2 with n = 2 and ϕ_1 = 5	As specified in TS 38.508-1 [14] Annex A.		
	DUT Part	A.3.2.3.4			
Exceptions to connection diagram	N/A				

1. Message contents are defined in clause 6.7.1.2.1.4.3.

2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in a different FR1 frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.2.1.4.2 Test procedure

Same as in clause 6.7.1.1.1.4.2 but replacing Table 6.7.1.1.1.5-1 and 6.7.1.1.1.5-2 with 6.7.1.2.1.5-1 and 6.7.1.2.1.5-2, respectively.

6.7.1.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.1.2.1.5 Test requirement

TBD

6.7.1.2.2 NR SA FR1-FR1 SS-RSRP relative measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.1.2.2.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.1.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.2.

6.7.1.2.2.4 Test description

6.7.1.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.2.2.4.1-1.

Table 6.7.1.2.2.4.1-1: NR SA FR1-FR1 SS-RSRP relative measurement accuracy supported test configurations

Test Case ID	Description			
6.7.1.2.2-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD			
6.7.1.2.2-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD			
6.7.1.2.2-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD			
Note: The UE is only required to be tested in one of the supported test configurations				

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.2.2.4.1-2.

Table 6.7.1.2.2.4.1-2: Initial conditions for SS-RSRP inter frequency relative accuracy in FR1

Parameter		Value	Comment		
Test environment	NC, T	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	,	As specified in Annex E, Table E.1-1	1 and TS 38.508-1 [14] sclause 4.3.1.		
Channel bandwidth	A	As specified by the test configuration	n selected from Table 6.7.1.2.2.4.1-1.		
Propagation conditions		AWGN	As specified in Annex C.2.2.		
Connection Diagram	TE Part	A.3. 1.8.2 with n = 2 and ϕ_1 = 5	As specified in TS 38.508-1 [14] Annex A.		
	DUT Part	A.3.2.3.4			
Exceptions to connection diagram	N/A				

- 1. Message contents are defined in clause 6.7.1.2.2.4.3.
- 2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in a different FR1 frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.2.2.4.2 Test procedure

Same as in clause 6.7.1.1.2.4.2 but replacing Table 6.7.1.1.2.5-1 and 6.7.1.1.2.5-2 with 6.7.1.2.2.5-1 and 6.7.1.2.2.5-2, respectively.

6.7.1.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.1.2.2.5 Test requirement

TBD

6.7.2 SS-RSRQ

6.7.2.0 Minimum conformance requirements

6.7.2.0.1 Intra-frequency SS-RSRQ measurement accuracy requirements

Same as in clause 4.7.2.0.1.

6.7.2.0.2 Inter-frequency SS-RSRQ measurement accuracy requirements

Same as in clause 4.7.2.0.2.

6.7.2.1 NR SA FR1 SS-RSRQ measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.2.1.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRQ measurement accuracy is within the specified limits for all bands.

6.7.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.2.1.

6.7.2.1.4 Test description

6.7.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.2.1.4.1-1.

Table 6.7.2.1.4.1-1: NR SA FR1 SS-RSRQ measurement accuracy supported test configurations

Test Case ID	Description	
6.7.2.1-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
6.7.2.1-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
6.7.2.1-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 6.7.2.1.4.1-2.

Table 6.7.2.1.4.1-2: Initial conditions for SS-RSRQ intra frequency accuracy in FR1

Parameter		Value	Comment
Test environment	NC, T	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	,	As specified in Annex E, Table E.1-1	. and TS 38.508-1 [14] sclause 4.3.1.
Channel bandwidth		As specified by the test configuration	on selected from Table 6.7.2.1.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	A.3.1.8.2 with n = 2 and ϕ_1 = 5	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 6.7.2.1.4.3.
- 2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the same frequency as Cell 1. Cell 2 is the target cell for SS-RSRQ measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.2.1.4.2 Test procedure

TBD

6.7.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.2.1.5 Test requirement

TBD

6.7.2.2 NR SA FR1-FR1 SS-RSRQ measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.2.2.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRQ measurement accuracy is within the specified limits for all bands.

6.7.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.2.2.

6.7.2.2.4 Test description

6.7.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.2.2.4.1-1.

Table 6.7.2.2.4.1-1: NR SA FR1-FR1 SS-RSRQ measurement accuracy supported test configurations

Test Case ID	Description	
6.7.2.2-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
6.7.2.2-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
6.7.2.2-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 6.7.2.2.4.1-2.

Table 6.7.2.2.4.1-2: Initial conditions for SS-RSRQ inter frequency accuracy in FR1

Parameter	Value		Comment
Test environment	NC, T	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	ļ ,	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.
Channel bandwidth		As specified by the test configuration	on selected from Table 6.7.2.1.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	A.3.1.8.2 with n = 2 and ϕ_1 = 5	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 6.7.2.2.4.3.
- 2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the same frequency as Cell 1. Cell 2 is the target cell for SS-RSRQ measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.2.2.4.2 Test procedure

TBD

6.7.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.2.2.5 Test requirement

TBD

6.7.3 SS-SINR

6.7.3.1 NR SA FR1 SS-SINR measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

6.7.3.1.1 Test purpose

FFS

6.7.3.1.2 Test applicability

FFS

6.7.3.1.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.3.1.

6.7.3.1.4 Test description

6.7.3.1.4.1 Initial conditions

FFS

6.7.3.1.4.2 Test procedure

FFS

6.7.3.1.4.3 Message contents

FFS

6.7.3.1.5 Test requirements

FFS

6.7.3.2 NR SA FR1-FR1 SS-SINR measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

6.7.3.2.1 Test purpose

FFS

6.7.3.2.2 Test applicability

FFS

6.7.3.2.3 Minimum conformance requirements

FFS

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.3.2.

6.7.3.2.4 Test description

6.7.3.2.4.1 Initial conditions

FFS

6.7.3.2.4.2 Test procedure

FFS

6.7.3.2.4.3 Message contents

FFS

6.7.3.2.5 Test requirements

FFS

6.7.4 L1-RSRP

6.7.4.0 Minimum conformance requirements

6.7.4.0.1 SSB based absolute L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.1.

6.7.4.0.2 SSB based relative L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.2.

6.7.4.0.3 CSI-RS based absolute L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.3.

6.7.4.0.4 CSI-RS based relative L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.4.

6.7.4.1 SSB based L1-RSRP measurements

6.7.4.1.1 NR SA FR1 SSB based L1-RSRP absolute measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.4.1.1.1 Test purpose

The purpose of this test is to verify that the SSB based L1-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.4.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.1.

6.7.4.1.1.4 Test description

6.7.4.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.1.1.4.1-1.

Table 6.7.4.1.1.4.1-1: NR SA FR1 SSB based L1-RSRP absolute measurement accuracy supported test configurations

Test Case ID	Description	
6.7.4.1.1-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD	
6.7.4.1.1-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD	
6.7.4.1.1-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD	
Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.1.1.4.1-2.

Table 6.7.4.1.4.1-2: Initial conditions for SSB based L1-RSRP absolute accuracy in FR1

Parameter		Value	Comment
Test environment	NC, TI	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E, Table E.1-1 and TS 38.508-1 [14] sclause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 6.7.4.1.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 6.7.4.1.1.4.3.
- 2. Cell 1 is the NR FR1 cell. Cell 1 is the target for SSB based L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.1.1.4.2 Test procedure

TBD

6.7.4.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.4.1.1.5 Test requirement

TBD

6.7.4.1.2 NR SA FR1 SSB based L1-RSRP relative measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.4.1.2.1 Test purpose

The purpose of this test is to verify that the SSB based L1-RSRP relative measurement accuracy is within the specified limits for all bands.

6.7.4.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.1.

6.7.4.1.2.4 Test description

6.7.4.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.1.2.4.1-1.

Table 6.7.4.1.2.4.1-1: NR SA FR1 SSB based L1-RSRP relative measurement accuracy supported test configurations

Test Case ID	Description					
6.7.4.1.2-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD					
6.7.4.1.2-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD					
6.7.4.1.2-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD					
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations					

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.1.2.4.1-2.

Table 6.7.4.1.2.4.1-2: Initial conditions for SSB based L1-RSRP relative accuracy in FR1

Parameter		Value	Comment
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH As specified in TS 38.508-1 [14]		
Test frequencies	P	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.
Channel bandwidth	ļ ,	as specified by the test configuration	n selected from Table 6.7.4.1.2.4.1-1.
Propagation conditions		AWGN	As specified in Annex C.2.2.
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.2.3.4	
Exceptions to connection diagram		N/A	

- 1. Message contents are defined in clause 6.7.4.1.2.4.3.
- 2. Cell 1 is the NR FR1 cell. Cell 1 is the target for SSB base L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.1.2.4.2 Test procedure

TBD

6.7.4.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.4.1.2.5 Test requirement

TBD

6.7.4.2 CSI-RS based L1-RSRP measurements

6.7.4.2.1 NR SA FR1 CSI-RS based L1-RSRP absolute measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.4.2.1.1 Test purpose

The purpose of this test is to verify that the CSI-RS based L1-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.4.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.2.

6.7.4.2.1.4 Test description

6.7.4.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.2.1.4.1-1.

Table 6.7.4.2.1.4.1-1: NR SA FR1 CSI-RS based L1-RSRP absolute measurement accuracy supported test configurations

Test Case ID	Description					
6.7.4.2.1-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD					
6.7.4.2.1-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD					
6.7.4.2.1-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD					
Note	Note: The UE is only required to be tested in one of the supported test configurations					

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.2.1.4.1-2.

Table 6.7.4.2.1.4.1-2: Initial conditions for CSI-RS based L1-RSRP absolute accuracy in FR1

Parameter		Value	Comment		
Test environment	NC, TI	L/VL, TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	A	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 6.7.4.2.1.4.1-1.				
Propagation conditions		AWGN	As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to connection diagram		N/A			

- 1. Message contents are defined in clause 6.7.4.2.1.4.3.
- 2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.2.1.4.2 Test procedure

TBD

6.7.4.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.4.2.1.5 Test requirement

TBD

6.7.4.2.2 NR SA FR1 CSI-RS based L1-RSRP relative measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- The core requirements in TS 38.133 are between [.] or TBD.
- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD

6.7.4.2.2.1 Test purpose

The purpose of this test is to verify that the CSI-RS based L1-RSRP relative measurement accuracy is within the specified limits for all bands.

6.7.4.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.2.

6.7.4.2.2.4 Test description

6.7.4.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.2.2.4.1-1.

Table 6.7.4.2.2.4.1-1: NR SA FR1 CSI-RS based L1-RSRP relative measurement accuracy supported test configurations

Test Case ID	Description					
6.7.4.2.2-1	NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD					
6.7.4.2.2-2	NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD					
6.7.4.2.2-3	NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD					
Note: The UE is	Note: The UE is only required to be tested in one of the supported test configurations					

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.2.2.4.1-2.

Table 6.7.4.2.2.4.1-2: Initial conditions for CSI-RS based L1-RSRP relative accuracy in FR1

Parameter	Value Comment				
Test environment	NC, TL/VL, TL/VH, TH/VL, TH/VH As specified in TS 38.508-1 [14] of				
Test frequencies	A	As specified in Annex E, Table E.1-1	and TS 38.508-1 [14] sclause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 6.7.4.2.2.4.1-1.				
Propagation conditions		AWGN	As specified in Annex C.2.2.		
Connection	TE Part	A.3.1.8.2 with n = 1	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.2.3.4			
Exceptions to connection diagram		N/A			

- 1. Message contents are defined in clause 6.7.4.2.2.4.3.
- 2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based L1-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.2.2.4.2 Test procedure

TBD

6.7.4.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

6.7.4.2.2.5 Test requirement

TBD

7 NR standalone with at least one NR cell in FR2

This section contains test scenarios for NR standalone. This configuration is also known as SA Option 2. At least one NR cell is in Frequency Range 2.

For conformance testing involving FR2 test cases in this specification, the UE under test shall disable UL Tx diversity schemes.

7.1 RRC_IDLE state mobility

7.1.1 NR cell re-selection

7.1.1.0 Minimum conformance requirements

7.1.1.0.1 Minimum conformance requirements for intra-frequency cell re-selection

The cell re-selection delay shall be less than $T_{\text{evaluate NR_Intra}} + T_{\text{SI-NR}}$ in RRC_IDLE state.

The UE shall be able to identify new intra-frequency cells and perform SS-RSRP and SS-RSRQ measurements of the identified intra-frequency cells without an explicit intra-frequency neighbour list containing physical layer cell identities.

The UE shall be able to evaluate whether a newly detectable intra-frequency cell meets the reselection criteria defined in TS38.304 [30] within $T_{\text{detect},NR_Intra}$ as defined in table 4.2.2.3-1 of TS 38.133 [6] when that Treselection= 0. An intra frequency cell is considered to be detectable according to the conditions defined in Annex B.1.2 of TS 38.133 [6] for a corresponding Band.

The UE shall measure SS-RSRP and SS-RSRQ at least every $T_{measure,NR_Intra}$ (see table 4.2.2.3-1 of TS 38.133 [6]) for intra-frequency cells that are identified and measured according to the measurement rules.

The UE shall filter SS-RSRP and SS-RSRQ measurements of each measured intra-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,NR\ Intra}/2$.

The UE shall not consider a NR neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an intra-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the intra-frequency cell has met reselection criterion defined within $T_{\text{evaluate},NR_Intra}$ when $T_{\text{reselection}} = 0$ as specified in table 4.2.2.3-1 of TS 38.133 [6] provided that the cell has at least [3]dB better ranked.

When evaluating cells for reselection, the SSB side conditions apply to both serving and non-serving intra-frequency cells

If $T_{reselection}$ timer has a non zero value and the intra-frequency cell is satisfied with the reselection criteria which are defined in TS38.304 [30], the UE shall evaluate this intra-frequency cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

The normative reference for this requirement is TS 38.133 [6] clause 4.2.2.2 and 4.2.2.3.

7.1.1.0.2 Minimum conformance requirements for inter-frequency cell re-selection

The cell re-selection delay shall be less than $T_{\text{evaluate NR_Intra}} + T_{\text{SI-NR}}$ in RRC_IDLE state.

The UE shall be able to identify new inter-frequency cells and perform SS-RSRP or SS-RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided.

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-frequency layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in clause 4.2.2.7 of TS 38.133 [6].

If $Srxlev \le S_{nonIntraSearchP}$ or $Squal \le S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below in this subclause.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS38.304 [30] within $K_{\text{carrier}} * T_{\text{detect},NR_Inter}$ if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when $T_{\text{reselection}} = 0$ provided that the reselection criteria is met by a margin of at least [5] dB for reselections based on ranking or [6]dB for SS-RSRP reselections based on absolute priorities or [4]dB for SS-RSRQ reselections based on absolute priorities. The parameter K_{carrier} is the number of NR inter-frequency carriers indicated by the serving cell. An inter-frequency cell is considered to be detectable according to the conditions defined in Annex B.1.3 of TS 38.133 [6] for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every T_{measure,NR_Inter}. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a NR carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure SS-RSRP or SS-RSRQ at least every $K_{carrier} * T_{measure,NR_Inter}$ (see table 4.2.2.4-1 of TS 38.133 [6]) for identified lower or equal priority inter-frequency cells. If the UE detects on a NR carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter SS-RSRP or SS-RSRQ measurements of each measured higher, lower and equal priority interfrequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least $T_{measure,NR_Inter}/2$.

The UE shall not consider a NR neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met reselection criterion defined TS 38.304 [30] within $K_{carrier} * T_{evaluate,NR_Inter}$ when $T_{reselection} = 0$ as specified in table 4.2.2.4-1 of TS 38.133 [6] provided that the reselection criteria is met by

- the condition when performing equal priority reselection and the cell has at least [5]dB better ranked
- [6]dB for SS-RSRP reselections based on absolute priorities or
- [4]dB for SS-RSRQ reselections based on absolute priorities.

When evaluating cells for reselection, the SSB side conditions apply to both serving and inter-frequency cells.

If $T_{reselection}$ timer has a non zero value and the inter-frequency cell is satisfied with the reselection criteria, the UE shall evaluate this inter-frequency cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

The UE is not expected to meet the measurement requirements for an inter-frequency carrier under DRX cycle=320 ms defined in Table 4.2.2.4-1 of TS 38.133 [6] under the following conditions:

- T_{SMTC_intra} = T_{SMTC_inter} = 160 ms; where T_{SMTC_intra} and T_{SMTC_inter} are periodicities of the SMTC occasions configured for the intra-frequency carrier and the inter-frequency carrier respectively,
- SMTC occasions configured for the inter-frequency carrier occur up to TBD ms before the start or up to TBD ms after the end of the SMTC occasions configured for the intra-frequency carrier and
- SMTC occasions configured for the intra-frequency carrier and for the inter-frequency carrier occur up to TBD ms before the start or up to TBD ms after the end of the paging occasion [1].

The normative reference for this requirement is TS 38.133 [6] clause 4.2.2.4.

7.1.1.1 NR SA FR2 cell re-selection

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- TT analysis is missing.
- Message contents are not complete.
- Connection diagram is TBD.

7.1.1.1.1 Test purpose

The purpose of this test is:

- To verify the requirement for the intra frequency NR cell reselection requirements specified in TS 38.133 clause 4.2.2.3.

7.1.1.1.2 Test applicability

This test applies to all types of NR UE release 15.

7.1.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.1.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.7.1.1.1.

7.1.1.1.4 Test description

7.1.1.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 7.1.1.1.4.1-1.

Table 7.1.1.1.4.1-1: Supported test configurations for NR SA FR2 cell re-selection

Configuration	Description
7.1.1.1-1	120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode
7.1.1.1-2	240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode
Note: The UE is only	required to be tested in one of the supported test configurations.

Configure the test equipment and the DUT according to the parameters in Table 7.1.1.1.4.1-2.

Table 7.1.1.1.4.1-2: Initial conditions for NR SA FR2 cell re-selection

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.5	508-1 [14] clause 4.3.1.			
Channel bandwidth	As specified by the test configuration selected from Table 7.1.1.4.1-1.					
Propagation conditions	AWGN		As specified in Annex C.2.2.			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	TBD				
Exceptions to connection diagram	N/A					

- 1. The general test parameter settings are set up according to Table 7.1.1.1.4.1-3.
- 2. Message contents are defined in clause 7.1.1.1.4.3.
- 3. There is one NR carrier and 2 NR Cells specified in the test. Cell 1 is the PCell and Cell 2 is the neighbour cell. Cell 1 and Cell 2 are configured according to Annex C.1.1 and C.1.2.

Table 7.1.1.4.1-3: General test parameters for NR SA FR2 cell re-selection

Parameter		Unit	Test configuration	Value	Comment
Initial	Active cell		1, 2	Cell1	
condition	Neighbour cells		1, 2	Cell2	
T2 end	Active cell		1, 2	Cell2	
condition	Neighbour cells		1, 2	Cell1	
Final condition	Visited cell		1, 2	Cell1	
RF Channe	el Number		1, 2	1	
Time offset	t between cells		1, 2	3 µs	Synchronous cells
	rring Information	-	1, 2	Not Sent	No additional delays in random access procedure.
SSB config	juration		1	SSB.1 FR2	
			2	SSB.2 FR2	
	SMTC configuration		1, 2	SMTC pattern 1	
DRX cycle length		S	1, 2	1.28	The value shall be used for all cells in the test.
PRACH configuration index			1, 2	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
rangeToBestCell			1, 2	Not configured	
T1		S	1, 2	>7	During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2
T2		S	1, 2	135	T2 needs to be defined so that cell reselection reaction time is taken into account.
ТЗ		S	1, 2	35	T3 needs to be defined so that cell reselection reaction time is taken into account.

7.1.1.4.2 Test procedure

Two cells are deployed in the test, which are one FR2 NR PCell (Cell 1) and an NR neighbour cell (Cell 2) on the same frequency. The test consists of 3 successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure.

- 1. Ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5. Set Cell 2 physical cell identity = initial cell 2 physical cell identity.
- 2. Set the parameters according to T1 in Table 7.1.1.1.5-1. T1 starts.
- 3. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.1.1.1.5-1.
- 5. The SS waits for random access requests information from the UE to perform cell re-selection to a newly detectable cell, Cell 2.
- 6. If the UE responds on the newly detectable cell, Cell 2 during time duration T2 within 130 seconds from the beginning of time period T2, then count a success for the event "Re-select newly detected Cell 2". Otherwise count a fail for the event "Re-select newly detected Cell 2".

- 7. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 8. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 12.
- 8. The SS shall switch the power setting from T2 to T3 as specified in Table 7.1.1.1.5-1.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection to an already detected cell, Cell 1.
- 10. If the UE responds on the already detected cell, Cell 1 during time duration T3 within 27 seconds from the beginning of time period T3, then count a success for the event "Re-select already detected Cell 1". Otherwise count a fail for the event "Re-select already detected Cell 1".
- 11. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5 in Cell 1.
- 13. Repeat step 2-12 until a test verdict has been achieved.

Each of the events "Re-select newly detected Cell 2" and "Re-select already detected Cell 1" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

If both events pass, the test passes. If one event fails, the test fails.

7.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.1.1.1.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information FFS					
blocks exceptions					
Default RRC messages and information	FFS				
elements contents exceptions					

7.1.1.1.5 Test requirement

Tables 7.1.1.1.4.1-3 and 7.1.1.1.5-1 define the primary level settings including test tolerances for intra frequency NR cell re-selection test case.

Table 7.1.1.1.5-1: Cell specific test parameters for NR SA FR2 cell re-selection

Parameter	Unit			Cell 2				
		configuratio	T1	T2	T3	T1	T2	T3
		n						
TDD configuration		1, 2	TDDConf.3.1		TDDConf.3.1			
PDSCH RMC configuration		1		R.3.1 TD			N/A	
		2	S	R.3.1 TD	D			
RMSI CORESET RMC		1	С	R.3.1 TD	D	CI	R.3.1 TD	D
configuration		2	С	R.3.1 TD	D	CI	R.3.1 TD	D
Dedicated CORESET RMC		1	CC	CR.3.1 TI	OD	CCR.3.1 TDD		
configuration		2	CC	CR.3.1 TI	OD	CCR.3.1 TDD		
OCNG Pattern		1, 2	OP.1 de	efined in	A.3.2.1	OP.1 de	efined in	A.3.2.1
Initial DL BWP configuration		1, 2	D	LBWP.0.	.1		LBWP.0	
Initial UL BWP configuration		1, 2		LBWP.0.		U	LBWP.0	.1
RLM-RS		1, 2		SSB			SSB	
Qrxlevmin	dBm/SCS	1		-140			-140	
C		2		-137			-137	
Pcompensation	dB	1, 2		0			0	
Qhyst _s	dB	1, 2		0			0	
Qoffset _{s, n}	dB	1, 2		0			0	
Cell selection and	42	1, 2						
reselection quality measuremen		_,_		SS-RSRP SS-R		S-RSRF	RSRP	
t			00 110111					
AoA setup		1, 2	Setu	p 1 defin	ed in	Setu	o 1 defin	ed in
, to, tootap		_, _		A.3.15.1			A.3.15.1	
♠ / r	dB	1	17	-3.09	2.83		2.83	-3.09
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	uБ	2	- 1 <i>'</i>	-3.09	2.03	infinity	2.03	-3.09
T	dBm/SCS	1)		
$N_{_{oc}}^{}$ Note2	ubili/3C3	2				95		
T.T. W. A.	dBm/15 kHz	1						
$N_{_{oC}}$ Note2	OBIII/12 KHZ	2	-107					
•	dB	1	17	14	17	1	17	1.4
\hat{E}_s/N_{oc}	ав		17	14	17	infinit.	17	14
SS-RSRP Note3	-ID/COC	2	01	0.4	01	infinity	01	0.4
55-K5KP *****	dBm/SCS	1	-81	-84	-81	infinit.	-81	-84
		2	70	01	70	infinity	70	01
		2	-78	-81	-78	infinit.	-78	-81
lo	dBm/95.04	1	_		_	infinity -51.93	_	
10	MHz	1		FO 10		-51.93		50.19
	IVITZ	2	51.93	50.19	50.19	-51.93	50.19	50.19
			51.93	50.19	50.19	-51.93	50.19	50.19
Translastian		1.0	_					+
Treselection SintrasearchP	s dB	1, 2	0	<u> </u>	0	0	0 50	0
	uB	1, 2 1, 2		50	A 1 A	ICN	50	
Propagation Condition	de de sa le subject de					/GN		41
Note 1: OCNG shall be used suddensity is achieved for a	II OFDM symbols.							
Note 2: Interference from other of	alle and naice car	roos not specific	d in the te	et ic acc	umad ta	ha const	ant aver	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell re-selection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell test requirement in this case is expressed as:

Cell re-selection delay to a newly detectable cell = $T_{detect,NR}$ Intra + T_{SI-NR}

 T_{detect,NR_Intra} = 128 s; as specified in TS 38.133 [6] clause 4.2.2.3.

 $T_{\text{SI-NR}}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test.

The cell re-selection delay to a newly detectable cell shall be less than a total of 129.28 seconds in this test case (note: this gives a total of 129.28 seconds but the test allows 130 seconds).

The cell re-selection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on Cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 1.

The cell re-selection delay to an already detected cell test requirement in this case is expressed as:

Cell re-selection to an already detected cell delay = $T_{evaluate,NR Intra} + T_{SI-NR}$

 $T_{\text{evaluate,NR Intra}} = 25.6 \text{ s}$; as specified in TS 38.133 [6] clause 4.2.2.3.

 $T_{\text{SI-NR}}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test.

The cell re-selection delay to an already detected cell shall be less than a total of 26.88 seconds in this test case (note: this gives a total of 26.88 seconds but the test allows 27 seconds).

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

7.1.1.2 NR SA FR2-FR2 cell re-selection

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- TT analysis is missing.
- Message contents are missing.
- Connect diagram is TBD

7.1.1.2.1 Test purpose

The purpose of this test is:

- To verify the requirement for the inter frequency NR cell reselection requirements specified in TS 38.133 clause 4.2.2.4.

7.1.1.2.2 Test applicability

This test applies to all types of NR UE release 15.

7.1.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.1.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.7.1.1.2.

7.1.1.2.4 Test description

7.1.1.2.4.1 Initial conditions

This test shall be run in one of the configurations defined in Table 7.1.1.2.4.1-1.

Table 7.1.1.2.4.1-1: Supported test configurations for NR SA FR2-FR2 cell re-selection

Configuration	Description for serving cell	Description for target cell			
7.1.1.2-1	120 kHz SSB SCS, 100 MHz bandwidth,	120 kHz SSB SCS, 100 MHz bandwidth, TDD			
	TDD duplex mode	duplex mode			
7.1.1.2-2	240 kHz SSB SCS, 100 MHz bandwidth,	240 kHz SSB SCS, 100 MHz bandwidth, TDD			
	TDD duplex mode	duplex mode			
Note: The UE is only required to be tested in one of the supported test configurations.					

Configure the test equipment and the DUT according to the parameters in Table 7.1.1.2.4.1-2.

Table 7.1.1.2.4.1-2: Initial conditions for NR SA FR2-FR2 cell re-selection

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.5	508-1 [14] clause 4.3.1.		
Channel	As specified	by the test configuration selected fr	om Table 7.1.1.2.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to	N/A				
connection					
diagram					

- 1. The general test parameter settings are set up according to Table 7.1.1.2.4.1-3.
- 2. Message contents are defined in clause 7.1.1.2.4.3.
- 3. There is two NR carrier and 2 NR Cells specified in the test. Cell 1 is the PCell and Cell 2 is the neighbour cell in a different carrier than cell 1. Cell 1 and Cell 2 are configured according to Annex C.1.2.

Table 7.1.1.2.4.1-3: General test parameters for NR SA FR2-FR2 cell re-selection

	Parameter	Unit	Test configuration	Value	Comment
Initial condition	Active cell		1, 2	Cell2	The UE camps on cell 2 in the initial phase and during T1 period the UE reselects to cell 1
T1 end	Active cell		1, 2	Cell1	The UE shall perform reselection to cell 1
condition	Neighbour cells		1, 2	Cell2	during T1
T3 end condition	Active cell		1, 2	Cell2	The UE shall perform reselection to cell 2 with higher priority during T3
RF Channe			1, 2	1, 2	
Time offset	t between cells		1, 2	3 µs	Synchronous cells
Access Ba	rring Information	-	1, 2	Not Sent	No additional delays in random access procedure.
SSB config	juration		1	SSB.1 FR2	
			2	SSB.2 FR2	
SMTC con	figuration		1, 2	SMTC pattern 1	
DRX cycle length		S	1, 2	1.28	The value shall be used for all cells in the test.
PRACH configuration index			1, 2	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
rangeToBe	stCell		1, 2	Not configured	
T1		S	1, 2	35	T1 needs to be defined so that cell reselection reaction time is taken into account.
T2		S	1, 2	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
Т3		S	1, 2	95	T3 needs to be defined so that cell re- selection reaction time is taken into account.

7.1.1.2.4.2 Test procedure

The test consists of one active cell and one neighbour cell. The UE is requested to monitor the neighbouring cell on one of the NR carriers. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 1.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure.

- 1. Ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity *NR* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.1.1.2.5-1. Propagation conditions are set according to Annex B clause B.1.1. T1 starts.
- 3. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. The SS waits for random access requests information from the UE to perform cell re-selection on the lower priority cell, Cell 1.
- 5. If the UE responds on lower priority cell, Cell 1 during time duration T1 within 27 seconds from the beginning of time period T1, then count a success for the event "Re-select lower priority Cell 1". Otherwise count a fail for the event "Re-select lower priority Cell 1".

- 6. If the UE has re-selected Cell 1 within T1, after the re-selection or when T1 expires, continue with step 7. Otherwise, if T1 expires and the UE has not yet re-selected Cell 1, skip to step 12.
- 7. The SS shall switch the power setting from T1 to T2 as specified in Table 7.1.1.2.5-1. During time duration T2, Cell 2 shall be powered OFF and the physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) shall be changed to ensure Cell 2 is not detected by the UE.
- 8. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 7.1.1.2.5-1.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection on the higher priority cell, Cell 2.
- 10. If the UE responds on higher priority cell, Cell 2 during time duration T3 within 87 seconds from the beginning of time period T3, then count a success for the event "Re-select higher priority Cell 2". Otherwise count a fail for the event "Re-select higher priority Cell 2".
- 11. If the UE has re-selected Cell 2 within T3, after the re-selection or when T3 expires, skip to step 13. Otherwise, if T3 expires and the UE has not yet re-selected Cell 2, continue with step 12.
- 12. Switch off and on the UE and ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity *NR* according to TS 38.508-1 [14] clause 4.5 in Cell 2.
- 13. Repeat step 3-12 until a test verdict has been achieved.
 Each of the events "Re-select lower priority Cell 1" and "Re-select higher priority Cell 2" is evaluated independently for the statistic, resulting in an event verdict: pass or fail. Each event is evaluated only until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved. Different events may require different times for a verdict.

 If both events pass, the test passes. If one event fails, the test fails.

7.1.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.1.1.2.4.3-1: Common Exception messages

Default Message Contents						
Common contents of system information	FFS					
blocks exceptions						
Default RRC messages and information	FFS					
elements contents exceptions						

7.1.1.2.5 Test requirement

Tables 7.1.1.2.4.1-2 and 7.1.1.2.5-1 define the primary level settings including test tolerances for inter frequency NR cell re-selection test case.

Table 7.1.1.2.5-1: Cell specific test parameters for NR SA FR2-FR2 cell re-selection

Parameter	Unit	Test		Cell 1			Cell 2	
		configuratio	T1	T2	T3	T1	T2	T3
		n						
TDD configuration		1, 2		DConf.3		TI	DDConf.3	3.1
PDSCH RMC configuration		1, 2		R.3.1 TD		N/A		
RMSI CORESET parameters		1, 2		CR.3.1 TDD			R.3.1 TD	
RMSI CORESET RMC		1, 2	CC	CR.3.1 TI	DD	C	CR.3.1 TI	DD
configuration								
OCNG Pattern		1, 2		efined in			efined in	
Initial DL BWP configuration		1, 2		LBWP.0.			DLBWP.0.	
Initial UL BWP configuration		1, 2	U	LBWP.0.	1	ι	JLBWP.0.	.1
RLM-RS		1, 2		SSB			SSB	
Qrxlevmin	dBm/SCS	1		-140			-140	
		2		-137			-137	
Pcompensation	dB	1, 2		0			0	
Qhyst _s	dB	1, 2		0			0	
Qoffset _{s, n}	dB	1, 2		0			0	
Cell_selection_and_		1, 2						
reselection_quality_measuremen			SS-RSRP		SS-RSRP)	
t								
AoA setup		1, 2	Setu	p 1 defin	ed in	Setu	ıp 1 defin	ed in
			A.3.15.1			A.3.15.1		
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1	15	15	15	-3	_	13
$\mathbf{L}_{\mathrm{s}}/1_{\mathrm{ot}}$	ub.	2	1 -0	10	10		infinity	10
$N_{_{QC}}$ Note2	dBm/SCS	1		ļ	_(98		
IV oc	uBiii,000	2				95		
$N_{_{OC}}$ Note2	dBm/15 kHz	1				07		
TV oc	02, 20 <u>2</u>	2	1		_	•		
\hat{E}_s/N_{oc}	dB	1	15	15	15	-3	-	13
E_s/IV_{oc}	u.b	2	1 -0	=0			infinity	=0
SS-RSRP Note3	dBm/SCS	1	-83	-83	-83	-101	-	-85
30 North	abiii/000	_				101	infinity	
		2	-80	-80	-80	-98	-	-82
		_					infinity	02
Io	dBm/95.04	1	-	-	-	-	-	-
	MHz		53.88	53.88	53.88	67.25	infinity	55.80
		2	-	-	-	-	-	-
		_	53.88	53.88	53.88	67.25	infinity	55.80
Treselection	S	1, 2	0	0	0	0	0	0
SnonintrasearchP	dB	1, 2		50			Not sent	
Thresh _{x, high}	dB	1, 2		48 48				
Thresh _{serving, low}	dB	1, 2		44			44	
Thresh _{x, low}	dB	1, 2		50			50	
Propagation Condition		1, 2			ΑW	'GN		
Note 1: OCNG shall be used suc	th that both cells a		and a cor	nstant to			wer spec	tral
density is achieved for a		any anotatou	001	.Starre to		toa po	0,000	
Note 2: Interference from other of		ircas not snacifia	d in the te	et ie ace	umad ta	he cone	tant over	

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over

subcarriers and time and shall be modelled as AWGN of appropriate power for $^{N_{oc}}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The cell reselection delay to a higher priority cell is defined as the time from the beginning of time period T3, to the moment when the UE camps again on cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to a higher priority cell test requirement in this case is expressed as:

 $Cell \ re-selection \ delay \ to \ a \ higher \ priority \ cell = T_{higher_priority_search} + T_{evaluate, \ NR_inter} + T_{SI-NR}$

 $T_{higher_priority_search}$ = 60 s, as specified in TS 38.133 [6] clause 4.2.2.7;

 $T_{\text{evaluate, NR}_inter}$ = 25.6 s, as specified in TS 38.133 [6] clause 4.2.2.4;

 $T_{\text{SI-NR}}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test.

The cell re-selection delay to a higher priority cell shall be less than a total of 86.88 seconds in this test case (note: this gives a total of 86.88 seconds but this test allows 87 seconds)

The cell reselection delay to a lower priority cell is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to a lower priority cell test requirement in this case is expressed as:

Cell re-selection delay to a lower priority cell = $T_{evaluate, NR_inter} + T_{SI-NR}$

 $T_{\text{evaluate, NR inter}} = 25.6 \text{ s, as specified in TS } 38.133 [6] \text{ clause } 4.2.2.4;$

 $T_{\text{SI-NR}}$ = 1280 ms; maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell is assumed in this test.

The cell re-selection delay to a lower priority cell shall be less than a total of 26.88 seconds in this test case (note: this gives a total of 26.88 seconds but this test allows 27 seconds)

For the test to pass, both events above shall pass.

The statistical pass/ fail decisions are done separated for each event. For an event to pass, the total number of successful loops shall be more than 90% of the cases with a confidence level of 95%.

7.2 RRC_INACTIVE state mobility

7.3 RRC_CONNECTED state mobility

7.3.1 Handover

7.3.2 RRC connection mobility control

7.3.2.1 RRC re-establishment

7.3.2.1.0 Minimum conformance requirements

[TS 38.133, clause 6.2.1.2]

In RRC connected mode the UE shall be capable of sending RRCReestablishmentRequest message within $T_{re-establish_delay}$ seconds from the moment it detects a loss in RRC connection. The total RRC connection delay ($T_{re-establish_delay}$) shall be less than:

$$T_{\text{re-establish delay}} = T_{\text{UE re-establish delay}} + T_{\text{UL grant}}$$

T_{UL_grant}: It is the time required to acquire and process uplink grant from the target PCell. The uplink grant is required to transmit *RRCReestablishmentRequest* message.

The UE re-establishment delay ($T_{UE_re-establish_delay}$) is the time between the moments when any of the conditions requiring RRC re-establishment as defined in clause 5.3.7 in TS 38.331 [2] is detected by the UE and when the UE sends PRACH to the target PCell. The UE re-establishment delay ($T_{UE_re-establish_delay}$) requirement shall be less than:

$$T_{\textit{UE_re-establish_delay}} = 50 + T_{\textit{identify_intra_NR}} + \sum_{i=1}^{N freq-1} T_{\textit{identify_intra_NR,I}} + T_{\textit{SI-NR}} + T_{\textit{PRACH}}$$

The intra-frequency target NR cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Section 10.1.2 and 10.1.3 are fulfilled for a corresponding NR Band for FR1 and FR2, respectively,
- SSB_RP and SSB £s/Iot according to Annex B.2.2 for a corresponding NR Band.

The inter-frequency target NR cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in Section 10.1.4 and 10.1.5 are fulfilled for a corresponding NR Band for FR1 and FR2, respectively,
- SSB RP and SSB Ês/Iot according to Annex B.2.2 for a corresponding NR Band.

 $T_{identify_intra_NR}$: It is the time to identify the target intra-frequency NR cell and it depends on whether the target NR cell is known cell or unknown cell and on the frequency range (FR) of the target NR cell. If the UE is not configured with intra-frequency NR carrier for RRC re-establishment then $T_{identify_intra_NR}$ =0; otherwise $T_{identify_intra_NR}$ shall not exceed the values defined in table 6.2.1.2.1-1.

 $T_{identify_inter_NR,i}$: It is the time to identify the target inter-frequency NR cell on inter-frequency carrier i configured for RRC re-establishment and it depends on whether the target NR cell is known cell or unknown cell and on the frequency range (FR) of the target NR cell. $T_{identify_inter_NR,i}$ shall not exceed the values defined in table 6.2.1.2.1-2.

 T_{SMTC} : It is the periodicity of the SMTC occasion configured for the intra-frequency carrier. If the UE has been provided with higher layer in TS 38.331 [2] signalling of *smtc2*, T_{smtc} follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.

 $T_{SMTC,i}$: It is the periodicity of the SMTC occasion configured for the inter-frequency carrier i.

 $T_{\text{SI-NR}}$ = It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 38.331 [2] for the target NR cell.

T_{PRACH} = It is the delay caused due to the random access procedure when sending random access to the target NR cell. The delay depends on the PRACH configuration defined in Table 6.3.3.2-2 [6] or Table 6.3.3.2-3 [6] for FR1 and in Table 6.3.3.2-4 [6] for FR2.

 N_{freq} : It is the total number of NR frequencies to be monitored for RRC re-establishment; $N_{\text{freq}} = 1$ if the target intrafrequency NR cell is known, else $N_{\text{freq}} = 2$ and $T_{\text{identify_intra_NR}} = 0$ if the target inter-frequency NR cell is known.

There is no requirement if the target cell does not contain the UE context.

In the requirement defined in the below tables, the target FR1 cell is known if it has been meeting the relevant cell identification requirement during the last [5] seconds otherwise it is unknown.

Table 6.2.1.2.1-1: Time to identify target NR cell for RRC connection re-establishment to NR intrafrequency cell

Serving cell	Frequency range	T _{identify_intra_NR} [ms]				
SSB Ês/lot (dB)	(FR) of target NR	Known NR cell	Unknown NR cell			
	cell					
≥ [-8]	FR1	MAX (200 ms, [5] x T _{SMTC})	MAX (800 ms, [10] x T_{SMTC})			
≥ [-8]	FR2	N/A	MAX (1000 ms, [80] x T _{SMTC}))			
< [-8]	FR1	N/A	800 ^{Note1}			
< [-8]	FR2	N/A	3520 ^{Note1}			
Note 1: The UE	is not required to succe	essfully identify a cell on any NR free	quency layer when $T_{SMTC} > 20 \text{ ms and}$			
serving	cell SSB Ês/lot < [-8] dE	3.				

Table 6.2.1.2.1-2: Time to identify target NR cell for RRC connection re-establishment to NR interfrequency cell

Serving cell SSB	Frequency range	T _{identify_inter_NR, i} [ms]				
Ês/lot (dB)	(FR) of target NR	Known NR cell Unknown NR cell				
	cell					

≥ [-8]	FR1	MAX (200 ms, [6] x T _{SMTC, i})	MAX (800 ms, [13] x T _{SMTC, i})
≥ [-8]	FR2	N/A	MAX (1000 ms, [104] x T _{SMTC, i}))
< [-8]	FR1	N/A	800 ^{Note1}
< [-8]	FR2	N/A	4000 ^{Note1}
Note 1:	The UE is not required to succ	essfully identify a cell on any NR fre	quency layer when T _{SMTC,i} > 20 ms and
	serving cell SSB Ês/lot < [-8] d	B.	

The normative reference for this requirement is TS 38.133 [6] clause 6.2.1.

7.3.2.1.1 NR SA FR2 RRC re-establishment

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The test tolerances and test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD
- Message content is TBD
- Minimum conformance requirements contain square brackets [RAN4 dependant]
- Test requirement contains square brackets [RAN4 dependant]

7.3.2.1.1.1 Test purpose

The purpose of this test is to verify that the NR intra-frequency RRC re-establishment delay in FR2 without known target cell is within the specified limits.

7.3.2.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.3.2.1.1.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 7.3.2.1.0

The normative reference for this requirement is TS 38.133 [6] clause A.7.3.2.1.1

7.3.2.1.1.4 Test description

7.3.2.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.3.2.1.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 7.3.2.1.1.4.1-2. Test environment parameters are given in Table 7.3.2.1.1.4.1-3.

Table 7.3.2.1.1.4.1-1: Intra-frequency RRC re-establishment in FR2 supported test configurations

	Config	Description
1		NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note:	The UE is only red	ruired to be tested in one of the supported test configurations depending on UE capability

Table 7.3.2.1.1.4.1-2: General test parameters for Intra-frequency RRC re-establishment in FR2

	Parameter	Unit	Test configuration	Value	Comment
Initial	Active cell		1	Cell1	
condition	Neighbour cells		1	Cell2	
Final condition	Active cell		1	Cell2	
RF Channe	el Number		1	1	
			1	3 μs	Synchronous cells
N310		-	1	1	Maximum consecutive out-of-sync indications from lower layers
N311		-	1	1	Minimum consecutive in-sync indications from lower layers
T310		ms	1	0	Radio link failure timer; T310 is disabled
T311		ms	1	5000	RRC re-establishment timer
Access Ba	rring Information	-	1	Not Sent	No additional delays in random access procedure.
SSB config	guration		1	SSB.1 FR2	
SMTC con	figuration		1	SMTC pattern 1	
DRX cycle	length	S	1	OFF	
PRACH co	onfiguration index		1	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
T1		S	1	5	
T2		ms	1	1600	Time for the UE to detect RLF
T3		S	1	6	

Table 7.3.2.1.1.4.1-3: Test Environment Intra-frequency RRC re-establishment in FR2

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.5.1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2		
Channel	As specified	by the test configuration selected fr	om Table 7.3.2.1.1.4.1-1		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	FFS	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	FFS			
Exceptions to					
connection					
diagram					

- 1. Message contents are defined in clause 7.3.2.1.1.4.3.
- 2. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.1.1 and C.1.2 for this test.

7.3.2.1.1.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, becomes inactive. The time period T3 starts after the occurrence of the radio link failure.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.3.2.1.1.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.

- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.3.2.1.1.5-1. T2 starts
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 7.3.2.1.1.5-1. T3 starts
- 7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2 within [6] s from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

7.3.2.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause FFS with the following exceptions:

Table 7.3.2.1.1.4.3-1: Common Exception messages for NR intra-frequency RRC re-establishment test case in FR2

Default Message Contents				
Common contents of system information blocks	FFS			
exceptions				
Default RRC messages and information	FFS			
elements contents exceptions				
·				

7.3.2.1.1.5 Test requirement

Table 7.3.2.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.3.2.1.1.5-1 : Cell specific test parameters for NR intra-frequency RRC re-establishment test case in FR2

Parameter	Unit	Test		Cell 1			Cell 2	
		configuration	T1	T2	T3	T1	T2	Т3

Note 2:

Note 3:

TDD configuration		1	TI	DDConf.3.2	L	T	DDConf.3.	.1
		1	S	SR.3.1 TDD			N/A	
RMSI CORESET		1	C	CR.3.1 FDD		CR.3.1 FDD)
RMC configuration								
Dedicated CORESET		1	C	CR.3.1 FDI)	С	CR.3.1 FD	D
RMC configuration								
TRS configuration		1	TF	RS.2.1 TDI)		N/A	
TCI state		1	CSI	I-RS.Config	g.0		N/A	
OCNG Pattern		1	OP.1 d	efined in A	.3.2.1	OP.1 (defined in A	٩.3.2.1
Initial DL BWP		1		DLBWP.0.1		I	OLBWP.0.2	L
configuration								
Initial UL BWP		1	l L	JLBWP.0.1		(JLBWP.0.2	L
configuration								
RLM-RS		1		SSB			SSB	
AoA setup		1	Setup 1	defined in A	4.3.15.1	Setup 1	defined in	A.3.15.1
$\hat{ extbf{E}}_{ extsf{s}}/ extbf{I}_{ ext{ot}}$	dB	1	1.81+TT	-infinity	-infinity	-	5+TT	5+TT
s / ot						3.64+T		
						T		
$N_{_{OC}}$ Note2	dBm/SCS	1			-98			
$N_{_{OC}}$ Note2	dBm/15 kHz	1			-98			
\hat{E}_s/N_{oc}	dB	1	8+TT	-infinity	-infinity	5+TT	5+TT	5+TT
SS-RSRP Note3	dBm/SCS	1	-90+TT	-infinity	-infinity	-93+TT	-93+TT	-
				,	1			93+TT
lo	dBm/95.04 MHz	1	-	-infinity	-infinity	-	-	-
			58.81+TT			58.81+	62.82+	62.82+
						TT	TT	TT
Propagation		1	AWGN					
Condition								
Note 1: OCNG shall	be used such that both	cells are fully a	llocated and a	constant t	otal transm	itted powe	r spectral (density
	is achieved for all OFDM symbols.							
1	=							

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

SS-RSRP levels have been derived from other parameters for information purposes. They are not settable

Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers

The RRC re-establishment delay to an unknown NR intra frequency cell shall be less than [6] s.

and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.3.2.1.2 NR SA FR2 - FR2 RRC re-establishment

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The test tolerances and test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD

parameters themselves.

- Message content is TBD
- Minimum conformance requirements contain square brackets [RAN4 dependant]
- Test requirement contains square brackets [RAN4 dependant]

7.3.2.1.2.1 Test purpose

The purpose of this test is to verify that the NR inter-frequency RRC re-establishment delay in FR2 without known target cell is within the specified limits.

7.3.2.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.3.2.1.2.3 Minimum conformance requirement

The minimum conformance requirements are specified in clause 7.3.2.1.0

The normative reference for this requirement is TS 38.133 [6] clause A.7.3.2.1.2

7.3.2.1.2.4 Test description

7.3.2.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.3.2.1.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 7.3.2.1.2.4.1-2. Test environment parameters are given in Table 7.3.2.1.2.4.1-3.

Table 7.3.2.1.2.4.1-1: Inter-frequency RRC re-establishment in FR2 supported test configurations

	Config	Description
1		NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note:	The UE is only re-	quired to be tested in one of the supported test configurations depending on UE capability

Table 7.3.2.1.2.4.1-2: General test parameters for Inter-frequency RRC re-establishment in FR2

Parameter		Unit	Test	Value	Comment
			configuration		
Initial	Active cell		1	Cell1	
condition	Neighbour cells		1	Cell2	
Final	Active cell		1	Cell2	
condition					
RF Channe	el Number		1	1, 2	
			1	3 μs	Synchronous cells
N310		-	1	1	Maximum consecutive out-of-sync indications from lower layers
N311	N311		1	1	Minimum consecutive in-sync indications from lower layers
T310		ms	1	0	Radio link failure timer; T310 is disabled
T311		ms	1	5000	RRC re-establishment timer
Access Bai	Access Barring Information		1	Not Sent	No additional delays in random access procedure.
SSB config	uration		1	SSB.1 FR2	
			1	SMTC pattern 1	
DRX cycle length		S	1	OFF	
PRACH configuration index			1	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
T1	T1		1	5	
T2		ms	1	1600	Time for the UE to detect RLF
T3		S	1	6	

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, Table FFS and TS 38.5	08-1 [14] clause 4.3.1 and 4.4.2		
Channel bandwidth	As specified	by the test configuration selected fr	rom Table 7.3.2.1.2.4.1-1		
Propagation conditions	AWGN		As specified in Annex C2.2		
Connection	TE Part	FFS	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	FFS			
Exceptions to connection diagram					

Table 7.3.2.1.2.4.1-3: Test Environment Inter-frequency RRC re-establishment in FR2

- 1. Message contents are defined in clause 7.3.2.1.2.4.3
- 2. There are two cells on two NR carriers specified in the test. Cell 1 is the cell used for registration with the power level set according to Annex C.1.1 and C.1.2 for this test.

7.3.2.1.2.4.2 Test procedure

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, becomes inactive. The time period T3 starts after the occurrence of the radio link failure. During T1, the UE shall be configured with the carrier frequency of cell 2 (with RF Channel Number #2) to ensure that the UE has the context of the carrier frequency of cell 2 by the end of T1.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.3.2.1.2.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.3.2.1.2.5-1. T2 starts
- 6. When T2 expires, the SS shall switch the power setting from T2 to T3 as specified in Table 7.3.2.1.2.5-1. T3 starts
- 7. If the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2 within [6] seconds from the beginning of time period T3, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 8. After T3 expires, cause UE handover back to Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. Cell 1 is the active cell.
- 9. Repeat step 2-8 until the confidence level according to Table G.2.3-1 in Annex G clause G.2 is achieved.

7.3.2.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause FFS with the following exceptions:

Table 7.3.2.1.2.4.3-1: Common Exception messages for NR intra-frequency RRC re-establishment test case in FR2

Default Message Contents					
Common contents of system information blocks	FFS				
exceptions					
Default RRC messages and information	FFS				
elements contents exceptions					
· ·					

7.3.2.1.2.5 Test requirement

Table 7.3.2.1.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.3.2.1.2.5-1: Cell specific test parameters for NR intra-frequency RRC re-establishment test case in FR2

Parameter	Unit	Test		Cell 1 Cell		Cell 2		
		configuration	T1	T2	T3	T1	T2	T3
TDD configuration		1	TI	DDConf.3.	1	Т	TDDConf.3.1	
		1	S	R.3.1 TDD)		N/A	
RMSI CORESET		1	C	R.3.1 FDD)		CR.3.1 FDE)
RMC configuration								
Dedicated CORESET		1	C	CR.3.1 FDI	D	С	CR.3.1 FD	D
RMC configuration								
TRS configuration		1	Ti	RS.2.1 TDI)		N/A	
TCI state		1	CS	l-RS.Confiç	g.0		N/A	
OCNG Pattern		1	OP.1 d	efined in A	.3.2.1	OP.1 c	defined in A	۸.3.2.1
Initial DL BWP		1		LBWP.0.1		[DLBWP.0.1	L
configuration								
Initial UL BWP		1	l	JLBWP.0.1		ULBWP.0.1		
configuration								
RLM-RS		1		SSB		SSB		
AoA setup		1	Setup 1	defined in A	4.3.15.1	Setup 1 defined in A.3.15.1		
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1	5+TT	-infinity	-infinity	-infinity	-infinity	8+TT
$N_{_{oC}}$ Note2	dBm/SCS	1			-98+7	ГТ		
$N_{oc}^{ m Note2}$	dBm/15 kHz	1			-98+7	ГТ		
\hat{E}_s/N_{oc}	dB	1	5+TT	-infinity	-infinity	-infinity	-infinity	8+TT
SS-RSRP Note3	dBm/SCS	1	-93+TT	-infinity	-infinity	-infinity	-infinity	-
						1		90+TT
lo	dBm/95.04 MHz	1	-	-infinity	-infinity	-infinity	-infinity	-
			62.82+TT			1		60.37+
								TT
Propagation		1			AWG	N		•
Condition								

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown NR inter frequency cell shall be less than [6] s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90% with a confidence level of 95%.

- 7.3.2.2 Random access
- 7.3.2.3 RRC connection release with redirection
- 7.4 Timing
- 7.4.1 UE transmit timing
- 7.4.2 UE timer accuracy
- 7.4.3 Timing advance
- 7.5 Signalling characteristics
- 7.5.1 Radio link monitoring
- 7.5.2 Interruption
- 7.5.3 SCell activation and deactivation delay
- 7.5.4 UE UL carrier RRC reconfiguration delay
- 7.5.5 Link recovery procedures
- 7.5.5.0 Minimum conformance requirements
- 7.5.5.0.1 Minimum conformance requirements for SSB-based BFD and link recovery procedures

UE shall be able to evaluate whether the downlink radio link quality on the configured SSB resource in set \overline{Q}_0 estimated over the last $T_{\text{Evaluate_BFD_SSB}}$ [ms] period becomes worse than the threshold $Q_{\text{out_LR_SSB}}$ within $T_{\text{Evaluate_BFD_SSB}}$ [ms] period.

The value of $T_{\text{Evaluate BFD SSB}}$ is defined in Table 7.5.5.0.1-1 for FR2 with N=8

For FR2.

- $P=1/(1-T_{SSB}/T_{SMTCperiod})$, when BFD-RS is not overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$).
- P is $P_{\text{sharing factor}}$, when BFD-RS is not overlapped with measurement gap and BFD-RS is fully overlapped with SMTC period ($T_{\text{SSB}} = T_{\text{SMTCperiod}}$).
- P is $1/(1-T_{SSB}/MGRP-T_{SSB}/T_{SMTCperiod})$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and
- $T_{SMTCperiod} \neq MGRP$ or
- $T_{SMTCperiod} = MGRP \text{ and } T_{SSB} \le 0.5*T_{SMTCperiod}$

- P is $1/(1-T_{SSB}/MGRP)^*$ P_{sharing factor}, when BFD-RS is partially overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{SSB} = 0.5*T_{SMTCperiod}$
- P is $1/\{1-T_{SSB} / min (T_{SMTCperiod}, MGRP)\}$, when BFD-RS is partially overlapped with measurement gap ($T_{SSB} < MGRP$) and BFD-RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap.
- P is $1/(1-T_{SSB}/MGRP)*P_{sharing\ factor}$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is fully overlapped with SMTC occasion ($T_{SSB} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)
- $P_{\text{sharing factor}} = 3$.

If the high layer in TS 38.331 [2] signalling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

Longer evaluation period would be expected if the combination of BFD-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

 $\begin{tabular}{c|cccc} \textbf{Configuration} & \textbf{T}_{\tt Evaluate_BFD_SSB} \ \textbf{(ms)} \\ & no \ \mathsf{DRX} & max([50], \ ceil(5^*P^*N)^*T_{\tt SSB}) \\ \\ \mathsf{DRX} \ cycle \leq 320ms & max([50], \ ceil(7.5^*P^*N)^*max(T_{\tt DRX}, T_{\tt SSB})) \\ \\ \mathsf{DRX} \ cycle > 320ms & ceil(5^*P^*N)^*T_{\tt DRX} \\ \end{tabular}$

Table 7.5.5.0.1-1: Evaluation period T_{Evaluate_BFD_out} for FR2

Note: $T_{\rm SSB}$ is the periodicity of SSB in the set $\overline{q}_{\rm 0}$. $T_{\rm DRX}$ is the DRX cycle length.

When the radio link quality on all the configured RS resources in set \overline{q}_0 is worse than $Q_{\text{out_LR}}$, Layer 1 of the UE shall send a beam failure instance indication to the higher layers. A Layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331 [13].

The beam failure instance evaluation for the configured RS resources in set \overline{q}_0 shall be performed as specified in section 6 in TS 38.213 [8]. Two successive indications from Layer 1 shall be separated by at least $T_{Indication_interval_BFD}$.

When DRX is not used, $T_{Indication_interval_BFD}$ is max(2ms, $T_{BFD-RS,M}$), where $T_{BFD-RS,M}$ is the shortest periodicity of all configured RS resources in set \overline{q}_0 for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set \overline{q}_0 or CSI-RS resource in the set \overline{q}_0 .

When DRX is used, $T_{Indication_interval_BFD}$ is max(1.5*DRX_cycle_length, 1.5* $T_{BFD-RS,M}$) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms.

UE shall be able to evaluate whether the L1-RSRP measured on the configured SSB resource in set \overline{q}_1 estimated over the last $T_{\text{Evaluate_CBD_SSB}}$ [ms] period becomes better than the threshold $Q_{\text{in_LR}}$ provided SSB_RP and SSB \hat{E} s/Iot are according to Annex Table B.2.4.1 for a corresponding band.

The value of T_{Evaluate_CBD_SSB} is defined in Table 7.5.5.0.1-2 for FR2 with N=8.

For FR2,

- $P=1/(1-T_{SSB}/T_{SMTCperiod})$, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$).
- P is 3, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC period ($T_{SSB} = T_{SMTCperiod}$).
- P is 1/(1- T_{SSB}/MGRP T_{SSB}/T_{SMTCperiod}), when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion (T_{SSB} < T_{SMTCperiod}) and SMTC occasion is not overlapped with measurement gap and
- T_{SMTCperiod} ≠ MGRP or

- $T_{\text{SMTCperiod}} = MGRP \text{ and } T_{\text{SSB}} \leq 0.5*T_{\text{SMTCperiod}}$

Note:

- P is $1/(1-T_{SSB}/MGRP)*3$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{SSB} = 0.5*T_{SMTCperiod}$
- P is $1/\{1-T_{SSB}/min(T_{SMTCperiod},MGRP)\}$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{SSB} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap
- P is $1/(1-T_{SSB}/MGRP)$ *3, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC occasion ($T_{SSB} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)

In both FR1 and FR2, if different SCS is used for SSB and CSI-RS, and the UE does not support simultaneousRxDataSSB-DiffNumerology, it is assumed that the SSB configured for candidate beam detection and each CSI-RS resource shall be TDMed transmitted.

In FR2, it is assumed that the SSB configured for candidate beam detection and each CSI-RS resource shall be TDMed transmitted.

 T_{SSB} is the periodicity of SSB in the set \overline{q}_1 . T_{DRX} is the DRX cycle

Table 7.5.5.0.1-2: Evaluation period $T_{\text{Evaluate_CBD_out}}$ for FR2

The normative reference for this requirement is TS 38.133 [6] clause 8.5.2.2, 8.5.4 and 8.5.5.2.

7.5.5.0.2 Minimum conformance requirements for CSI-RS-based BFD and link recovery procedures

UE shall be able to evaluate whether the downlink radio link quality on the configured CSI-RS resource in set \overline{Q}_0 estimated over the last $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period becomes worse than the threshold $Q_{\text{out_LR_CSI-RS}}$ within $T_{\text{Evaluate_BFD_CSI-RS}}$ [ms] period.

The value of $T_{\text{Evaluate_BFD_CSI-RS}}$ is defined in Table 7.5.5.0.2-1 for FR2 with N=1

Editor's Note: It is FFS if a CSI-RS resource in the resource set with repetition "ON" can be configured as a BFD-RS. If CSI-RS for BFD can be in the resource set with repetition "ON", N=8 may apply.

Editor's Note: FFS if there are other conditions with N=8.

For FR2,

- P=1, when BFD-RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.
- $P=1/(1-T_{CSI-RS}/MGRP)$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is not overlapped with SMTC occasion ($T_{CSI-RS} < MGRP$)
- $P=1/(1-T_{CSI-RS}/T_{SMTCperiod})$, when BFD-RS is not overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$).
- P is $P_{\text{sharing factor}}$, when BFD-RS is not overlapped with measurement gap and BFD-RS is fully overlapped with SMTC occasion ($T_{\text{CSI-RS}} = T_{\text{SMTCperiod}}$).
- P is $1/(1-T_{CSI-RS}/MGRP-T_{CSI-RS}/T_{SMTCperiod})$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion (TCSI-RS $< T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and

- $T_{SMTCperiod} \neq MGRP$ or
- $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} < 0.5*T_{SMTCperiod}$
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ $P_{sharing factor}$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} = 0.5^*T_{SMTCperiod}$
- P is 1/{1- T_{CSI-RS} /min (T_{SMTCperiod} ,MGRP)}, when BFD-RS is partially overlapped with measurement gap (T_{CSI-RS} < MGRP) and BFD-RS is partially overlapped with SMTC occasion (T_{CSI-RS} < T_{SMTCperiod}) and SMTC occasion is partially or fully overlapped with measurement gap.
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ $P_{sharing\ factor}$, when BFD-RS is partially overlapped with measurement gap and BFD-RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$)
- P_{sharing factor} is 3.

If the high layer in TS 38.331 [2] signalling of smtc2 is configured, $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc2; Otherwise $T_{SMTCperiod}$ corresponds to the value of higher layer parameter smtc1.

NOTE: The overlap between CSI-RS for BFD and SMTC means that CSI-RS for BFD is within the SMTC window duration.

Longer evaluation period would be expected if the combination of BFD-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

The values of $M_{\mbox{\scriptsize BFD}}$ used in Table 7.5.5.0.2-1 is defined as

- M_{BFD} = 10, if the CSI-RS resource configured for BFD is transmitted with Density = 3.

Table 7.5.5.0.2-1: Evaluation period T_{Evaluate BFD CSI-RS} for FR2

Con	nfiguration	T _{Evaluate_BFD_CSI-RS} (ms)		
ı	no DRX	$max([50], [M_{BFD} *P*N] * T_{CSI-RS})$		
DRX cycle ≤ 320ms		$max([50], [1.5 \times M_{BFD} \times P \times N] \times max(T_{DRX}, T_{CSI-RS}))$		
DRX c	ycle > 320ms	[M _{BFD} *P*N] * T _{DRX}		
Note: T_{CSI-RS} is the periodicity of CSI-RS resource in the set \overline{q}_0 . T_{DRX} is to DRX cycle length.				

When the radio link quality on all the configured RS resources in set \overline{q}_0 is worse than $Q_{\text{out_LR}}$, Layer 1 of the UE shall send a beam failure instance indication to the higher layers. A Layer 3 filter may be applied to the beam failure instance indications as specified in TS 38.331 [13].

The beam failure instance evaluation for the configured RS resources in set \overline{q}_0 shall be performed as specified in section 6 in TS 38.213 [8]. Two successive indications from Layer 1 shall be separated by at least T_{Indication interval BFD}.

When DRX is not used, $T_{Indication_interval_BFD}$ is max(2ms, $T_{BFD-RS,M}$), where $T_{BFD-RS,M}$ is the shortest periodicity of all configured RS resources in set \overline{q}_0 for the accessed cell, corresponding to either the shortest periodicity of the SSB in the set \overline{q}_0 or CSI-RS resource in the set \overline{q}_0 .

When DRX is used, $T_{Indication_interval_BFD}$ is max(1.5*DRX_cycle_length, 1.5* $T_{BFD-RS,M}$) if DRX cycle_length is less than or equal to 320ms, and $T_{Indication_interval}$ is DRX_cycle_length if DRX cycle_length is greater than 320ms.

UE shall be able to evaluate whether the L1-RSRP measured on the configured CSI-RS resource in set \overline{q}_1 estimated over the last $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period becomes better than the threshold $Q_{\text{in_LR}}$ within $T_{\text{Evaluate_CBD_CSI-RS}}$ [ms] period provided CSI-RS \hat{E} s/Iot is according to Annex Table B.2.4.2 for a corresponding band.

The value of T_{Evaluate CBD CSI-RS} is defined in Table 7.5.5.0.2-2 for FR2 with N=8.

Editor's Note: FFS whether N=1 need to be applied for CSI-RS based candidate beam detection in FR2.

For FR2,

- P=1, when candidate beam detection RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.
- $P=1/(1-T_{CSI-RS}/MGRP)$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is not overlapped with SMTC occasion ($T_{CSI-RS} < MGRP$)
- $P=1/(1-T_{CSI-RS}/T_{SMTCperiod})$, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$).
- P is 3, when candidate beam detection RS is not overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$).
- P is $1/(1-T_{CSI-RS}/MGRP-T_{CSI-RS}/T_{SMTC,period})$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion (TCSI-RS < $T_{SMTC,period}$) and SMTC occasion is not overlapped with measurement gap and
- $T_{SMTCperiod} \neq MGRP$ or
- $T_{\text{SMTCperiod}}$ = MGRP and $T_{\text{CSI-RS}}$ < 0.5* $T_{\text{SMTCperiod}}$
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ 3, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is not overlapped with measurement gap and $T_{SMTCperiod} = MGRP$ and $T_{CSI-RS} = 0.5*T_{SMTCperiod}$
- P is $1/\{1-T_{CSI-RS} / min (T_{SMTCperiod}, MGRP)\}$, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is partially overlapped with SMTC occasion ($T_{CSI-RS} < T_{SMTCperiod}$) and SMTC occasion is partially or fully overlapped with measurement gap
- P is $1/(1-T_{CSI-RS}/MGRP)^*$ 3, when candidate beam detection RS is partially overlapped with measurement gap and candidate beam detection RS is fully overlapped with SMTC occasion ($T_{CSI-RS} = T_{SMTCperiod}$) and SMTC occasion is partially overlapped with measurement gap ($T_{SMTCperiod} < MGRP$) [Longer evaluation period would be expected if the CSI-RS is on the same OFDM symbols with RLM/BFD/BM-RS, or other CBD-RS, according to the measurement restrictions defined in section TBD.]

In both FR1 and FR2, if different SCS is used for SSB and CSI-RS, and the UE does not support simultaneousRxDataSSB-DiffNumerology, it iss assumed that the CSI-RS configured for candidate beam detection and each SSB shall be TDMed transmitted.

In FR2, It is assumed that the CSI-RS configured for candidate beam detection with N=1 shall be TDMed with any RS resources configured for RLM/BFD/CBD/L1-RSRP reporting which is not is QCL-Type D with this CSI-RS resource or under the conditions of N>1 as specified in TS 38.133 [6] section 8.1.2.2, 8.1.2.3, 8.5.2.2, 8.5.2.3, 8.5.2.5, 8.5.2.6, 9.5.4.1 and 9,5,4,2.

The values of M_{CBD} used in Table 7.5.5.0.2-2 is defined as

- $M_{CBD} = 3$, if the CSI-RS resource configured in the set \overline{q}_1 is transmitted with Density = 3.

Table 7.5.5.0.2-2: Evaluation period T_{Evaluate CBD CSI-RS} for FR2

Configuration		T _{Evaluate_CBD_CSI-RS} (ms)		
no	on-DRX	$max([25], ceil(M_{CBD} *P*N) * T_{CSI-RS})$		
DRX cycle ≤ 320ms		ceil(M_{CBD} *P*N*1.5) * max(T_{DRX} , T_{CSI-RS})		
DRX cy	ycle > 320ms	ceil(M _{CBD} *P*N) *T _{DRX}		
Note: T_{CSI-RS} is the periodicity of CSI-RS resource in the set \overline{q}_1 . T_{DRX} is DRX cycle length.				

The normative reference for this requirement is TS 38.133 [6] clause 8.5.3.2, 8.5.4 and 8.5.6.2.

7.5.5.1 NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Connection diagram is TBD.
- Test requirements are between brackets.

7.5.5.1.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects SSB-based beam failure in the set q_0 configured for a serving cell and that the UE performs correct SSB-based link recovery based on beam candidate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when no DRX is used.

To partly verify the SSB based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

7.5.5.1.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.5.5.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.5.5.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.7.5.5.1.

7.5.5.1.4 Test description

There is one NR serving cell configured in this test. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.5.5.1.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate SSB based beam failure.

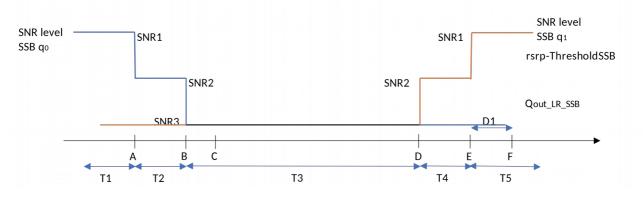


Figure 7.5.5.1.4-1: SNR variation SSB for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

7.5.5.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.5.5.1.4.1-1.

Table 7.5.5.1.4.1-1: Supported test configurations for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

Con	figuration	Description		
1		TDD duplex mode, 120 kHz SSB SCS, 100MHz bandwidth		
2		TDD duplex mode, 240 kHz SSB SCS, 100MHz bandwidth		
Note: The UE is only required to pass in one of the supported test configurations in FR2				

Configure the test equipment and the DUT according to the parameters in Table 7.5.5.1.4.1-2.

Table 7.5.5.1.4.1-2: Initial conditions for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies		in Annex E, table E.5-1 and TS 38.5			
Channel	As specified	by the test configuration selected fr	om Table 7.5.5.1.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.TBD			
Exceptions to	N/A				
connection					
diagram					

- 1. The general test parameter settings are set up according to Table 7.5.5.1.4.1-3. The measurement gap configuration is according to Table 7.5.5.1.4.1-4.
- 2. Message contents are defined in clause 7.5.5.1.4.3.
- 3. There is one NR carrier and one NR cells specified in the test. Cell 1 is the NR cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.5.5.1.4.1-3: General test parameters for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

Parar	neter	Unit	Value	Comment
			Test 1	
Active PCell			Cell 1	
RF Channel Num	ber		1	
Duplex mode	Config 1, 2		TDD	
BW _{channel}	Config 1, 2		100: $N_{RB,c} = 66$	
DL initial BWP configuration	Config 1, 2		DLBWP.0.1	
DL dedicated BWP configuration	Config 1, 2		DLBWP.1.1	
UL initial BWP configuration	Config 1, 2		ULBWP.0.1	
UL dedicated BWP configuration	Config 1, 2		ULBWP.1.1	
TDD Configuration	Config 1, 2		TDDConf.3.1	
CORESET Reference Channel	Config 1		CR. 3.1 TDD	
SSB Configuration	Config 1, 2		SSB.1 FR2	

SMTC		Config 1, 2		SMTC.1			
Configu	ration	Coming 1, 2		SIVIT C.I			
PDSCH H subca spacing	ırrier	Config 1, 2		120 KHz			
	PRACH Config 1, 2 Configuration			Table A.3.8.3.4			
SSB ind	lex assigne	ed as BFD RS		0			
SSB ind	lex assigne	ed as CBD RS		1			
TCI Configu	ration	Config 1, 2		TBD			
OCNG	parameters	3		OP.1			
CP leng				Normal			
Correlat Configu		and Antenna		2x2 Low			
<u> </u>	DCI forma			1-0			
Beam	Number of OFDM sy			2			
failure	Aggregat		CCE	8			
detect	Ratio of h	ypothetical	dB	0			
ion trans		RE energy to					
missio	energy	CSI-RS RE					
n	Ratio of h	nypothetical	dB	0			
param	PDCCH [DMRS energy					
eters		e CSI-RS RE					
	energy DMRS pr	ecoder		REG bundle size			
	granularit			NEO buridie 3ize			
	REG bun	dle size		6			
DRX				OFF			
Gap pat		ncThreshold		gp0 absent	When the field is		
ПППЗу	ncouloisy	ncmesnou		ausen	absent, the UE applies the value 0. (Table 8.1.1-1).		
rsrp-Thr	esholdSSE	3	dBm	[-94.5]	Threshold used for Qout_LR_SSB		
powerC	verControlOffsetSS			db0	Used for deriving rsrp-ThresholdCSI-RS		
beamFa	FailureInstanceMaxCount		FailureInstanceMaxCount			n2	see clause 5.17 of TS 38.321 [7]
beamFa	beamFailureDetectionTimer			pbfd4	see clause 5.17 of TS 38.321 [7]		
CSI-RS configuration Config 1, 2			[CSI-RS.3.3 TDD]				
TCI stat	TCI states			[TCI.State.0]			
CSI-RS for tracking Config 1, 2			[TRS.2.1 TDD]				
T1	U		S	1	During this time the the UE shall be fully synchronized to cell 1		
T2			S	0.4			
T3			S	[0.6]			
T4			S	[0.4]			
T5 D1			S S	[1.4] [0.44]			
דח	D1			[U. 44]			

Note 1: All configurations are assigned to the UE prior to the start of time period T1.

Note 2: UE-specific PDCCH is not transmitted after T1 starts.

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

Table 7.5.5.1.4.1-4: Measurement gap configuration for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

Field	Test 2			
Field	Value			
gapOffset	0			

7.5.5.1.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 7.5.5.1.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.5.5.1.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.5.5.1.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.5.5.1.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.5.5.1.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. When T5 expires the SS shall change the SNR value to T1 as specified in Table 7.5.5.1.5-1.
- 9. Wait 1s for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within 1s continue to step 11. Otherwise continue to step 10.
- 10. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 11. Repeat steps 2-10 for until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.5.5.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.5.5.1.4.3-1: Common Exception messages for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED and GAP NEEDED;
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR2, SMTC.1 and RLM
	Table H.3.1-4 with a3-offset = -6dB;
	Table H.3.1-6 with Condition RLM.
	Table H.3.1-8 with Condition SSB BFD
	Table H.3.1-10 with Condition SSB
	Table H.3.1-11

7.5.5.1.5 Test requirement

Tables 7.5.5.1.4.1-3 and 7.5.5.1.5-1 define the primary level settings including test tolerances for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX.

Table 7.5.5.1.5-1: NR Cell specific test parameters for NR SA FR2 SSB-based beam failure detection and link recovery in non-DRX

	Parameter	Unit	Test 1					Test 1					
			SSB of set q ₀ SSB of set q ₁										
			T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	
EPRE ra	tio of PDCCH	dB			-								
DMRS to	SSS												
EPRE ratio of PDCCH to		dB											
PDCCH	PDCCH DMRS												
	EPRE ratio of PBCH DMRS												
to SSS													
EPRE ratio of PBCH to		dB											
PBCH DMRS		dB			0					0			
	EPRE ratio of PSS to SSS												
	PRE ratio of PDSCH												
DMRS to													
EPRE ratio of PDSCH to		dB											
PDSCH DMRS		dB											
	PRE ratio of OCNG DMRS												
to SSS	Config 1 0	dB	[[]	[0]	[10]	[10]	[10]	[10]	[10]	[10]	[[]	[10]	
SNR	Config 1, 2	dBm/1	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]	
N_{oc}	Config 1, 2	5KHz			[-98]					[-98]			
Dronagat	tion condition	SKHZ	TDLA30-75 TDLA30-75				75						
Note 1:	1, 1, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,												
Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.													
Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.													
Note 3:	NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time												
. 1010 0.	period T1.		garat				a.soigi lo		5 - p.10		car or t	0	
Note 4:	1	easurement gap configuration is assigned to the UE prior to the start of time period T1.											
Note 5:	The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.												
	The state of the s												

Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.

Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.

Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.5.5.1.1-1.

Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6].

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

7.5.5.2 NR SA FR2 SSB-based beam failure detection and link recovery in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Connection diagram is TBD.
- Test requirements are between brackets.

7.5.5.2.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects SSB-based beam failure in the set q_0 configured for a serving cell and that the UE performs correct SSB-based link recovery based on beam candidate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when DRX is used.

To partly verify the SSB based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

7.5.5.2.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.5.5.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.5.5.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.7.5.5.2.

7.5.5.2.4 Test description

There are one NR serving cell configured in this test. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.5.5.2.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate SSB based beam failure.

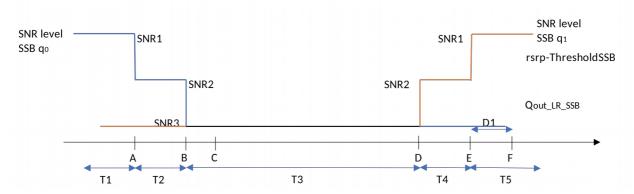


Figure 7.5.5.2.4-1: SNR variation SSB for NR SA FR2 SSB-based beam failure detection and link recovery in DRX

7.5.5.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.5.5.2.4.1-1.

Table 7.5.5.2.4.1-1: Supported test configurations for NR SA FR2 SSB-based beam failure detection and link recovery in DRX

Configuration	Description				
1	TDD duplex mode, 120 kHz SSB SCS, 100MHz bandwidth				
2	TDD duplex mode, 240 kHz SSB SCS, 100MHz bandwidth				
Note: The UE is only required to pass in one of the supported test configurations in FR2					

Configure the test equipment and the DUT according to the parameters in Table 7.5.5.2.4.1-2.

Table 7.5.5.2.4.1-2: Initial conditions for NR SA FR2 SSB-based beam failure detection and link recovery in DRX

Parameter		Value	Comment				
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies		in Annex E, table E.5-1 and TS 38.5					
Channel	As specified by the test configuration selected from Table 7.5.5.2.4.1-1.						
bandwidth							
Propagation	AWGN		As specified in Annex C.2.2.				
conditions							
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.TBD					
Exceptions to	N/A						
connection							
diagram							

- 1. The general test parameter settings are set up according to Table 7.5.5.2.4.1-3. The measurement gap configuration is according to Table 7.5.5.2.4.1-4. The DRX configuration is according to Table 7.5.5.2.4.1-3. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.
- 2. Message contents are defined in clause 7.5.5.2.4.3.
- 3. There is one NR carrier and one NR cells specified in the test. Cell 1 is the NR cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.5.5.2.4.1-3: General test parameters for NR SA FR2 SSB-based beam failure detection and link recovery in DRX

Paramet	er	Unit	Value	Comment
			Test 1	
Active PCell			Cell 1	
RF Channel Number			1	
Duplex mode	Config 1, 2		TDD	
BW _{channel}	Config 1, 2		100: $N_{RB,c} = 66$	
DL initial BWP	Config 1, 2		DLBWP.0.1	
configuration				
DL dedicated BWP	Config 1, 2		DLBWP.1.1	
configuration				
UL initial BWP	Config 1, 2		ULBWP.0.1	
configuration				
UL dedicated BWP	Config 1, 2		ULBWP.1.1	
configuration				
TDD Configuration	Config 1, 2		TDDConf.3.1	
CORESET Reference	Config 1		CR. 3.1 TDD	
Channel				
SSB Configuration	Config 1, 2		SSB.1 FR2	
SMTC Configuration	Config 1, 2		SMTC.1	
PDSCH/PDCCH	Config 1, 2		120 KHz	
subcarrier spacing	Corning 1, 2		120 KHZ	
Subcarrier spacing				
PRACH Configuration	Config 1, 2		Table A.3.8.3.4	
	J 50g _, _		radio / Morero.	
SSB index assigned as	BFD RS (q ₀)		0	
SSB index assigned as	CPD DC (a)		1	
336 illuex assigned as			1	
TCI Configuration	Config 1, 2		TBD	
OCNG parameters			OP.1	
CP length			Normal	
Correlation Matrix and A	ntonno		2x2 Low	
	unenna		ZXZ LUW	
Configuration Beam failure DCI form	not	+	1-0	
	IIdl		T-0	

detection	Number of Co			2	
transmission	OFDM symbo				
parameters	Aggregation le		CCE	8	
	Ratio of hypot	hetical	dB	0	
	PDCCH RE er	nergy to			
	average CSI-F				
	energy				
	Ratio of hypot	hetical	dB	0	
	PDCCH DMR		l ab		
	to average CSI-RS RE				
	energy			DEC hundle size	
	DMRS precod	er		REG bundle size	
	granularity				
	REG bundle s	ıze		6	
DRX				DRX.7	A.3.3.7
	Gap pattern ID			gp0	
rlmInSyncOut	OfSyncThreshol	d		absent	When the field is
					absent, the UE
					applies the value
					0. (Table 8.1.1-
					1).
rsrp-Threshold	rsrp-ThresholdSSB			[-94.5]	Threshold used
					for Q _{out_LR_SSB}
powerControlC	OffsetSS			db0	Used for
-					deriving rsrp-
					ThresholdCSI-
					RS
beamFailureIn	stanceMaxCour	nt		n2	see clause 5.17
					of TS 38.321 [7]
beamFailureD	etectionTimer			pbfd4	see clause 5.17
				ļ	of TS 38.321 [7]
		Config 1,		[CSI-RS.3.3 TDD]	
CSI-RS config	uration	2		[66.1.6.6.6.2.2]	
TCI states				[TCI.State.0]	
		Config 1,		[TRS.2.1 TDD]	
CSI-RS for tra	cking	2		[]	
T1		<u> </u>	s	1	During this time
				_	the the UE shall
					be fully
					synchronized to
					cell 1
T2			s	0.4	OCII I
T3			S	[0.6]	
T4			S	[0.4]	
T5			S	[1.4]	
D1			S	[0.44]	

Note 1: All configurations are assigned to the UE prior to the start of time period T1.

Note 2: UE-specific PDCCH is not transmitted after T1 starts.

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

Table 7.5.5.2.4.1-4: Measurement gap configuration for NR SA FR2 SSB-based beam failure detection and link recovery in DRX

Field	Test 1
Field	Value
gapOffset	0

7.5.5.2.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 7.5.5.2.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.5.5.2.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.5.5.2.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.5.5.2.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.5.5.2.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1
 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. When T5 expires the SS shall change the SNR value to T1 as specified in Table 7.5.5.2.5-1.
- 9. Wait 1s for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within 1s continue to step 11. Otherwise continue to step 10.
- 10. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.5.5.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.5.5.2.4.3-1: Common Exception messages for NR SA FR2 SSB-based beam failure detection and link recovery in DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED and GAP NEEDED;
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR2, SMTC.1 and RLM
	Table H.3.1-4 with a3-offset = -6dB;
	Table H.3.1-6 with Condition RLM.
	Table H.3.1-8 with Condition SSB BFD
	Table H.3.1-10 with Condition SSB
	Table H.3.1-11
	Table H.3.7-1 with condition DRX.7

7.5.5.2.5 Test requirement

Tables 7.5.5.2.4.1-3 and 7.5.5.2.5-1 define the primary level settings including test tolerances for NR SA FR2 SSB-based beam failure detection and link recovery in DRX.

Note 6:

Note 7:

Note 8:

Note 9:

A.7.5.5.2.1-1.

Table 7.5.5.2.5-1: NR Cell specific test parameters for NR SA FR2 SSB-based beam failure detection and link recovery in DRX

	Parameter	Unit	Test 1					Test 1				
				SS	SB of se	t q₀			SS	SB of se	t q₁	
			T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
AoA set	up		Setup 3 defined in A.3.15			Setup 3 defined in A.3.15						
	atio of PDCCH	dB										
DMRS t												
PDCCH	atio of PDCCH to DMRS	dB										
EPRE ra	atio of PBCH	dB										
DMRS t	o SSS											
EPRE ra	atio of PBCH to	dB										
PBCH D	MRS				0					0		
EPRE ra	atio of PSS to SSS	dB										
1	atio of PDSCH	dB										
DMRS t												
1	atio of PDSCH to	dB										
PDSCH	_											
	atio of OCNG	dB										
DMRS t		40	[F]	[0]	[10]	[10]	[10]	[10]	[10]	[10]	[[]	[10]
SNR	Config 1, 2	dB	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
N_{oc}	Config 1, 2	dBm/1 5KHz			[-98]					[-98]		
Propaga	ation condition	JITIZ		Т	DLA30-	75			Т	DLA30-	75	
Note 1:	OCNG shall be use	ed such tl	hat the i				v alloca	ted and				ted
	power spectral der						,					
Note 2:												
Note 3:												
	period T1.		-		ž.	=	-		-			
Note 4:	Measurement gap											
Note 5:	The timers and lay	er 3 filteri	ing relat	ted paran	neters a	re configi	ured prid	or to the	start of t	time peri	od T1.	

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

which supports 4RX on all bands, the SNR during T3 is [A.3.6].

SNR levels correspond to the signal to noise ratio over the SSS REs.

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

The signal contains PDCCH for UEs other than the device under test as part of OCNG.

The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure

The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

7.5.5.3 NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Connection diagram is TBD.
- Test requirements are between brackets.

7.5.5.3.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects CSI-RS-based beam failure in the set q_0 configured for a serving cell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q_1 .

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when no DRX is used.

To partly verify the CSI-RS based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

7.5.5.3.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.5.5.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.5.5.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.7.5.5.3.

7.5.5.3.4 Test description

There is one NR serving cell configured in this test. This test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.5.5.3.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate CSI-RS based beam failure.



Figure 7.5.5.3.4-1: SNR variation CSI-RS for NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

7.5.5.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.5.5.3.4.1-1.

Table 7.5.5.3.4.1-1: Supported test configurations for NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Configuration	Description
1	TDD duplex mode, 120 kHz SSB SCS, 100MHz bandwidth

Configure the test equipment and the DUT according to the parameters in Table 7.5.5.3.4.1-2.

Table 7.5.5.3.4.1-2: Initial conditions for NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Parameter		Value	Comment				
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1				
Test frequencies	As specified	in Annex E, table E.5-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.				
Channel bandwidth	As specified	As specified by the test configuration selected from Table 7.5.5.3.4.1-1.					
Propagation conditions	AWGN		As specified in Annex C.2.2.				
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.TBD					
Exceptions to connection diagram	N/A						

- 1. The general test parameter settings are set up according to Table 7.5.5.3.4.1-3. The NZP-CSI-RS configuration is according to Table 7.5.5.3.4.1-3.
- 2. Message contents are defined in clause 7.5.5.3.4.3.
- 3. There is one NR carrier and one NR cells specified in the test. Cell 1 is the NR cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.5.5.3.4.1-3: General test parameters for NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Parameter		Unit	Value	Comment		
•	aramete.		Test 1			
Active PCell			Cell 1			
RF Channel Nur	nber		1			
Duplex mode	Config 1		TDD			
TDD	Config 1		TDDConf.3.1			
Configuration						
CORESET	Config 1		CR.3.1 TDD	A.3.1.2		
Reference						
Channel						
SSB	Config 1		SSB.1 FR2	A.3.10		
Configuration						
SMTC	Config 1		SMTC.1	A.3.11		
Configuration						
PDSCH/PDCC	Config 1		120KHz			
H subcarrier						
spacing						
	signed as beam failure		[0]			
detection RS in s						
TRS configuration			TRS.2.1 TDD			
TCI configuration			CSI-RS.Config.0			
OCNG paramete	ers		OP.1	A.3.2.1		
CP length			Normal			
Correlation Matr	ix and Antenna		2x2 Low			
Configuration						
Beam failure	DCI format		1-0			
detection	Number of Control		2			
transmission	OFDM symbols					
parameters	Aggregation level	CCE	8			
	Ratio of hypothetical	dB	0			
	PDCCH RE energy to					
	average CSI-RS RE					
	energy					
	Ratio of hypothetical	dB	0			
	PDCCH DMRS					
	energy to average					
	CSI-RS RE energy					
	DMRS precoder		REG bundle size			
	granularity					
	REG bundle size		6			
DRX			OFF			
Gap pattern ID			N.A.			
	signed as candidate		1			
beam detection						
rlmInSyncOutOf	SyncThreshold		absent	When the field is		
				absent, the UE		
				applies the value		
				0. (Table 8.1.1-1).		
rsrp-ThresholdS	SB	dBm	[-94.5]	Threshold used for		
				Q _{in_LR_SSB}		
powerControlOff	setSS		N.A.	Used for deriving		
				rsrp-ThresholdCSI-		
become E-the color	anaaMayO=:::-+		[0]	RS		
beamFailureInst	ancemaxcount		[n2]	see clause 5.17 of		
hoom Failure Dat	ootionTimer		Imbfd 41	TS 38.321 [7]		
beamFailureDet	ection timer		[pbfd4]	see clause 5.17 of		
CCLDC	Config 1		CCL DC 2 2 TDD	TS 38.321 [7]		
CSI-RS	Config 1		CSI-RS.3.2 TDD	A.3.14.2		
configuration			1	During this time		
T1		S	1	During this time the the UE shall be		
				fully synchronized		
				to cell 1		
			1	IO CEIL I		

T2	S	0.4	
T3	S	[0.6]	
T4	S	[0.4]	
T5	S	[1.4]	
D1	S	[0.24]	
Note 1: UE-specific PDCCH is not trans	mitted after	T1 starts.	•

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

7.5.5.3.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is not enabled.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 7.5.5.3.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.5.5.3.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.5.5.3.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.5.5.3.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.5.5.3.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1
 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. When T5 expires the SS shall change the SNR value to T1 as specified in Table 7.5.5.3.5-1.
- 9. Wait 1s for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within 1s continue to step 11. Otherwise continue to step 10.
- 10. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.5.5.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.5.5.3.4.3-1: Common Exception messages for NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

	Default Message Contents							
Common contents of system information blocks exceptions								
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTRA-FREQ and L3 FILTERING NEEDED;							
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR2, SMTC.1 and RLM							
	Table H.3.1-8 with Condition CSI-RS BFD							
	Table H.3.1-10 with Condition CSI-RS							
	Table H.3.1-11							

7.5.5.3.5 Test requirement

Tables 7.5.5.3.4.1-3 and 7.5.5.3.5-1 define the primary level settings including test tolerances for NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX.

Table 7.5.5.3.5-1: NR Cell specific test parameters for NR SA FR2 CSI-RS-based beam failure detection and link recovery in non-DRX

Par	ameter	Unit			Test 1			Test 1				
				CSI	-RS of se	et q₀			CSI	-RS of se	t q₁	
			T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
EPRE ra	tio of PSS	dB										
to SSS												
	tio of PBCH	dB										
DMRS to												
	tio of PBCH	dB										
to PBCH												
EPRE ra		dB										
	DMRS to											
SSS												
EPRE ra		dB										
	to PDCCH				•					•		
DMRS		ID.			0					0		
EPRE ra		dB										
PDSCH	DMRS to											
SSS EPRE ra	tio of	dB										
	to PDSCH	ub										
DMRS	10 PD3CH											
	tio of OCNG	dB										
	SSS ^(Note 1)	ub										
	tio of OCNG	dB										
	DMRS (Note	u D										
1)	2											
SNR C	Config 1	dB	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
SI-RS	Config 2	1	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
	Config 3	1	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
N_{oc}	Config 1	dBm/	r-1	1	[-98]	<u> </u>	<u> </u>	. ==1	<u> </u>	[-98]		<u> </u>
[⊥] V OC	Config 2	15K			[-98]					[-98]		
	Config 3	Hz			[-98]					[-98]		
Propagat				П	DLA30-7	5]			Т]	DLA30-7	5]	
condition						•					-	
NI=+= 1.	00010 -11		-I I - 4I-			0-11.1	£II II					

Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q_1 .

No later than time point F occurring no later than D1 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

7.5.5.4 NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Connection diagram is TBD.
- Test requirements are between brackets.

7.5.5.4.1 Test purpose

The purpose of this test is:

To verify that the UE properly detects CSI-RS-based beam failure in the set q₀ configured for a serving cell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q₁.

To test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when DRX is used.

To partly verify the CSI-RS based beam failure detection and link recovery for an FR2 serving cell requirements in TS 38.133 [6] clause 8.5.

7.5.5.4.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.5.5.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.5.5.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.7.5.5.4.

7.5.5.4.4 Test description

There is one NR serving cell configured in this test. This testconsists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure 7.5.5.4.4-1 shows the five different time durations and the corresponding variation of the downlink SNR in the active cell to emulate CSI-RS based beam failure.



Figure 7.5.5.4.4-1: SNR variation CSI-RS for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

7.5.5.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.5.5.4.4.1-1.

Table 7.5.5.4.4.1-1: Supported test configurations for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

Configuration	Description
7.5.5.4-1	TDD duplex mode, 120 kHz SSB SCS, 100MHz bandwidth

Configure the test equipment and the DUT according to the parameters in Table 7.5.5.4.4.1-2.

Table 7.5.5.4.4.1-2: Initial conditions for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.5-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified by the test configuration selected from Table 6.5.5.3.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to connection diagram	N/A		

- 1. The general test parameter settings are set up according to Table 7.5.5.4.4.1-3. The measurement gap configuration is according to Table 7.5.5.4.4.1-4. The NZP-CSI-RS configuration is according to Table 7.5.5.4.4.1-3. The DRX configuration for is according to Table 7.5.5.4.4.1-3. Time alignment timers shall be set to "infinity" so that UL timing alignment is maintained during the test.
- 2. Message contents are defined in clause 7.5.5.4.4.3.
- 3. There is one NR carrier and one NR cells specified in the test. Cell 1 is the NR cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.5.5.4.4.1-3: General test parameters for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

Parameter		Unit	Value	Comment
			Test 1	
Active PCell			Cell 1	
RF Channel Nun	nber		1	
Duplex mode	Config 1		TDD	
TDD	Config 1		TDDConf.3.1	
Configuration				
CORESET	Config 1		CR.3.1 TDD	A.3.1.2
Reference				
Channel	Confin 1		CCD 1 FD2	A 2 10
SSB Configuration	Config 1		SSB.1 FR2	A.3.10
SMTC	Config 1		SMTC.1	A.3.11
Configuration	Coming 1		SWITC.1	7.5.11
PDSCH/PDCC	Config 1		120 KHz	
H subcarrier				
spacing				
	signed as beam failure		[0]	
detection RS in s				
TRS configuration			TRS.2.1 TDD	
TCI configuration			CSI-RS.Config.0	
OCNG paramete	ers		OP.1	A.3.2.1
CP length			Normal	
Correlation Matri	ix and Antenna		2x2 Low	
Configuration				
Beam failure	DCI format		1-0	
detection	Number of Control OFDM		2	
transmission parameters	symbols Aggregation level	CCE	0	
parameters	Aggregation level Ratio of hypothetical	dB	8	
	PDCCH RE energy to	uБ		
	average CSI-RS RE			
	energy			
	Ratio of hypothetical	dB	0	
	PDCCH DMRS energy to			
	average CSI-RS RE			
	energy			
	DMRS precoder		REG bundle size	
	granularity			
	REG bundle size		6	
DRX			DRX.7	A.3.3.7
Gap pattern ID			*[gp0]	
	signed as candidate beam		1	
detection RS in s				
rlmInSyncOutOf	SyncThreshold		absent	When the field is
				absent, the UE
				applies the value
rsrp-ThresholdS	SB	dBm	-94.5	0. (Table 8.1.1-1). Threshold used for
151p-1111e51101u55b		uDIII	-34.3	Qin_LR_SSB
powerControlOffsetSS			NA	Used for deriving
				rsrp-ThresholdCSI-
				RS
beamFailureInsta	anceMaxCount		[n2]	see clause 5.17 of
				TS 38.321 [7]
beamFailureDetectionTimer			[pbfd4]	see clause 5.17 of
				TS 38.321 [7]
CSI-RS	Config 1		CSI-RS.3.2 TDD	A.3.14.2
configuration				
T1		S	1	During this time
				the the UE shall be fully synchronized
				to cell 1
			1	I O CEILT

T2	S	0.4	
T3	S	[0.6]	
T4	S	[0.4]	
T5	S	[1.4]	
D1	S	[0.44]	
Note 1: UE-specific PDCCH is not transmitted after T1 starts.			

Editor's note: An additional RS for RLM, different from BFD-RS at constant high SNR shall be configured as part of the test configuration.

Table 7.5.5.4.4.1-4: Measurement gap configuration for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

Field	Test 1
Field	Value
gapOffset	0

7.5.5.4.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to NR Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of [2] ms. In the test, DRX configuration is enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms).

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters of NR Cell 1 according to T1 in Table 7.5.5.4.5-1. Propagation conditions are set according to Annex C.2.3. T1 starts.
- 3. When T1 expires the SS shall change the SNR value to T2 as specified in Table 7.5.5.4.5-1. T2 starts.
- 4. When T2 expires the SS shall change the SNR value to T3 as specified in Table 7.5.5.4.5-1. T3 starts.
- 5. When T3 expires the SS shall change the SNR value to T4 as specified in Table 7.5.5.4.5-1. T4 starts.
- 6. When T4 expires the SS shall change the SNR value to T5 as specified in Table 7.5.5.4.5-1. T5 starts.
- 7. If the SS:
 - a) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1
 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point A to time point B

and

b) does not detect any uplink power on NR carrier higher than OFF power defined in TS 38.521-1 [17] clause 6.3.2.5 from time point C until T3 expires

and

c) detects uplink power on NR carrier equal to or higher than minimum output power defined in TS 38.521-1 [17] clause 6.3.1.5 in each slot configured for CQI transmission (according CQI reporting on PUCCH) during the period from time point F (D1 after the start of T5) until T5 expires,

the number of successful tests is increased by one.

Otherwise the number of failed tests is increased by one.

- 8. When T5 expires the SS shall change the SNR value to T1 as specified in Table 7.5.5.4.5-1.
- 9. Wait [1s] for the UE to re-establish the connection or continue directly to step 10. If the UE re-establishes the connection within [1s] continue to step 11. Otherwise continue to step 10.

- 10. Switch the UE on and off. Ensure the UE is in RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 11. Repeat steps 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.5.5.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.5.5.4.4.3-1: Common Exception messages for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-2 with Condition INTER-FREQ, L3 FILTERING NEEDED and GAP NEEDED;
	Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR2, SMTC.1 and RLM
	Table H.3.1-4 with a3-offset = -6dB;
	Table H.3.1-6 with Condition RLM.
	Table H.3.1-8 with Condition CSI-RS BFD
	Table H.3.1-10 with Condition CSI-RS
	Table H.3.1-11;
	Table H3.7-1 with Condition DRX.7

7.5.5.4.5 Test requirement

Tables 7.5.5.4.4.1-3 and 7.5.5.4.5-1 define the primary level settings including test tolerances for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX.

Table 7.5.5.4.5-1: NR Cell specific test parameters for NR SA FR2 CSI-RS-based beam failure detection and link recovery in DRX

Par	ameter	Unit	Test 1 Test 1									
			CSI-RS of set q₀					-RS of se	et q ₁			
			T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
EPRE ra	tio of PSS to	dB										
EPRE ra	tio of PBCH SSS	dB										
EPRE rat	tio of PBCH DMRS	dB										
EPRE rai		dB										
EPRE rai PDCCH t DMRS	tio of to PDCCH	dB			0					0		
EPRE rai PDSCH I SSS		dB										
EPRE rate PDSCH to DMRS	tio of to PDSCH	dB										
	tio of OCNG SSS ^(Note 1)	dB										
	tio of OCNG DMRS (Note	dB										
SNR_C	Config 1	dB	[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
SI-RS	Config 2		[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
	Config 3		[5]	[-3]	[-12]	[-12]	[-12]	[-12]	[-12]	[-12]	[-3]	[10]
N_{oc}	Config 1	dBm/			[-98]					[-98]		
¹ °oc	Config 2	15K	[-98]					[-98]				
	Config 3	Hz	[-98]					[-98]				
Propagat condition	ion		[TDLA30-75] [TDLA30-75]									
Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not												

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

settable parameters themselves.

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q₁.

No later than time point F occurring no later than D1 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q_1 .

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

7.5.6 Active BWP switch delay

7.5.6.1 DCI-based and time-based active BWP switch

7.5.6.1.0 Minimum conformance requirements

FFS

7.5.6.1.1 NR SA FR2 DCI-based DL active BWP switch in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

7.5.6.1.1.1 Test purpose

FFS

7.5.6.1.1.2 Test applicability

FFS

7.5.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.5.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.7.5.6.1.1.

7.5.6.1.1.4 Test description

7.5.6.1.1.4.1 Initial conditions

FFS

7.5.6.1.1.4.2 Test procedure

FFS

7.5.6.1.1.4.3 Message contents

FFS

7.5.6.1.1.5 Test requirements

FFS

7.5.6.1.2 NR SA FR1-FR2 DCI-based DL active BWP switch in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD

- Cell mapping is TBD
- Test procedure is TBD

- Test applicability needs to be added to TS 38.522

7.5.6.1.2.1 Test purpose

FFS

7.5.6.1.2.2 Test applicability

FFS

7.5.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.5.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.7.5.6.1.2.

7.5.6.1.2.4 Test description

7.5.6.1.2.4.1 Initial conditions

FFS

7.5.6.1.2.4.2 Test procedure

FFS

7.5.6.1.2.4.3 Message contents

FFS

7.5.6.1.2.5 Test requirements

FFS

7.5.6.2 RRC-based active BWP switch

7.5.6.2.0 Minimum conformance requirements

FFS

7.5.6.2.1 NR SA FR2 RRC-based DL active BWP switch in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Test tolerance analysis is missing
- Message contents are TBD
- Cell mapping is TBD
- Test procedure is TBD
- Test applicability needs to be added to TS 38.522

7.5.6.2.1.1 Test purpose

FFS

7.5.6.2.1.2 Test applicability

FFS

7.5.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.5.6.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.7.5.6.2.1.

7.5.6.2.1.4 Test description

7.5.6.2.1.4.1 Initial conditions

FFS

7.5.6.2.1.4.2 Test procedure

FFS

7.5.6.2.1.4.3 Message contents

FFS

7.5.6.2.1.5 Test requirements

FFS

7.6 Measurement procedures

7.6.1 Intra-frequency measurements

7.6.1.0 Minimum conformance requirements

7.6.1.0.1 Minimum conformance requirements for event-triggered measurement without gap

[TS 38.133, clause 9.2.5.1 and 9.2.5.2]

The UE shall be able to identify a new detectable intra frequency cell within T_{identify_intra_without_index} if UE is not indicated to report SSB based RRM measurement result with the associated SSB index(*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE has been indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within T_{identify_intra_without_index}. It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

$$T_{identify_intra_without_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}\right) \, ms$$

Where:

 T_{PSS/SSS_sync_intr} : it is the time period used in PSS/SSS detection given in table 7.6.1.0.1-1.

T SSB_measurement_period_intra: equal to a measurement period of SSB based measurement given in table 7.6.1.0.1-2.

CSSF_{intra}: it is a carrier specific scaling factor and is determined according to CSSF_{outside_gap,i} in TS 38.133 [6] clause 9.1.5.1 for measurement conducted outside measurement gaps.

 $M_{pss/sss_sync_w/o_gaps}$: For a UE supporting FR2 power class 1, $M_{pss/sss_sync_w/o_gaps}$ = 40. For a UE supporting power class 2, $M_{pss/sss_sync_w/o_gaps}$ = 24. For a UE supporting FR2 power class 3, $M_{pss/sss_sync_w/o_gaps}$ = 24. For a UE supporting FR2 power class 4, $M_{pss/sss_sync_w/o_gaps}$ = 24

 $M_{\text{meas_period_w/o_gaps}}$: For a UE supporting power class 1, $M_{\text{meas_period_w/o_gaps}} = 40$. For a UE supporting FR2 power class 2, $M_{\text{meas_period_w/o_gaps}} = 24$. For a UE supporting power class 3, $M_{\text{meas_period_w/o_gaps}} = 24$. For a UE supporting power class 4, $M_{\text{meas_period_w/o_gaps}} = 24$.

When intrafrequency SMTC is fully non-overlapping with measurement gaps or intrafrequency SMTC is fully overlapping with MGs, Kp=1.

When intrafrequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1 - (SMTC period / MGRP)), where SMTC period < MGRP

For FR2 when any of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap is fully overlapping with intra-frequency SMTC, $K_{layer1_measurement}$ = 1.5, otherwise $K_{laver1_measurement}$ =1.

Table 7.6.1.0.1-1: Time period for PSS/SSS detection (Frequency range FR2)

DRX cycle	T _{PSS/SSS_sync_intra}		
No DRX	max(600ms, ceil(M _{pss/sss_sync_w/o_gaps} x K _p x K _{layer1_measurement})		
	x SMTC period) ^{Note 1} x CSSF _{intra}		
DRX cycle≤ 320ms	max(600ms, ceil(1.5 x M _{pss/sss_sync_w/o_gaps} x K _p x		
	K _{layer1_measurement}) x max(SMTC period,DRX cycle)) x		
	CSSF _{intra}		
DRX cycle>320ms	ceil(M _{pss/sss_sync_w/o_gaps} x K _p x K _{layer1_measurement}) x DRX		
	cycle x CSSF _{intra}		
NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is			
the one used by the cell being identified	·		

the one used by the cell being identified

Table 7.6.1.0.1-2: Measurement period for intra-frequency measurements without gaps (Frequency FR2)

DRX cycle	T SSB_measurement_period_intra
No DRX	max(400ms, ceil(M _{meas_period_w/o_gaps} x K _p x K _{layer1_measurement})
	x SMTC period) ^{Note 1} x CSSF _{intra}
DRX cycle≤ 320ms	max(400ms, ceil(1.5x M _{meas_period_w/o_gaps} x K _p x
	$K_{layer1_measurement}$) x max(SMTC period,DRX cycle)) x
	CSSF _{intra}
DRX cycle>320ms	$ceil(M_{meas_period_w/o_gaps} xK_p x K_{layer1_measurement}) x DRX cycle$
	x CSSF _{intra}
NOTE 1: If different SMTC periodicities are configured to	for different cells, the SMTC period in the requirement is
the one used by the cell being identified	

[TS 38.133, clause 9.2.4.3]

Reported RSRP, RSRQ, and RS-SINR measurements contained in periodically triggered measurement reports shall meet the requirements in TS 38.133 [6] clause 10.1.2.1, 10.1.7.1 and 10.1.12.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T $_{identify\ intra\ without\ index}$ defined in TS 38.133 [6] clause 9.2.5.1. When L3 filtering is used an additional delay can be expected.

If a cell which has been detectable at least for the time period than $T_{identify\ intra\ without\ index}$ defined in TS 38.133 [6] clause 9.2.5.1 becomes undetectable for a period and then the cell becomes detectable again and triggers an event, the event triggered measurement reporting delay shall be less than $T_{Measurement_Period,\ Intra}$ provided the timing to that cell has not changed more than \pm 3200 Tc while the measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used, an additional delay can be expected.

[TS 38.133, clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,
- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,
- SS-SINR related side conditions given in TS 38.133 [6] sections 10.1.12 are fulfilled for a corresponding Band,
- SSB_RP and SSB £s/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

References: The conformance requirements covered in the current TC are specified in: TS 38.133 [6], clauses 9.2.2, 9.2.4.3, 9.2.5.1 and 9.2.5.2.

7.6.1.0.2 Minimum conformance requirements for event-triggered measurement with gap

[TS 38.133 [6], clause 9.2.6.2, 9.2.6.3]

The UE shall be able to identify a new detectable intra frequency cell within $T_{identify_intra_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (reportQuantityRsIndexes or maxNrofRSIndexesToReport is not configured), or the UE has been indicated that the neighbour cell is synchronous with the serving cell (deriveSSB-IndexFromCell is enabled). It is assumed that deriveSSB-IndexFromCell is always enabled for FR1 TDD and FR2.

$$T_{identify_intra_without_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra} \quad ms$$

Where:

 T_{PSS/SSS_sync_intra} : it is the time period used in PSS/SSS detection given in table 7.6.1.0.2-1.

T_{SSB_measurement_period_intra}: equal to a measurement period of SSB based measurement given in table 7.6.1.0.2-2.

CSSF_{intra}: it is a carrier specific scaling factor and is determined according to CSSF_{within_gap,i} in TS 38.133 [6] section 9.1.5.2.2 for measurement conducted within measurement gaps.

 $M_{pss/sss_sync_with_gaps}$: For a UE supporting FR2 power class 1, $M_{pss/sss_sync_with_gaps}$ =40. For a UE supporting FR2 power class 2, $M_{pss/sss_sync_with_gaps}$ =24. For a UE supporting FR2 power class 3, $M_{pss/sss_sync_with_gaps}$ =24. For a UE supporting power class 4, $M_{pss/sss_sync_with_gaps}$ =24.

 $M_{\text{meas_period_with_gaps}}$: For a UE supporting power class 1, $M_{\text{meas_period_with_gaps}}$ =40. For a UE supporting power class 2, $M_{\text{meas_period_with_gaps}}$ =24. For a UE supporting power class 3, $M_{\text{meas_period_with_gaps}}$ =24. For a UE supporting power class 4, $M_{\text{meas_period_with_gaps}}$ =24.

Table 7.6.1.0.2-1: Time period for PSS/SSS detection (Frequency range FR2)

DRX cycle	T _{PSS/SSS_sync_intra}
No DRX	max(600ms, M _{pss/sss_sync_with_gaps} x max(MGRP, SMTC
	period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(600ms, ceil(1.5x M _{pss/sss_sync_with_gaps}) x max(MGRP,
	SMTC period, DRX cycle)) x CSSF _{intra}
DRX cycle>320ms	M _{nss/sss_sync_with_gaps} x max(MGRP, DRX cycle) x CSSF _{intra}

Table 7.6.1.0.2-2: Measurement period for intra-frequency measurements with gaps (Frequency Range FR2)

DRX cycle	T _{SSB_measurement_period_intra}
No DRX	max(400ms, M _{meas_period with_gaps} x max(MGRP, SMTC
	period)) x CSSF _{intra}
DRX cycle≤ 320ms	max(400ms, ceil(1.5 x M _{meas_period with_gaps}) x max(MGRP,
	SMTC period, DRX cycle)) Note 1 x CSSF _{intra}
DRX cycle>320ms	M _{meas_period with_gaps} x max(MGRP, DRX cycle) x CSSF _{intra}

[TS 38.133 [6], clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,
- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,
- SS-SINR related side conditions given in TS 38.133 [6] Sections 10.1.12 are fulfilled for a corresponding Band,
- SSB RP and SSB £s/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

[TS 38.133 [6], clause 9.2.4.2]

The RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.2.1.2, the RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.7.1.1, and the SINR measurement accuracy for all measured cells shall be as specified in the TS 38.133 [6] clause 10.1.12.1.1.

Reported RSRP, RSRQ and SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1.1, 10.1.2.1.2, 10.1.7.1.1 and 10.1.12.1.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: $2 \times TTI_{DCCH}$. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify_intra_without_index}$ defined in TS 38.133 [6] section 9.2.6.2. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.2, 9.2.6.2 and 9.2.6.3.

7.6.1.1 NR SA FR2 event-triggered reporting without gap in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- -Connection diagrams are missing.
- Some parameters are TBD
- Test tolerance is missing.

7.6.1.1.1 Test purpose

The purpose of this test is:

- To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search without gap under non-DRX.
- To verify partly the TDD intra-frequency cell search requirements defined in TS 38.133 clause 9.2.5.1 and 9.2.5.2

7.6.1.1.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.1.1.

7.6.1.1.4 Test description

7.6.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.1.1.4.1-1.

Table 7.6.1.1.4.1-1: Supported test configurations for NR SA FR2 event-triggered reporting without gap in non-DRX

Test Case ID	Description
7.6.1.1-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
7.6.1.1-2	240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note: The UE is only re	quired to be tested in one of the supported test configurations.

Configure the test requirement and the DUT according to the parameters in Table 7.6.1.1.4.1-2.

Table 7.6.1.1.4.1-2: Initial conditions for NR SA FR2 event-triggered reporting without gap in non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.5-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified	by the test configuration selected fr	om Table 6.6.1.1.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to connection diagram	N/A		

- 1. The test parameters for PCell and neighbour cell are given in Table 7.6.1.1.4.1-3 below.
- 2. Message contents are defined in clause 7.6.1.1.4.3.
- 3. There is one carrier and two cells specified in the test. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.6.1.1.4.1-3: General test parameters for NR SA FR2 event-triggered reporting without gap in non-DRX

Parameter	Unit	Config	Value	Comment
Active cell		1, 2	PCell (Cell 1)	
Neighbour cell		1, 2	Cell 2	Cell to be identified.
RF Channel Number		1, 2	1: Cell 1 and Cell	One TDD carrier frequency is used for the NR
		1, 2	2	cells.
SMTC configuration		1, 2	SMTC.1	
A3-Offset	dB	1, 2	-6	
CP length		1, 2	Normal	
Hysteresis	dB	1, 2	0	
Time To Trigger	S	1, 2	0	
Filter coefficient		1, 2	0	L3 filtering is not used
DRX		1, 2	OFF	
Time offset between Cell 1 and Cell 2		1, 2	3 μs	Synchronous cells
T1	s	1, 2	5	
T2	S	1, 2	5	

7.6.1.1.4.2 Test procedure

Two cells are deployed in the test, which are FR2 PCell (NR Cell 1) and a FR2 neighbour cell (NR Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 7.6.1.1.4.1-3 and Table 7.6.1.1.5-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR Cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.1.1.5-1. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit an RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.1.1.5-1. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than X ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X is
 - 2402 ms for UE supporting power class 1,
 - 1442 ms for UE supporting power class 2, 3 or 4,
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit an *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set NR Cell 2 physical cell identity = ((current NR Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),

or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.6.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.1.1.4.3-1: Common Exception messages for NR SA FR2 event-triggered reporting without gap in non-DRX

De	fault Message Contents
Common contents of system information blocks	
exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
	Table H.3.1-2 with Condition INTRA-FREQ
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR2, SMTC.1 and Synchronous cells for configuration 7.6.1.1-1 Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR2, SMTC.1 and Synchronous cells for configuration 7.6.1.1-2
	Table H.3.1-4 with A3-offset = -6dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-7 with Condition INTRA-FREQ

7.6.1.1.5 Test requirement

Table 7.6.1.1.4.1-3, Table 7.6.1.1.5-1 and Table 7.6.1.1.5-2 define the primary level settings including test tolerances for NR SA FR2 event-triggered reporting without gap in non-DRX.

Table 7.6.1.1.5-1: NR Cell specific test parameters for NR SA FR2 event-triggered reporting without gap in non-DRX

Parameter	Unit	Config	Cell 1	Cell 2
			T1 T2	T1 T2
TDD		1, 2	TDDConf.3.1	TDDConf.3.1
configuration				
Initial BWP		1, 2	DLBWP.0.1	DLBWP.0.1
configuration			ULBWP.0.1	ULBWP.0.1
Active DL BWP		1, 2	DLBWP.1.1	DLBWP.1.1
configuration				
Active UL BWP		1, 2	ULBWP.1.1	ULBWP.1.1
configuration				
RLM-RS		1, 2	SSB	SSB
PDSCH RMC		1, 2	SR.3.1 TDD	N/A
configuration				
RMSI CORESET		1, 2	CR.3.1 TDD	CR.3.1 TDD
RMC				
configuration				
Dedicated		1, 2	CCR.3.1 TDD	CCR.3.1 TDD
CORESET RMC				
configuration				
TRS configuration		1, 2	TRS.2.1 TDD	N/A
PDSCH/PDCCH		1, 2	TCI.state.2	N/A
TCI states				
OCNG Patterns		1, 2	OP.1	OP.1
SSB		1	SSB.1 FR2	SSB.1 FR2
		2	SSB.2 FR2	SSB.2 FR2
Propagation		1, 2		AWGN
Condition				

Table 7.6.1.1.5-2: NR OTA Cell specific test parameters for NR SA FR2 event-triggered reporting without gap in non-DRX

Parameter	Unit	Config	Cell 1		Ce	II 2
			T1	T2	T1	T2
AoA setup		1, 2	Se	tup 3 defin	ed in A.3.8.3	15.3
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1, 2	TBD	TBD	TBD	TBD
$N_{oc}^{ m Note~2}$	dBm/15 KHz	1, 2	TBD			
$N_{oc}^{$	dBm/SCS	1	TBD TBD			
oc oc		2				
SS-RSRP	dBm/SCS	1	TBD	TBD	TBD	TBD
		<u>2</u>	TBD	TBD	TBD	TBD
\hat{E}_s/N_{oc}	dB	1, 2	TBD	TBD	TBD	TBD
Io	dBm/95.04MHz	1, 2	TBD TBD		3D	

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to NR Cell 2.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = T_{identify intra without index}

 $T_{identify_intra_without_index} = (T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}) ms$

For UE supporting power class 1, T_{PSS/SSS sync intr} = 1200 ms, T_{SSB measurement period intra}= 1200 ms,

For UE supporting power class 2, 3 or 4, T_{PSS/SSS} svuc intr = 720 ms, T_{SSB} measurement period intra = 720 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of X ms in this test case (note: this gives a total of X ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty), where

X = 2402 for UE supporting power class 1,

X = 1442 for UE supporting power class 2, 3 or 4,

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.6.1.2 NR SA FR2 event-triggered reporting without gap in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- -Connection diagrams are missing.
- Test tolerance is missing.

7.6.1.2.1 Test purpose

Ther purpose of this test is:

- To verify the UE's ability to make a correct reporting of an event within intra-frequency cell search without gap under DRX.
- To verify partly the TDD intra-frequency cell search requirements in TS 38.133 clause 9.2.5.1 and 9.2.5.2.

7.6.1.2.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.1.2.

7.6.1.2.4 Test description

7.6.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.1.2.4.1-1.

Table 7.6.1.2.4.1-1: Supported test configurations for NR SA FR2 event-triggered reporting without gap in DRX

Test Case ID	Description			
7.6.1.2-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode			
7.6.1.2-2	240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode			
Note: The UE is only required to be tested in one of the supported test configurations.				

Configure the test equipment and the DUT according to the parameters in Table 7.6.1.2.4.1-2.

Table 7.6.1.2.4.1-2: Initial conditions for NR SA FR2 event-triggered reporting without gap in DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, table E.5-1 and TS 38.	508-1 [14] clause 4.3.1.		
Channel	As specified	by the test configuration selected fr	om Table 7.6.1.2.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions			·		
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.TBD			
Exceptions to	N/A				
connection					
diagram					

- 1. The test parameters for PCell and neighbour cell are given in Table 7.6.1.2.4.1-3 below.
- 2. Message contents are defined in clause 7.6.1.2.4.3.
- 3. There is one carrier and two cells specified in the test. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.6.1.2.4.1-3: General test parameters for NR SA FR2 event-triggered reporting without gap in DRX

Parameter	Unit	Config	Va	lue	Comment		
		_	Test 1	Test 2]		
Active cell		1, 2	PCell (Ce	ll 1)			
Neighbour cell		1, 2	Cell 2		Cell to be identified.		
RF Channel Number		1, 2	1: Cell 1 a 2	1: Cell 1 and Cell One TDD carrier frequency is used cells.			
SMTC configuration		1, 2	SMTC.1				
A3-Offset	dB	1, 2	-6				
CP length		1, 2	Normal				
Hysteresis	dB	1, 2	0				
Time To Trigger	S	1, 2	0				
Filter coefficient		1, 2	0		L3 filtering is not used		
DRX		1, 2	DRX.1 DRX.2		DRX.1 DRX.2 DRX related para A.7.6.1.2.1-5		DRX related parameters are defined in Table A.7.6.1.2.1-5
Time offset between Cell 1 and Cell 2		1, 2	3 μs		Synchronous EN-DC		
T1	S	1, 2	5				
T2	S	1, 2	10	TBD			

7.6.1.2.4.2 Test procedure

Two cells are deployed in the test, which are FR2 PCell (NR Cell 1) and a FR2 neighbour cell (NR Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 7.6.1.2.4.1-3, Table 7.6.1.2.5-1 and Table 7.6.1.2.5-2, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR Cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.1.2.5-1 and Table 7.6.1.2.5-2. T1 starts.
- 3. SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit an RRCReconfigurationComplete message.

- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.1.2.5-1 and Table 7.6.1.2.5-2. T2 starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than X ms for sub-test 1 or less than Y ms for sub-test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X is
 - 7202 for UE supporting power class 1,
 - 4322 for UE supporting power class 2, 3 or 4.

and Y is

- 51202 for UE supporting power class 1,
- 30722 for UE supporting power class 2, 3 or 4.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit an *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set NR Cell 2 physical cell identity = ((current NR Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in State state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.1.2.4.1-1 as appropriate.

7.6.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.1.2.4.3-1: Common Exception messages for NR SA FR2 event-triggered reporting without gap in DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
	Table H.3.1-2 with Condition INTRA-FREQ
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR2, SMTC.1 and Synchronous cells for configuration 7.6.1.2-1
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR2, SMTC.1 and Synchronous cells for configuration 7.6.1.2-2
	Table H.3.1-4 with A3-offset = -6dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-7 with Condition INTRA-FREQ
	Table H.3.7-1 with Condition DRX.1 for sub-test 1
	Table H.3.7-1 with Condition DRX.2 for sub-test 2

7.6.1.2.5 Test requirement

Table 7.6.1.2.4.1-3, Table 7.6.1.2.5-1 and Table 7.6.1.2.5-2 define the primary level settings including test tolerances for NR event triggered reporting in synchronous cells when DRX is used test.

Table 7.6.1.2.5-1: NR Cell specific test parameters for NR SA FR2 event-triggered reporting without gap in DRX

Parameter	Unit	Config	Ce	II 1	Се	II 2
			T1	T1 T2		T2
TDD configuration		1, 2	TDDC	onf.3.1	TDDC	onf.3.1
Initial BWP		1, 2	DLBV	VP.0.1	DLBV	VP.0.1
configuration			ULBV	VP.0.1	ULBV	VP.0.1
Active DL BWP		1, 2	DLBV	VP.1.1	DLBV	VP.1.1
configuration						
Active UL BWP		1, 2	ULBV	VP.1.1	ULBV	VP.1.1
configuration						
RLM-RS		1, 2	S	SB	S	SB
PDSCH RMC		1, 2 1, 2	SR.3.2	L TDD	N	/A
configuration						
RMSI CORESET		1, 2	CR.3.	1 TDD	CR.3.2	L TDD
RMC						
configuration						
Dedicated		1, 2	CCR.3	.1 TDD	CCR.3	1 TDD
CORESET RMC						
configuration						
TRS configuration		1, 2 1, 2	TRS.2	.1 TDD	N	/A
PDSCH/PDCCH		1, 2	TCI.s	tate.2	N	/A
TCI states						
OCNG Patterns		1, 2	OI	P.1	OI	P.1
SSB		1	SSB.	SSB.1 FR2		1 FR2
		2	SSB.	SSB.2 FR2		2 FR2
Propagation		1, 2		AWGN		
Condition						

Table 7.6.1.2.5-2: NR OTA Cell specific test parameters for NR SA FR2 event-triggered reporting without gap in DRX

Parameter	Unit	Config	Ce	ll 1	Cell 2	
			T1	T2	T1	T2

AoA setup		1, 2	Setup 1 defined in A.3.15.1				
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	1, 2	4	-1.46	-Infinity	-1.46	
$N_{_{OC}}$ Note 2	dBm/15 KHz	1, 2	-98				
Note 2	dBm/SCS	1	-89				
1 v oc		2	-86				
SS-RSRP	dBm/SCS	1	-85	-85	-Infinity	-85	
		2	-82	-82	-Infinity	-82	
\hat{E}_s/N_{oc}	dB	1, 2	4	4	-Infinity	4	
Io	dBm/95.04MHz	1	-54.56	-52.21	-54.56	-52.21	
Note 1: The reso	urces for uplink transn	nission are assigned t	o the UE p	rior to the s	tart of time	period T2.	

Interference from other cells and noise sources not specified in the test is assumed to be Note 2: constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

SS-RSRP levels have been derived from other parameters for information purposes. They are Note 3: not settable parameters themselves.

In Test 1 when DRX cycle length = 40 ms, the overall delay measured is defined as the time from the beginning of time period T2 to the moment the UE send one Event A3 triggered measurement report on PUSCH.

In Test 2 when DRX cycle length = 640 ms, the overall delay measured is defined as the time from the beginning of time period T2 to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to NR Cell 2 on PUSCH.

For both tests:

The overall delays measured is defined as the time from the beginning of time period T2 to the moment the UE send one Event A3 triggered measurement report to NR Cell 2.

The overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delay measured when DRX cycle length is 40 ms (sub-test 1) is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify intra without index}$

$$T_{identify_intra_without_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}\right) ms$$

For UE supporting power class 1, T_{PSS/SSS_sync_intra} = 3600 ms, T_{SSB_measurement_period_intra} = 3600 ms,

For UE supporting power class 2, 3 or 4, Tpss/SSS_sync_intra = 2160 ms, TssB_measurement_period_intra = 2160 ms

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 40 ms shall be less than a total of X ms, where X is

- X = 7202 for UE supporting power class 1,
- X = 4322 for UE supporting power class 2, 3 or 4,

The overall delay measured when DRX cycle length is 640 ms (sub-test 2) is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_intra_without_index}$

```
T_{identify\_intra\_without\_index} = (T_{PSS/SSS\_sync\_intra} + T_{SSB\_measurement\_period\_intra}) ms
```

For UE supporting power class 1, T_{PSS/SSS_sync_intra} = 25600 ms, T_{SSB_measurement_period_intra} = 25600 ms,

For UE supporting power class 2, 3 or 4, Tpss/sss_sync_intra = 15360 ms, Tssb_measurement_period_intra = 15360 ms

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 640 ms shall be less than a total of X ms, where

- X = 51202 for UE supporting power class 1,
- X = 30722 for UE supporting power class 2, 3 or 4,

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.6.1.3 NR SA FR2 event-triggered reporting with gap in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- -Connection diagrams are missing.
- Some parameters are TBD
- Test tolerance is missing.

7.6.1.3.1 Test purpose

The purpose of this test is:

- To verify UE's ability to make a correct reporting of an event with gaps under non-DRX within intra-frequency cell search with gaps requirements.
- To verify partly the TDD intra-frequency cell search requirements in TS 38.133 clause 9.2.5.1 and 9.2.5.2.

7.6.1.3.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.6.1.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.1.3.

7.6.1.3.4 Test description

7.6.1.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.1.3.4.1-1.

Table 7.6.1.3.4.1-1: Supported test configurations for NR SA FR2 event-triggered reporting with gap in non-DRX

Test Case ID	Description
7.6.1.3-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
7.6.1.3-2	240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note: The U	JE is only required to be tested in one of the supported test configurations.

Configure the test equipment and the DUT according to the parameters in Table 7.6.1.3.4.1-2.

Table 7.6.1.3.4.1-2: Initial conditions for NR SA FR2 event-triggered reporting with gap in non-DRX

Parameter		Value	Comment			
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.			
Test frequencies	As specified in Annex E, table E.5-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.					
Channel bandwidth	As specified	As specified by the test configuration selected from Table 6.6.1.3.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	A.3.TBD				
Exceptions to connection diagram	N/A					

- 1. The general test parameter settings are set up according to Table 7.6.1.3.4.1-3.
- 2. Message contents are defined in clause 7.6.1.3.4.3.
- 3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.6.1.3.4.1-3: General test parameters for NR SA FR2 event-triggered reporting with gap in non-DRX

Parameter	Unit	Config	Value	Comment
Active cell		1, 2	PCell (Cell 1)	
Neighbour cell		1, 2	Cell 2	Cell to be identified.
RF Channel Number		1, 2	1: Cell 1 and Cell 2	One TDD carrier frequency is used for the NR cells.
Gap type		1, 2	Per-UE gaps	
Measurement gap repitition periodicity	ms	1, 2	40	
Measurement gap length	ms	1, 2	6	
Measurement gap offset	ms	1, 2	39	
SMTC configuration		1, 2	SMTC.1	
CSI-RS parameters		1, 2	CSI-RS.3.2 TDD	
A3-Offset	dB	1, 2	-6	
CP length		1, 2	Normal	
Hysteresis	dB	1, 2	0	
Time To Trigger	S	1, 2	0	
Filter coefficient		1, 2	0	L3 filtering is not used
DRX		1, 2	OFF	
Time offset between Cell 1 and Cell 2		1, 2	3 μs	Synchronous cells
T1	S	1, 2	5	
T2	S	1, 2	5	

7.6.1.3.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 7.6.1.3.4.1-3, Table 7.6.1.3.5-1 and Tavke 7.6.1.3.5-2, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

- 2. Set the parameters according to T1 in Table 7.6.1.3.5-1 and Table 7.6.1.3.5-2. T1 starts.
- 3. SS shall transmit an *RRCReconfiguration* message.
- 4. The UE shall transmit an RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.1.3.5-1 and Table 7.6.1.3.5-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than X ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X is
 - X = 3202 for UE supporting power class 1,
 - X = 1922 ms for UE supporting power class 2, 3 or 4,
- 7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall transmit an *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

7.6.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.1.3.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting with gap in non-DRX

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	Table H.3.1-1			
·	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED			
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR2, SMTC.1 and Synchronous cells for Configuration 7.6.1.3-1 Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR2, SMTC.1 and Synchronous cells for Configuration 7.6.1.3-2			
	Table H.3.1-4 with A3-offset = -6dB			
	Table H.3.1-5 with Condition INTRA-FREQ			
	Table H.3.1-6 with Condition Pattern #0			
	Table H.3.1-7 with Condition INTRA-FREQ			

7.6.1.3.5 Test requirement

Table 7.6.1.3.4.1-3 and Table 7.6.1.3.5-1 define the primary level settings including test tolerances for NR SA FR1 event-triggered reporting with gap in non-DRX test.

Table 7.6.1.3.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX

Parameter	Unit	Config	Cell 1 T1 T2		Cell 2		
					T1	T2	
TDD configuration		1, 2	TDDConf.3.1 TDDConf.3		onf.3.1		
Initial BWP		1, 2 1, 2	DLBWP.0.1 DLBWP.		VP.0.1		
configuration			ULBWP.0.1 ULBWP.0		VP.0.1		
Active DL BWP		1, 2	DLBW	/P.1.2	DLBV	VP.1.1	
configuration							
Active UL BWP		1, 2	ULBW	/P.1.2	ULBV	ULBWP.1.1	
configuration							
RLM-RS		1, 2	CSI	-RS	CSI	-RS	
PDSCH RMC		1, 2	SR.3.1	SR.3.1 TDD		N/A	
configuration							
RMSI CORESET		1, 2	CR.3.3	CR.3.1 TDD		1 TDD	
RMC							
configuration							
Dedicated		1, 2	CCR.3	.1 TDD	CCR.3.	.1 TDD	
CORESET RMC							
configuration							
TRS configuration		1, 2 1, 2	TRS.2.	1 TDD		/A	
PDSCH/PDCCH		1, 2	TCI.S	tate.2	N.	/A	
TCI states							
OCNG Patterns		1, 2	OF			P.1	
SSB		1	SSB.2	L FR2	SSB.:	1 FR2	
		2	SSB.2	PFR2	SSB.	2 FR2	
Propagation		1, 2	AWGN				
Condition							

7.6.1.3.5-1: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 with per-UE gaps without DRX

Parameter	Unit	Config	Cell 1		Cell 2		
			T1	T2	T1	T2	
AoA setup		1, 2	Setup 3 defined in A.3.15.3				
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 2	TBD	TBD	TBD	TBD	
N_{oc} Note 2	dBm/15 KHz	1, 2	TBD				
$N_{oc}^{ m Note 2}$	dBm/SCS	TBD					
1 oc		2	TBD				
SS-RSRP	dBm/SCS	1	TBD	TBD	TBD	TBD	
		<u>2</u>	TBD	TBD	TBD	TBD	
\hat{E}_s/N_{oc}	dB	1, 2	TBD	TBD	TBD	TBD	
Io	dBm/95.04MHz	1, 2	TBD TBD		3D		

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\it oc}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

 $Measurement \ reporting \ delay = T_{identify_intra_without_index}$

 $T_{identify_intra_without_index} = T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}$

For UE supporting power class 1, T_{PSS/SSS_sync_intr} = 1600 ms, T_{SSB_measurement_period_intra}= 1600 ms,

For UE supporting power class 2, 3 or 4, Tpss/sss_sync_intr = 960 ms, Tpss_measurement_period_intra = 960 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of X ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty), where

X = 3202 for UE supporting power class 1,

X = 1922 for UE supporting power class 2, 3 or 4,

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.6.1.4 NR SA FR2 event-triggered reporting with gap in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- -Connection diagrams are missing.
- Test tolerance is missing.

7.6.1.4.1 Test purpose

The purpose of this test is:

- To verify UE's ability to make a correct reporting of an event with gaps under DRX within intra-frequency cell search with gaps requirements.
- To verify partly the TDD intra-frequency cell search requirements in TS 38.133 clause 9.2.5.1 and 9.2.5.2.

7.6.1.4.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.6.1.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.1.4.

7.6.1.4.4 Test description

7.6.1.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.1.4.4.1-1.

Table 7.6.1.4.4.1-1: Supported test configurations for NR SA FR2 event-triggered reporting with gap in DRX

Test Case ID Description	
7.6.1.4-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
7.6.1.4-2 240 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode	
Note: The UE is only required to be tested in one of the supported test configurations.	

Configure the test equipment and the DUT according to the parameters in Table 7.6.1.4.4.1-2.

Table 7.6.1.4.4.1-2: Initial conditions for NR SA FR2 event-triggered reporting with gap in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, table E.5-1 and TS 38.5	508-1 [14] clause 4.3.1 and 4.4.2.
Channel	As specified	by the test configuration selected fr	om Table 7.6.1.4.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.2.
conditions			
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	A.3.TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 7.6.1.4.4.1-3.
- 2. Message contents are defined in clause 7.6.1.4.4.3.
- 3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 7.6.1.4.4.1-3: General test parameters for NR SA FR2 event-triggered reporting with gap in DRX

Parameter	Parameter Unit Config Value		ue	Comment	
			Test 1	Test 2	
Active cell		1, 2	PCell (Cell 1)		
Neighbour cell		1, 2	Cell 2		Cell to be identified.
RF Channel Number		1, 2	1: Cell 1 and Cell		One TDD carrier frequency is used for the NR
			2		cells.
Gap type		1, 2	Per-UE ga	aps	
Measurement gap repitition periodicity	ms	1, 2	40		
Measurement gap length	ms	1, 2	6		
Measurement gap offset	ms	1, 2	39		
SMTC configuration		1, 2	SMTC.1		
CSI-RS parameters		1, 2	CSI-RS.3.	2 TDD	
A3-Offset	dB	1, 2	-6		
CP length		1, 2	Normal		
Hysteresis	dB	1, 2	0		
Time To Trigger	S	1, 2	0		
Filter coefficient		1, 2	0		L3 filtering is not used
DRX		1, 2	DRX.1	DRX.2	DRX related parameters are defined in Table A.7.6.1.2.1-5
Time offset between Cell 1 and Cell 2		1, 2	3 μs		Synchronous cells
T1	S	1, 2	5		
T2	S	1, 2	10	5	

7.6.1.4.4.2 Test procedure

Two cells are deployed in the test, which are FR2 PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 7.6.1.4.4.1-3 and Table 7.6.1.4.4.2-1, respectively. In the measurement control information a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

In Test 1 when DRX cycle = 40 ms is used, UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle. In Test 2 when DRX = 640 ms is used, the uplink time alignment is not maintained and the UE needs to use RACH to obtain uplink allocation for measurement reporting.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.1.4.5-1 and Table 7.6.1.4.5-2. T1 starts.
- 3. SS shall transmit an *RRCReconfiguration* message.
- 4. The UE shall transmit an RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.1.4.5-1 and Table 7.6.1.4.5-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than X ms for Test 1 or less than Y ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X and Y is
 - X = 7202, Y = 51202 for UE supporting power class 1,
 - X = 4322, Y = 30722 for UE supporting power class 2, 3 or 4,
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit an *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5), or
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.1.4.4.1-3 as appropriate.

7.6.1.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.1.4.4.3-1: Common Exception messages for NR SA FR2 event-triggered reporting with gap in DRX

	Default Message Contents
Common contents of system information blocks exceptions	
Default RRC messages and information elements contents exceptions	Table H.3.1-1
·	Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR2, SMTC.1 and Synchronous cells for configuration 7.6.1.4-1
	Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR2, SMTC.1 and
	Synchronous cells for configuration 7.6.1.4-2
	Table H.3.1-4 with A3-offset = -6dB
	Table H.3.1-5 with Condition INTRA-FREQ
	Table H.3.1-6 with Condition Pattern #0
	Table H.3.1-7 with Condition INTRA-FREQ
	Table H.3.7-1 with Condition DRX.1 for test 1
	Table H.3.7-1 with Condition DRX.1 for test 2

7.6.1.4.5 Test requirement

Table 7.6.1.4.4.1-3, Table 7.6.1.4.5-1 and Table 7.6.1.4.5-2 define the primary level settings including test tolerances for NR SA FR1 event-triggered reporting with gap in DRX test.

Table 7.6.1.4.5-1: NR Cell specific test parameters for NR SA FR2 event-triggered reporting with gap in DRX

Parameter	Unit	Config	Cell 1	Cell 2
			T1 T2	T1 T2
TDD configuration		1, 2	TDDConf.3.1	TDDConf.3.1
Initial BWP		1, 2	DLBWP.0.1	DLBWP.0.1
configuration			ULBWP.0.1	ULBWP.0.1
Active DL BWP		1, 2	DLBWP.1.2	DLBWP.1.1
configuration				
Active UL BWP		1, 2	ULBWP.1.2	ULBWP.1.1
configuration				
RLM-RS		1, 2	SCSI-RS	SSB
PDSCH RMC		1, 2	SR.3.1 TDD	N/A
configuration				
RMSI CORESET		1, 2	CR.3.1 TDD	CR.3.1 TDD
RMC				
configuration				
Dedicated		1, 2	CCR.3.1 TDD	CCR.3.1 TDD
CORESET RMC				
configuration				
TRS configuration		1, 2	TRS.2.1 TDD	N/A
TCI state		1, 2	CSI-RS.Config.0	N/A
OCNG Patterns		1, 2	OP.1	OP.1
SSB		1	SSB.1 FR2	SSB.1 FR2
		2	SSB.2 FR2	SSB.2 FR2
Propagation		1, 2	AWGN	
Condition				

Table 7.6.1.4.5-2: NR OTA Cell specific test parameters for NR SA FR2 event-triggered reporting with
gap in DRX

Parameter	Unit	Unit Config		II 1	Cell 2		
			T1	T2	T1	T2	
AoA setup		1, 2	1, 2 Setup 1 defined in A.3.15.1				
$\hat{\mathbf{E}}_{\mathrm{s}}/\mathrm{I}_{\mathrm{ot}}$	dB	dB 1, 2 4			-Infinity	-1.46	
$N_{_{OC}}$ Note 2	dBm/15 KHz	1, 2	-98				
N_{oc} Note 2	dBm/SCS	1	-89				
oc oc		2			-86		
SS-RSRP	dBm/SCS	1	-85	-85	-Infinity	-85	
		2	-82	-82	-Infinity	-82	
\hat{E}_s/N_{oc}	dB	1, 2	4	4	-Infinity	4	
Io	dBm/95.04MHz	1	-54.56	-52.21	-54.56	-52.21	

Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for $N_{\rm oc}$ to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

In Test 1 when DRX cycle length = 40 ms is used, the overall delay measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report on PUSCH.

In Test 2 when DRX cycle length = 640 ms is used, the overall delay measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report on PUSCH.

For both tests:

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

The overall delay measured when DRX cycle length is 40 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

 $Measurement\ reporting\ delay = T_{identify_intra_without_index}$

 $T_{identify_intra_without_index} = \left(T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}\right) \ ms$

For UE supporting power class 1, $T_{PSS/SSS_sync_intra} = 7200 ms$, $T_{SSB_measurement_period_intra} = 7200 ms$,

For UE supporting power class 2, 3 or 4, Tpss/sss_sync_intra = 2160 ms, Tssb_measurement_period_intra = 2160 ms

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 40 ms shall be less than a total of X ms, where X is

- X = 7202 for UE supporting power class 1,
- X = 4322 for UE supporting power class 2, 3 or 4,

The overall delay measured when DRX cycle length is 640 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_intra_without_index}$

$$T_{identify_intra_without_index} = (T_{PSS/SSS_sync_intra} + T_{SSB_measurement_period_intra}) ms$$

For UE supporting power class 1, T_{PSS/SSS_sync_intra} = 25600 ms, T_{SSB_measurement_period_intra} = 25600 ms,

For UE supporting power class 2, 3 or 4, T_{PSS/SSS} sync intra = 15360 ms, T_{SSB} measurement period intra = 15360 ms

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 640 ms shall be less than a total of X ms, where

- X = 51202 for UE supporting power class 1,
- X = 30722 for UE supporting power class 2, 3 or 4,

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

7.6.2 Inter-frequency measurements

7.6.2.0 Minimum conformance requirements for Inter-frequency measurements

Same as clause 5.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause 9.3.2, 9.3.4, 9.3.5, 9.3.6.3.

7.6.2.1 NR SA FR2-FR2 event-triggered reporting in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- AoA setup is missing in the test procedure
- Initial conditions contain square brackets (RAN4 Pending)

7.6.2.1.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.1.

7.6.2.1.4 Test description

7.6.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.1.4.1-1.

Table 7.6.2.1.4.1-1: NR FR2-FR2 event triggered reporting tests in non-DRX supported test configurations

Test Case ID	Description
7.6.2.1-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note 1: Void	

Table 7.6.2.1.4.1-1: General test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
NR RF Channel Number		Config 1	1, 2		Two FR1 NR carrier frequencies is used.
Active cell		Config 1	NR cell 1 (Pcell)		NR Cell 1 is on NR RF channel number 1.
Neighbour cell		Config 1	NR cell 2		NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1	0	13	As specified in TS 36.133 [6] clause 9.1.2-1.
Measurement gap offset		Config 1	39	39	
SMTC-SSB parameters		Config 1	SSB.3 FR2		As specified in clause A.3.2
A3-Offset	dB	Config 1	[-30]		
Hysteresis	dB	Config 1	0		
CP length		Config 1	Normal		
TimeToTrigger	S	Config 1	0		
Filter coefficient		Config 1	0		L3 filtering is not used
DRX		Config 1	OFF		DRX is not used
AoA setup		Config 1,2	Setup 3		As specified in clause A.9
Time offset between serving and neighbour cells		Config 1	3μs		Synchronous cells.
T1	S	Config 1	5		
T2	S	Config 1	5.2 for PC1; 3.5 for other PC	5.2 for PC1; 3.5 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 7.6.2.1.4-3: Test Environment parameters for SA inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Value	Comment

Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.				
Channel bandwidth	As specified by the test configuration selected from Table 7.6.2.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to connection diagram	TBD				

- 1. Message contents are defined in clause 7.6.2.1.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

7.6.2.1.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR2 on NR RF channel 1 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 7.6.2.1.4.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 7.6.2.1.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.1.4.1-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.1.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 5120 ms for UE supporting power class 1, or 3200 ms for UE supporting other power class for Test 1 and Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected

without release On according to TS 38.508-1 [14] clause 4.5.), or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.1.4.1-2 as appropriate.

7.6.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.2.1.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

Default Message Contents		
Common contents of system information blocks		
exceptions		
Default RRC messages and information	TBD	
elements contents exceptions		

7.6.2.1.5 Test requirement

Table 7.6.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.2.1.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection

Parameter		Unit	Test	Cell 1		Cell 1		
			configuratio n	T1	T2	T1	T2	
NR RF Channel Number			Config 1	1		2		
Duplex mode			Config 1	TDD		TDD		
TDD configurat	ion		Config 1	TDDConf.3.1		TDDConf.3.1		
BW _{channel}		MHz	Config 1		$_{RB,c} = 66$		100: N _{RB,c} = 66	
BWP BW		MHz	Config 1		_{RB,c} = 66		_{RB,c} = 66	
BWP configuration	Initial DL BWP			DLBWP.0.1			N/A	
	Dedicated DL BWP		Config 1	DLBV	VP.1.1	N	I/A	
	Dedicated UL BWP			ULBV	VP.1.1	N	I/A	
OCNG Patterns A.3.2.1.1 (OP.1	.)		Config 1	OF		0	P.1	
PDSCH Refere measurement of			Config 1	SR.3.	1 TDD		-	
CORESET Ref Channel	erence		Config 1	CR.3.	1 TDD		-	
SMTC configur in A.3.11.1 and			Config 1	SM	ΓC.1	SM	TC.1	
PDSCH/PDCC spacing		kHz	Config 1	12	20	120		
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS								
to SSS				0		0		
EPRE ratio of PBCH to PBCH DMRS			-					
to SSS	EPRE ratio of PDCCH DMRS							
EPRE ratio of PDCCH to PDCCH DMRS			Config 1					
to SSS	EPRE ratio of PDSCH DMRS							
PDSCH	EPRE ratio of PDSCH to							
EPRE ratio of 0 to SSS(Note 1)	ı							
EPRE ratio of 0 OCNG DMRS								
N_{oc} Note2		dBm/15 kHz Note5		N.	/A	N/A		
$N_{_{OC}}$ Note2	N_{oc} Note2		Config 1	N/A		N/A		
SS-RSRP Note 3		Note4 dBm/S CS Note5	Config 1	-87	-87	-Infinity	-87	
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathbf{I}_{_{\mathrm{ot}}}$		dB	Config 1	N/A	N/A	-Infinity	N/A	
\hat{E}_s/N_{oc}		dB	Config 1	N/A	N/A	-Infinity	N/A	
IO ^{Note3}		dBm/95 .04 MHz Note5	Config 1	-87	-87	-Infinity	-87	
Propagation Co	ondition		Config 1	AWGN				

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power
	spectral density is achieved for all OFDM symbols.
L	

- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

5120 for UE supporting power class 1, or

3200 for UE supporting other power class.

In test 1 and 2 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.2.2 NR SA FR2-FR2 event-triggered reporting in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- -AoA setup is missing in the test procedure

7.6.2.2.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.2.

7.6.2.2.4 Test description

7.6.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.2.4.1-1.

Table 7.6.2.2.4.1-1: NR FR2-FR2 event triggered reporting tests in DRX supported test configurations

Test Case ID	Description
7.6.2.2-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note 1: Void	

Table 7.6.2.2.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection

Parameter	Unit	Test	Value				Comment
		configurati	Test	Test	Test	Test	
		on			4		
NR RF Channel Number		Config 1	1, 2			Two FR1 NR carrier frequencies is used.	
Active cell		Config 1	NR cell 1 (Pcell)			NR Cell 1 is on NR RF channel number 1.	
Neighbour cell		Config 1	NR ce	II 2			NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1	0 13			As specified in TS 36.133 [6] clause 9.1.2-1.	
Measurement gap offset		Config 1	39		39		
SMTC-SSB parameters		Config 1	SSB.3 FR2			As specified in clause A.3.2	
A3-Offset	dB	Config 1	-6				
Hysteresis	dB	Config 1	0				
CP length		Config 1	Norma	al			
TimeToTrigger	S	Config 1	0				
Filter coefficient		Config 1	0				L3 filtering is not used
DRX		Config 1	DRX .1	DRX .2	DRX .1	DRX .2	DRX is used
AoA setup		Config 1,2	Setu p 1	Setu p 1	Setu p 1	Setu p 1	As specified in clause A.9
Time offset between serving and neighbour cells		Config 1	3μs			Synchronous cells.	
T1	S	Config 1	5				
T2	S	Config 1	8 for PC1; 5 for othe r PC	82 for PC1; 52 for othe r PC	8 for PC1; 5 for othe r PC	82 for PC1; 52 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 7.6.2.2.4-3: Test Environment parameters for SA inter-frequency event triggered reporting without SSB time index detection in non-DRX

Parameter	Value	Comment				
Test environment	NC	As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.				
Channel bandwidth	As specified by the test configuration selected for	by the test configuration selected from Table 7.6.2.2.4.1-1.				
Propagation conditions	AWGN	As specified in Annex C.2.2.				

Connection Diagram	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	TBD	
Exceptions to connection diagram	TBD		

- 1. Message contents are defined in clause 7.6.2.2.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

7.6.2.2.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR2 on NR RF channel 1 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 7.6.2.2.4.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 7.6.2.2.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.2.4.1-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.2.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 7680 ms for UE supporting power class 1, or 4800 ms for UE supporting other power class for Test 1 and Test 3 and 81920 ms for UE supporting power class 1, or 51200 ms for UE supporting other power class for Test 2 and Test 4 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected

without release On according to TS 38.508-1 [14] clause 4.5.), or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.2.4.1-2 as appropriate.

7.6.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.2.2.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

Default Message Contents					
Common contents of system information blocks					
exceptions					
Default RRC messages and information	TBD				
elements contents exceptions					

7.6.2.2.5 Test requirement

Table 7.6.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Table A.7.6.2.2.1-3: Cell specific test parameters for CA inter-frequency event triggered reporting without SSB time index detection

Parameter		Unit Test		Ce	II 1	Ce	Cell 2	
			configuratio n	T1	T2	T1	T2	
NR RF Channel Number			Config 1	1		·	2	
	TDD configuration		Config 1	TDDConf.3.1		TDDConf.3.1		
Duplex mode			Config 1	TDD		TDD		
BW _{channel}		MHz	Config 1		_{RB,c} = 66		_{RB,c} = 66	
BWP BW	1	MHz	Config 1		_{RB,c} = 66		_{RB,c} = 66	
BWP configuration	Initial DL BWP		Config 1		DLBWP.0.1		I/A	
	Dedicated DL BWP			DLBV	VP.1.1	N	I/A	
	Dedicated UL BWP			ULBV	VP.1.1	N	I/A	
OCNG Pattern A.3.2.1.1 (OP.1			Config 1	OF	P.1	0	P.1	
PDSCH Refere			Config 1	SR.3.	1 TDD		-	
CORESET Ref			Config 1	CR.3.	1 TDD		-	
SMTC configur			Config 1	SM	ΓC.1	SM	TC.1	
PDSCH/PDCC spacing		kHz	Config 1	12	20	1	20	
EPRE ratio of I	PSS to SSS							
EPRE ratio of I to SSS	EPRE ratio of PBCH DMRS to SSS							
EPRE ratio of I	PBCH to PBCH							
EPRE ratio of I to SSS	EPRE ratio of PDCCH DMRS							
EPRE ratio of I			Config 1	()		0	
	PDSCH DMRS							
EPRE ratio of I	PDSCH to							
EPRE ratio of (to SSS(Note 1)								
EPRE ratio of OCNG DMRS	OCNG to							
N_{oc} Note2	(IAOIC I)	dBm/15 kHz Note5		-10	4.7	-104.7		
N_{oc} Note2		dBm/S CS Note4	Config 1	-95.7		-95.7		
SS-RSRP Note 3		dBm/S CS	Config 1	-89.7	-89.7	-Infinity	-86.7	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		Note5 dB	Config 1	6	6	-Infinity	9	
\hat{E}_s/N_{oc}		dB	Config 1	6	6	-Infinity	9	
IO ^{Note3}		dBm/95 .04 MHz Note5	Config 1	-59.7	-59.7	-66.7	-57.2	
Propagation Co	ondition		Config 1		AWGN			

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power
	spectral density is achieved for all OFDM symbols.

- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

7680 for UE supporting power class 1, or

4800 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

81920 for UE supporting power class 1, or

51200 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.2.3 NR SA FR2-FR2 event-triggered reporting in non-DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- AoA setup is missing in the test procedure
- Initial conditions contain square brackets (RAN4 Pending)

7.6.2.3.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.3.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.3.

7.6.2.3.4 Test description

7.6.2.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.3.4.1-1.

Table 7.6.2.3.4.1-1: NR FR2-FR2 event triggered reporting tests in non-DRX with SSB time index detection supported test configurations

Test Case ID	Description
7.6.2.3-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note 1: Void	

Table 7.6.2.3.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 with SSB time index detection

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
NR RF Channel Number		Config 1	1, 2		Two FR1 NR carrier frequencies is used
Active cell		Config 1	NR cell 1 (Pcell)		NR Cell 1 is on NR RF channel number 1.
Neighbour cell		Config 1	NR cell 2		NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1	0 13		As specified in TS 38.133 [6] clause 9.1.2-1
Measurement gap offset		Config 1	39 39		
SMTC-SSB parameters		Config 1	SSB.3 FR2		As specified in clause A.3.2
A3-Offset	dB	Config 1	[-30]		
Hysteresis	dB	Config 1	0		
CP length		Config 1	Normal		
TimeToTrigger	S	Config 1	0		
Filter coefficient		Config 1	0		L3 filtering is not used
DRX		Config 1	OFF		DRX is not used
AoA setup		Config 1,2	Setup 3		As specified in clause A.9
Time offset between serving and neighbour cells		Config 1	3μs		Synchronous cells
T1	S	Config 1	5		
T2	S	Config 1	7 for PC1; 7 for PC1; 4.5 for other PC PC		PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 7.6.2.3.4-3: Test Environment parameters for SA inter-frequency event triggered reporting with SSB time index detection in non-DRX

Parameter	Value	Comment

Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.					
Channel	As specified	by the test configuration selected for	rom Table 7.6.2.3.4.1-1.				
bandwidth							
Propagation	AWGN		As specified in Annex C.2.2.				
conditions							
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	TBD					
Exceptions to	TBD						
connection							
diagram							

- 1. Message contents are defined in clause 7.6.2.3.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

7.6.2.3.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR2 on NR RF channel 1 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 7.6.2.3.4.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 7.6.2.3.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.3.4.1-2. T1 starts.
- 3. The SS shall transmit an *RRCReconfiguration* message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.3.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 6720 ms for UE supporting power class 1, or 4160 ms for UE supporting other power class for Test 1 and Test 2, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected

without release On according to TS 38.508-1 [14] clause 4.5.), or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.3.4.1-2 as appropriate.

7.6.2.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.2.3.4.3-1: Common Exception messages SA inter frequency event triggered reporting with SSB time index detection in non-DRX

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	TBD			

7.6.2.3.5 Test requirement

Table 7.6.2.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.2.3.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR2 with SSB time index detection

Parameter		Unit	Test	Ce	II 1		Cell 2	
			configuratio n	T1	T2	T1	T2	
NR RF Channel Number			Config 1	:	1		2	
Duplex mode			Config 1	T	DD	TI	TDD	
TDD configurat	tion		Config 1	TDDConf.3.1		TDDConf.3.1		
BW _{channel}		MHz	Config 1	100: N	_{RB,c} = 66		_{RB,c} = 66	
BWP BW		MHz	Config 1		_{RB,c} = 66		_{RB,c} = 66	
BWP configuration	Initial DL BWP				VP.0.1		N/A	
	Dedicated DL BWP		Config 1	DLBV	VP.1.1	N	/A	
	Dedicated UL BWP				VP.1.1		/A	
OCNG Pattern A.3.2.1.1 (OP.1	.)		Config 1	OF	P.1	Ol	P.1	
PDSCH Refere measurement o			Config 1	SR.3.	1 TDD		-	
CORESET Ref Channel			Config 1	CR.3.	1 TDD		-	
SMTC configur in A.3.11.1 and			Config 1	SM	TC.1	SM	ΓC.1	
PDSCH/PDCC spacing		kHz	Config 1	12	20	1:	20	
EPRE ratio of F								
EPRE ratio of PBCH DMRS to SSS								
DMRS	PBCH to PBCH			0				
to SSS	PDCCH DMRS						0	
EPRE ratio of I PDCCH DMRS	5		Config 1					
EPRE ratio of I to SSS								
EPRE ratio of F PDSCH								
EPRE ratio of (to SSS(Note 1)								
EPRE ratio of 0 OCNG DMRS								
$N_{\scriptscriptstyle oc}$ Note2		dBm/15 kHz Note5		N	/A	N/A		
$N_{\scriptscriptstyle oc}$ Note2		dBm/S CS	Config 1	N	/A	N/A		
SS-RSRP Note 3		Note4 dBm/S CS	Config 1	-87	-87	-Infinity	-87	
£ /r		Note5 dB	Config 1	N/A	N/A	N/A	N/A	
$\frac{\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}}{\hat{\mathbf{r}}_{ot}/\mathbf{N}}$		dB	Config 1	N/A	N/A	N/A	N/A	
\hat{E}_s/N_{oc}								
Io ^{Note3}		dBm/95 .04 MHz Note5	Config 1	-87	-87	-Infinity	-87	
Propagation Co	ondition		Config 1		AWGN			

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power
	spectral density is achieved for all OFDM symbols.

- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

6720 for UE supporting power class 1, or

4160 for UE supporting other power class.

In test 1 and 2 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.2.4 NR SA FR2-FR2 event-triggered reporting in DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- AoA setup is missing in the test procedure

7.6.2.4.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.4.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.4.

7.6.2.4.4 Test description

7.6.2.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.4.4.1-1.

Table 7.6.2.4.4.1-1: NR FR2-FR2 event triggered reporting tests in DRX with SSB time index detection supported test configurations

Test Case ID	Description
7.6.2.4-1	120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode
Note 1: Void	

Table 7.6.2.4.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 with SSB time index detection

Parameter	Unit	Test		Va	lue		Comment
		configurati	Test	Test	Test Test		
		on	1			4	
NR RF Channel Number		Config 1	1, 2			Two FR1 NR carrier frequencies is used.	
Active cell		Config 1	NR cell 1 (Pcell)			NR Cell 1 is on NR RF channel number 1.	
Neighbour cell		Config 1	NR ce	II 2			NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1	0		13		As specified in TS 38.133 [6] clause 9.1.2-1.
Measurement gap offset		Config 1	39		39		
SMTC-SSB parameters		Config 1	SSB.3	FR2			As specified in clause A.3.2
A3-Offset	dB	Config 1	-6				
Hysteresis	dB	Config 1	0				
CP length		Config 1	Norma	ıl			
TimeToTrigger	S	Config 1	0				
Filter coefficient		Config 1	0				L3 filtering is not used
DRX		Config 1	DRX .1	DRX .2	DRX .1	DRX .2	DRX is used
AoA setup		Config 1,2	Setu p 1	Setu p 1	Setu p 1	Setu p 1	As specified in clause A.9
Time offset between serving and neighbour cells		Config 1	3μs			Synchronous cells.	
T1	S	Config 1	5				
T2	S	Config 1	for PC1; 6.5 for othe r PC	for PC1; 67 for othe r PC	for PC1; 6.5 for othe r PC	for PC1; 67 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 7.6.2.4.4-3: Test Environment parameters for SA inter-frequency event triggered reporting with SSB time index detection in non-DRX

Parameter	Value	Comment				
Test environment	NC	As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.	specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.				
Channel bandwidth	As specified by the test configuration selected from Table 7.6.2.4.4.1-1.					
Propagation conditions	AWGN	As specified in Annex C.2.2.				

Connection Diagram	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	TBD	
Exceptions to connection diagram	TBD		

- 1. Message contents are defined in clause 7.6.2.4.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

7.6.2.4.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR2 on NR RF channel 1 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 7.6.2.4.4.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 7.6.2.4.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.4.4.1-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.4.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 10080 ms for UE supporting power class 1, or 6240 ms for UE supporting other power class for Test 1 and Test 3 and 107520 ms for UE supporting power class 1, or 66560 ms for UE supporting other power class for Test 2 and Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected

without release On according to TS 38.508-1 [14] clause 4.5.), or

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.4.4.1-2 as appropriate.

7.6.2.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.2.4.4.3-1: Common Exception messages SA inter frequency event triggered reporting with SSB time index detection in non-DRX

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	TBD			

7.6.2.4.5 Test requirement

Table 7.6.2.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.2.4.5-1: Cell specific test parameters for CA inter-frequency event triggered reporting with SSB time index detection

Parameter		Unit	Test	Ce	II 1	Cell 2		
			configuratio n	T1	T2	T1	T2	
NR RF Channel Number			Config 1	:	1	2		
Duplex mode			Config 1	TDD		TDD		
TDD configurat	tion		Config 1	TDDConf.3.1		TDDConf.3.1		
BW _{channel}		MHz	Config 1		_{RB,c} = 66		_{RB,c} = 66	
BWP BW		MHz	Config 1		_{RB,c} = 66		_{RB,c} = 66	
BWP configuration	Initial DL BWP				VP.0.1		I/A	
	Dedicated DL BWP		Config 1	DLBV	VP.1.1	N	I/A	
	Dedicated UL BWP				VP.1.1		I/A	
OCNG Patterns A.3.2.1.1 (OP.1	.)		Config 1	OF	P.1	0	P.1	
PDSCH Refere measurement of			Config 1	SR.3.	1 TDD		-	
CORESET Ref	erence		Config 1	CR.3.	1 TDD		-	
SMTC configur in A.3.11.1 and	A.3.11.2		Config 1	SM	TC.1	SM	TC.1	
PDSCH/PDCC spacing	H subcarrier	kHz	Config 1	12	20	1	20	
EPRE ratio of F								
EPRE ratio of F to SSS	RCH DMKS			0				
	PBCH to PBCH							
EPRE ratio of F to SSS								
EPRE ratio of F			Config 1				0	
EPRE ratio of F to SSS	PDSCH DMRS							
EPRE ratio of F PDSCH								
EPRE ratio of (to SSS(Note 1)								
EPRE ratio of O	OCNG to							
$N_{_{oC}}$ Note2		dBm/15 kHz Note5		N	Л	-104.7		
$N_{_{OC}}$ Note2			Config 1	-95.7		-95.7		
SS-RSRP Note 3		dBm/S CS Note5	Config 1	-89.7	-89.7	-Infinity	-86.7	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	Config 1	6	6	-Infinity	9	
\hat{E}_s/N_{oc}		dB	Config 1	6	6	-Infinity	9	
IO ^{Note3}		dBm/95 .04 MHz Note5	Config 1	-59.7	-59.7	-66.7	-57.2	
Propagation Co	ondition		Config 1	AWGN				

Note 1:	OCNG shall be used such that both cells are fully allocated and a constant total transmitted power
	spectral density is achieved for all OFDM symbols.

- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

10080 for UE supporting power class 1, or

6240 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

107520 for UE supporting power class 1, or

66560 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

7.6.2.5 NR SA FR1-FR2 event-triggered reporting in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- AoA setup is missing in the test procedure
- Initial conditions contain square brackets (RAN4 Pending)

7.6.2.5.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.5.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.5.

7.6.2.5.4 Test description

7.6.2.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.5.4.1-1.

Table 7.6.2.5.4.1-1: SA FR1-FR2 event triggered reporting tests in non-DRX supported test configurations

Test Case ID	Description of serving cell	Description of target cell
7.6.2.5-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS,
7.6.2.5-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	100MHz
7.6.2.5-3	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	bandwidth, TDD duplex mode
Note 1: The UE Note 2: target N		

Table 7.6.2.5.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection

Parameter	Unit	Test	Va	lue	Comment		
	configurat		Test 1 Test 2				
NR RF Channel		Config 1,2,3	1, 2		Two NR carrier frequencies is used.		
Number							
Active cell		Config 1,2,3	NR cell 1 (Pcell)		NR cell 1 (Pcell)		NR Cell 1 is on NR RF channel number 1
Neighbour cell		Config 1,2,3	NR cell 2		NR cell 2 is on NR RF channel number 2.		
Gap Pattern Id		Config 1,2,3	0	13	As specified in TS 38.133 [6]clause 9.1.2-1.		
Measurement gap offset		Config 1,2,3	39	39			
SMTC-SSB parameters on NR RF Channel 1		Config 1	SSB.1 FR1		As specified in clause A.3.1		
		Config 2	SSB.1 FR1		As specified in clause A.3.1		
		Config 3	SSB.2 FR1		As specified in clause A.3.1		
SMTC-SSB parameters on NR RF Channel 2		Config 1,2,3	SSB.3 FR2		As specified in clause A.3.2		
offsetMO	dB	Config 1,2,3	6				
Hysteresis	dB	Config 1,2,3	0				
a4-Threshold	dBm	Config 1,2,3	[-120]				
CP length		Config 1,2,3	Normal				
TimeToTrigger	S	Config 1,2,3	0				
Filter coefficient		Config 1,2,3	0		L3 filtering is not used		
DRX		Config 1,2,3	OFF		DRX is not used		
AoA setup		Config 1,2	Setup 3		As specified in clause A.9		
Time offset between serving and neighbour cells		Config 1	3ms		 		Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		Config 2,3	Зµѕ		Synchronous cells.		
T1	S	Config 1,2,3	5				
T2	S	Config 1,2,3	5.2 for PC1; 3.5 for other PC	5.2 for PC1; 3.5 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0		

Table 7.6.2.5.4-3: Test Environment parameters for SA inter-frequency event triggered reporting with SSB time index detection in non-DRX

Parameter		Value	Comment				
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.						
Channel	As specified by the test configuration selected from Table 7.6.2.5.4.1-1.						
bandwidth							
Propagation	AWGN		As specified in Annex C.2.2.				
conditions							
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	TBD					
Exceptions to	TBD						
connection							
diagram							

- 1. Message contents are defined in clause 7.6.2.5.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

7.6.2.5.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 2 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 7.6.2.5.4.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 7.6.2.5.4.1-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.5.4.1-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.5.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 5120 ms for UE supporting power class 1, or 3200 ms for UE supporting other power class for Test 1 and Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.), or:
- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.5.4.1-2 as appropriate.

7.6.2.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 7.6.2.5.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	TBD			

7.6.2.5.5 Test requirement

Table 7.6.2.5.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.2.5.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection

Para	Parameter		Test		II 1	Cell 2	
			configuratio n	T1	T2	T1	T2
NR RF Channe	el Number		Config 1,2,3	-	Ĺ		2
Duplex mode			Config 1	FDD		Т	DD
			Config 2,3		DD .	TDD	
TDD configuration			Config 1	Not Ap	plicable	TDDConf.3.1	
			Config 2	TDDC	onf.1.1	TDDConf.3.1	
			Config 3		onf.2.1		Conf.3.1
BW _{channel}		MHz	Config 1	10: N _R	_{B,c} = 52	100: 1	N _{RB,c} = 66
			Config 2	10: $N_{RB,c} = 52$			$N_{RB,c} = 66$
			Config 3	40: N _{RB}			$N_{RB,c} = 66$
BWP BW		MHz	Config 1		_{B,c} = 52	100: N	$N_{RB,c} = 66$
			Config 2		_{B,c} = 52		N _{RB,c} = 66
	1		Config 3	40: N _{RB}			N _{RB,c} = 66
BWP configuration	Initial DL BWP				VP.0.1		N/A
	Dedicated DL BWP		Config 1,2,3	DLBV	VP.1.1	ľ	N/A
	Dedicated UL BWP			ULBV	VP.1.1	1	N/A
OCNG Pattern A.3.2.1.1 (OP.1			Config 1,2,3	Ol	2.1	C)P.1
PDSCH Refere	,		Config 1	SR.1.1	L FDD		-
measurement (channel		Config 2		1 TDD	†	
			Config 3		L TDD	†	
CORESET Re	ference		Config 1	CR.1.1 FDD			_
Channel			Config 2	CR.1.1 TDD CR2.1 TDD			
			Config 3				
SMTC configui in A.3.11.1 and			Config 1	SMTC.2		SMTC.2	
			Config 2,3	SM	ΓC.1	SMTC.1	
PDSCH/PDCC	H subcarrier	kHz	Config 1,2	1	5	1	120
spacing			Config 3	30		120	
EPRE ratio of I	PSS to SSS						
EPRE ratio of I	PBCH DMRS						
to SSS EPRE ratio of I	PBCH to PBCH						
DMRS EPRE ratio of I	PDCCH DMRS						
to SSS							
EPRE ratio of I	PDCCH to]		_		
PDCCH DMRS			Config 1,2,3	()		0
EPRE ratio of I to SSS	PDSCH DMRS						
EPRE ratio of I	PDSCH to						
EPRE ratio of (
to SSS(Note 1)							
EPRE ratio of (
OCNG DMRS	(MOIG T)	dBm/15		N.I	A	7	BD
$N_{oc}^{$		kHz Note5		IN	Λ	'	טט
Note2		dBm/S	Config 1,2	N	Α		NA
$N_{oc}^{$		CS Note4	Config 3		A		NA
SS-RSRP Note 3		dBm/S	Config 1,2	NA	NA	-Infinity	-87
OO-NORF		CS	Config 1,2	NA NA	NA NA	-Infinity	-87
		Note5		i NA	ואר	i iiiiiilly	-01
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		dB	Config 1,2,3	NA	NA	-Infinity	NA
⊥ _s / ⊥ _{ot}				* == =			

\hat{E}_s/N_{oc}	dB	Config 1,2,3	NA	NA	-Infinity	NA	
Io ^{Note3}	dBm/9.	Config 1,2	NA	NA	-	-	
	36MHz						
	dBm/38	Config 3	NA	NA	-	-	
	.16MHz						
	dBm/95	Config 1,2,3	-	-	-Infinity	-87	
	.04						
	MHz						
	Note5						
Propagation Condition		Config 1,2,3	AWGN				

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A4 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

5120 for UE supporting power class 1, or

3200 for UE supporting other power class.

In test 1 and 2 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.2.6 NR SA FR1-FR2 event-triggered reporting in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- AoA setup is missing in the test procedure
- Initial conditions contain square brackets (RAN4 Pending)

7.6.2.6.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.6.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.6.

7.6.2.6.4 Test description

7.6.2.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.6.4.1-1.

Table 7.6.2.6.4.1-1: SA FR1-FR2 event triggered reporting tests in DRX supported test configurations

Test Case ID	Description of serving cell	Description of target cell					
7.6.2.6-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS, 100MHz					
7.6.2.6-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	bandwidth, TDD duplex mode					
7.6.2.6-3	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	aapiox iiioac					
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations						
Note 2: target N	R cell has the same SCS, BW and duplex mode as NR serving cell						

Table 7.6.2.6.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection in DRX

Parameter	Unit	Test		Va	lue		Comment
		configurati	Test	Test	Test	Test	
ND DE Obsession		on	1	2	3	4	T NB
NR RF Channel Number		Config 1,2,3	1, 2			Two NR carrier frequencies is used.	
Active cell		Config 1,2,3	NR cell 1 (Pcell)			NR Cell 1 is on NR RF channel number 1.	
Neighbour cell		Config 1,2,3	NR ce	II 2			NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3	0		13		As specified in TS 38.133 [6] clause 9.1.2-1.
Measurement gap offset		Config 1,2,3	39		39		
SMTC-SSB parameters on NR RF Channel 1		Config 1	SSB.1				As specified in clause A.3.1
		Config 2	SSB.1				As specified in clause A.3.1
		Config 3	SSB.2				As specified in clause A.3.1
SMTC-SSB parameters on NR RF Channel 2		Config 1,2,3	SSB.3	FR2			As specified in clause A.3.2
offsetMO	dB	Config 1,2,3	6				
Hysteresis	dB	Config 1,2,3	0				
a4-Threshold	dBm	Config 1,2,3	TBD				
CP length		Config 1,2,3	Norma	al			
TimeToTrigger	S	Config 1,2,3	0				
Filter coefficient		Config 1,2,3	0				L3 filtering is not used
DRX		Config 1,2,3	DRX .1	DRX .2	DRX .1	DRX .2	DRX is used
AoA setup		Config 1,2	Setu p 1	Setu p 1	Setu p 1	Setu p 1	As specified in clause A.9
Time offset between serving and neighbour cells		Config 1	3ms				Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		Config 2,3	3µs				Synchronous cells.
T1	S	Config 1,2,3	5				
T2	S	Config 1,2,3	8 for PC1; 5 for othe r PC	82 for PC1; 52 for othe r PC	8 for PC1; 5 for othe r PC	82 for PC1; 52 for other PC	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 7.6.2.6.4-3: Test Environment parameters for SA inter-frequency event triggered reporting without SSB time index detection in DRX

Parameter	Value	Comment					
Test environment	NC	As specified in TS 38.508-1 [14] clause 4.1.					
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.					
Channel bandwidth	As specified by the test configuration selected fi	by the test configuration selected from Table 7.6.2.6.4.1-1.					
Propagation	AWGN	As specified in Annex C.2.2.					

conditions			
Connection Diagram	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	TBD	
Exceptions to connection diagram	TBD		

- 1. Message contents are defined in clause 7.6.2.6.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

7.6.2.6.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 2 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 7.6.2.6.4.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 7.6.2.6.4.1-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore UE is allocated with PUSCH resource at every DRX cycle.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.6.4.1-2. T1 starts.
- 3. The SS shall transmit an RRCReconfiguration message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.6.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 7680 ms for UE supporting power class 1, or 4800 ms for UE supporting other power class for Test 1 and Test 3 and 81920 ms for UE supporting power class 1, or 51200 ms for UE supporting other power class for Test 2 and Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without

release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.), or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.6.4.1-2 as appropriate.

7.6.2.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 7.6.2.6.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in DRX

Default Message Contents					
Common contents of system information blocks					
exceptions					
Default RRC messages and information	TBD				
elements contents exceptions					

7.6.2.6.5 Test requirement

Table 7.6.2.6.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.2.6.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection

Parar	Parameter		Test	Ce		Cell 2	
			configuratio n	T1	T2	T1	T2
NR RF Channe	l Number		Config 1,2,3	1	=		2
Duplex mode			Config 1	FDD		Т	DD
			Config 2,3	TD		TDD	
TDD configurat	ion		Config 1	Not Applicable		TDD	Conf.3.1
			Config 2	TDDConf.1.1		TDDConf.3.1	
			Config 3	TDDC			Conf.3.1
$BW_{channel}$		MHz	Config 1	10: N _{RE}		100: N _{RB,c} = 66	
			Config 2	10: $N_{RB,c} = 52$		100: N _{RB,c} = 66	
			Config 3	40: N _{RB,}			$N_{RB,c} = 66$
BWP BW		MHz	Config 1	10: N _{RE}		100: N	N _{RB,c} = 66
			Config 2	10: N _{RE}			N _{RB,c} = 66
DW/D	Initial DI		Config 3	40: N _{RB,}			N _{RB,c} = 66
BWP configuration	Initial DL BWP			DLBW			N/A
	Dedicated DL BWP		Config 1,2,3	DLBW	/P.1.1	ſ	N/A
	Dedicated UL BWP			ULBW	/P.1.1	N/A	
OCNG Patterns A.3.2.1.1 (OP.1			Config 1,2,3	OF	2.1	C)P.1
PDSCH Refere	,		Config 1	SR.1.1	. FDD		-
measurement o	channel		Config 2	SR.1.2			
			Config 3	SR2.1			
CORESET Ref	erence		Config 1	CR.1.1 FDD			-
Channel			Config 2	CR.1.1 TDD		1	
			Config 3	CR2.1 TDD			
SMTC configur in A.3.11.1 and			Config 1	SMTC.2		SMTC.2	
			Config 2,3	SMTC.1		SMTC.1	
PDSCH/PDCC	H subcarrier	kHz	Config 1,2	1	5	:	120
spacing			Config 3	3		120	
EPRE ratio of F	PSS to SSS						
EPRE ratio of F	PBCH DMRS						
EPRE ratio of F	PBCH to PBCH						
EPRE ratio of F	DMRS EPRE ratio of PDCCH DMRS						
EPRE ratio of F	PDCCH to		Config 1.2.3	C)		0
EPRE ratio of F PDCCH DMRS EPRE ratio of F	PDCCH to		Config 1,2,3	C)		0
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F	PDCCH to PDSCH DMRS		Config 1,2,3	C)		0
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F PDSCH	PDCCH to PDSCH DMRS PDSCH to		Config 1,2,3	C)		0
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F PDSCH EPRE ratio of C	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS		Config 1,2,3	C)		0
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F PDSCH EPRE ratio of C to SSS(Note 1)	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS		Config 1,2,3	C)		0
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F PDSCH EPRE ratio of C to SSS(Note 1) EPRE ratio of C	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to		Config 1,2,3	C)		0
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F PDSCH EPRE ratio of C to SSS(Note 1) EPRE ratio of C OCNG DMRS	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to	dBm/15	Config 1,2,3			_1	
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F PDSCH EPRE ratio of C to SSS(Note 1) EPRE ratio of C	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to	dBm/15 kHz Note5	Config 1,2,3	N		-1	04.7
EPRE ratio of FPDCCH DMRS EPRE ratio of Fto SSS EPRE ratio of FPDSCH EPRE ratio of Cto SSS(Note 1) EPRE ratio of COCNG DMRS (N_{oc} Note2	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to	kHz Note5		N	A		04.7
EPRE ratio of F PDCCH DMRS EPRE ratio of F to SSS EPRE ratio of F PDSCH EPRE ratio of C to SSS(Note 1) EPRE ratio of C OCNG DMRS	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to	kHz Note5 dBm/S CS	Config 1,2,3 Config 1,2 Config 3		A	-9	
EPRE ratio of FPDCCH DMRS EPRE ratio of Fto SSS EPRE ratio of FPDSCH EPRE ratio of Cto SSS(Note 1) EPRE ratio of COCNG DMRS (N_{oc} Note2	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to	kHz Note5 dBm/S CS Note4	Config 1,2 Config 3	N N N	A A	- <u>-</u> - <u>-</u> - <u>-</u> <u>-</u>	04.7 95.7 95.7
	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to	kHz Note5 dBm/S CS Note4 dBm/S	Config 1,2 Config 3 Config 1,2	N N N	A A A	-! -! -Infinity	04.7 95.7 95.7 -86.7
EPRE ratio of FPDCCH DMRS EPRE ratio of Fto SSS EPRE ratio of FPDSCH EPRE ratio of Cto SSS(Note 1) EPRE ratio of COCNG DMRS (N_{oc} Note2	PDCCH to PDSCH DMRS PDSCH to DCNG DMRS DCNG to	kHz Note5 dBm/S CS Note4	Config 1,2 Config 3	N N N	A A	- <u>-</u> - <u>-</u> - <u>-</u> <u>-</u>	04.7 95.7 95.7

\hat{E}_s/N_{oc}	dB	Config 1,2,3	NA	NA	-Infinity	9		
Io ^{Note3}	dBm/9.	Config 1,2	NA	NA	-	-		
	36MHz							
	dBm/38	Config 3	NA	NA	-	-		
	.16MHz							
	dBm/95	Config 1,2,3	-	-	-66.7	-57.2		
	.04							
	MHz							
	Note5							
Propagation Condition		Config 1,2,3	AWGN					

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with OdBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

7680 for UE supporting power class 1, or

4800 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

81920 for UE supporting power class 1, or

51200 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is not required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.2.7 NR SA FR1-FR2 event-triggered reporting in non-DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- AoA setup is missing in the test procedure
- Initial conditions contain square brackets (RAN4 Pending)

7.6.2.7.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.7.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.7.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.7.

7.6.2.7.4 Test description

7.6.2.7.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.7.4.1-1.

Table 7.6.2.7.4.1-1: SA FR1-FR2 event triggered reporting tests in non-DRX with SSB time index detection supported test configurations

Test Case ID	Description of serving cell	Description of target cell				
7.6.2.7-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS,				
7.6.2.7-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	100MHz				
7.6.2.7-3	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	bandwidth, TDD				
	·	duplex mode				
Note 1: The UE	Note 1: The UE is only required to be tested in one of the supported test configurations					
Note 2: target NI	R cell has the same SCS, BW and duplex mode as NR serving cell					

Table 7.6.2.7.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 with SSB time index detection in non-DRX

Parameter	Unit	Test	Value		Comment		
		configurati on	Test 1	Test 2			
NR RF Channel Number		Config 1,2,3	1, 2		1, 2		Two NR carrier frequencies is used
Active cell		Config 1,2,3	NR cell 1 (Pce	ell)	NR Cell 1 is on NR RF channel number 1.		
Neighbour cell		Config 1,2,3	NR cell 2		NR cell 2 is on NR RF channel number 2.		
Gap Pattern Id		Config 1,2,3	0	13	As specified in TS 38.133 [6] clause 9.1.2-1		
Measurement gap offset		Config 1,2,3	39	39			
SMTC-SSB parameters on NR RF Channel 1		Config 1	SSB.1 FR1		As specified in clause A.3.1		
		Config 2	SSB.1 FR1		As specified in clause A.3.1		
		Config 3	SSB.2 FR1		As specified in clause A.3.1		
SMTC-SSB parameters on NR RF Channel 2		Config 1,2,3	SSB.3 FR2		As specified in clause A.3.2		
offsetMO	dB	Config 1,2,3	6				
Hysteresis	dB	Config 1,2,3	0				
a4-Threshold	dBm	Config 1,2,3,4,5,6	[-120]				
CP length		Config 1,2,3	Normal				
TimeToTrigger	S	Config 1,2,3	0				
Filter coefficient		Config 1,2,3	0		L3 filtering is not used		
DRX		Config 1,2,3	OFF		DRX is not used		
AoA setup		Config 1,2	Setup 3		As specified in clause A.9		
Time offset between serving and neighbour cells		Config 1	3ms		Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.		
		Config 2,3	3µs		Synchronous cells		
T1	S	Config 1,2,3	5				
T2	S	Config 1,2,3	7 for PC1; 7 for PC1; 4.5 for other PC PC		PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0		

Table 7.6.2.7.4.1-3: Test Environment parameters for SA inter-frequency event triggered reporting with SSB time index detection in non-DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	.508-1 [14] clause 4.3.1 and 4.4.2.		
Channel	As specified	by the test configuration selected fr	om Table 7.6.2.7.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.2.		
conditions					
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to	TBD				
connection					
diagram					

1. Message contents are defined in clause 7.6.2.7.4.3.

- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

7.6.2.7.4.2 Test procedure

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3.4.

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 2 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1 measurement gap pattern configuration # 0 as defined in Table 7.6.2.7.4.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #13 as defined in Table 7.6.2.7.4.1-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.7.4.1-2. T1 starts.
- 3. The SS shall transmit an *RRCReconfiguration* message.
- 4. The UE shall transmit *RRCReconfigurationComplete* message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.7.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 6720 ms for UE supporting power class 1, or 4160 ms for UE supporting other power class for Test 1 and Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),
 - switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.7.4.1-2 as appropriate.

7.6.2.7.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 7.6.2.7.4.3-1: Common Exception messages SA inter frequency event triggered reporting with SSB time index detection in non-DRX

Default Message Contents					
Common contents of system information blocks	ommon contents of system information blocks				
exceptions					
Default RRC messages and information	TBD				
elements contents exceptions					

7.6.2.7.5 Test requirement

Table 7.6.2.7.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.2.7.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR2 with SSB time index detection

Parameter		Unit	Test		II 1	Cell 2		
			configuratio n	T1	T2	T1	T2	
NR RF Channe	el Number		Config 1,2,3	1			2	
Duplex mode			Config 1	FDD		TDD		
•			Config 2,3	TDD		TDD		
TDD configura	tion		Config 1	Not Ap	plicable	TDD	Conf.3.1	
			Config 2	TDDC	onf.1.1	TDD	Conf.3.1	
			Config 3		onf.2.1		Conf.3.1	
BW _{channel}		MHz	Config 1		_{B,c} = 52	100: 1	V _{RB,c} = 66	
			Config 2		_{B,c} = 52		$N_{RB,c} = 66$	
			Config 3	40: N _{RB}			$N_{RB,c} = 66$	
BWP BW		MHz	Config 1		_{B,c} = 52	100: I	$N_{RB,c} = 66$	
			Config 2		_{B,c} = 52		N _{RB,c} = 66	
51.45	1		Config 3	40: N _{RB}			N _{RB,c} = 66	
BWP configuration	Initial DL BWP				VP.0.1		N/A	
	Dedicated DL BWP		Config 1,2,3	DLBV	VP.1.1		N/A	
	Dedicated UL BWP			ULBV	VP.1.1		N/A	
OCNG Pattern A.3.2.1.1 (OP.1			Config 1,2,3	OF	P.1	(OP.1	
PDSCH Refere	,		Config 1	SR.1.1 FDD			-	
measurement (channel		Config 2		1 TDD	†		
			Config 3		L TDD	†		
CORESET Ref	ference		Config 1	CR.1.1 FDD			-	
Channel			Config 2	CR.1.1 TDD		1		
			Config 3		l TDD	1		
SMTC configuration defined in A.3.11.1 and A.3.11.2			Config 1	SMTC.2		SMTC.2		
			Config 2,3	SM	ΓC.1	SN	ITC.1	
PDSCH/PDCC	H subcarrier	kHz	Config 1,2	1	5		120	
spacing			Config 3		0	120		
EPRE ratio of I	PSS to SSS							
EPRE ratio of I	PBCH DMRS							
	PBCH to PBCH							
EPRE ratio of	PDCCH DMRS							
to SSS EPRE ratio of I	DDCCH to							
PDCCH DMRS			Config 1,2,3	()		0	
EPRE ratio of I	PDSCH DMRS							
to SSS EPRE ratio of I	PDSCH to							
PDSCH	OCNC DMDC							
EPRE ratio of (
to SSS(Note 1) EPRE ratio of OCNG to								
OCNG DMRS (Note 1)								
$N_{oc}^{ m Note2}$		dBm/15 kHz		NA		NA		
		Note5	Confirm 1.0		ΙΛ		N I A	
$N_{\scriptscriptstyle oc}$ Note2		dBm/S CS	Config 1,2 Config 3	NA NA		NA NA		
CC DCDD Note ?		Note4	Confir 1.0	N I A	NIA	India!+	0.7	
SS-RSRP Note 3		dBm/S	Config 1,2	NA NA	NA	-Infinity	-87	
		CS Note5	Config 3	NA	NA	-Infinity	-87	
f: /ɪ		dB	Config 1,2,3	NA	NA	-Infinity	NA	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		L 45	55ig 1,2,5	1 1/1	1 1 1		14/5	

\hat{E}_s/N_{oc}	dB	Config 1,2,3	NA	NA	-Infinity	NA
Io ^{Note3}	dBm/9.	Config 1,2	NA	NA	-	-
	36MHz					
	dBm/38	Config 3	NA	NA	-	-
	.16MHz					
	dBm/95	Config 1,2,3	-	-	Infinity	-87
	.04					
	MHz					
	Note5					
Propagation Condition		Config 1,2,3		Α	WGN	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

6720 for UE supporting power class 1, or

4160 for UE supporting other power class.

In test 1 and 2 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.2.8 NR SA FR1-FR2 event-triggered reporting in DRX with SSB time index detection

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Cell Configuration table in Annex E is undefined.
- Antenna diagram is TBD
- Message content is TBD
- AoA setup is missing in the test procedure
- Initial conditions contain square bracket (RAN4 Pending)

7.6.2.8.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event within inter-frequency cell search requirements.

7.6.2.8.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.2.8.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.2.8.

7.6.2.8.4 Test description

7.6.2.8.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.2.8.4.1-1.

Table 7.6.2.8.4.1-1: SA FR1-FR2 event triggered reporting tests in DRX with SSB time index detection supported test configurations

Test Case ID	Description of serving cell	Description of target cell
7.6.2.8-1	NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode	120 kHz SSB SCS,
7.6.2.8-2	NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode	100MHz
7.6.2.8-3	NR 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode	bandwidth, TDD duplex mode
	is only required to be tested in one of the supported test configurations R cell has the same SCS. BW and duplex mode as NR serving cell	

Table 7.6.2.8.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 with SSB time index detection in DRX

Parameter	Unit	Test		Va	lue		Comment
		configurati on	Test 1	Test 2	Test 3	Test 4	
NR RF Channel Number		Config 1,2,3	1, 2		4	Two NR carrier frequencies is used.	
Active cell		Config 1,2,3	NR ce	II 1 (Pce	ell)		NR Cell 1 is on NR RF channel number 1.
Neighbour cell		Config 1,2,3	NR ce	II 2			NR cell 2 is on NR RF channel number 2.
Gap Pattern Id		Config 1,2,3	0		13		As specified in TS 38.133 [6] clause 9.1.2-1.
Measurement gap offset		Config 1,2,3	39		39		
SMTC-SSB parameters on NR RF Channel 1		Config 1	SSB.1				As specified in clause A.3.1
		Config 2	SSB.1				As specified in clause A.3.1
		Config 3	SSB.2				As specified in clause A.3.1
SMTC-SSB parameters on NR RF Channel 2		Config 1,2,3	SSB.3	FR2			As specified in clause A.3.2
offsetMO	dB	Config 1,2,3	6				
Hysteresis	dB	Config 1,2,3	0				
a4-Threshold	dBm	Config 1,2,3	[-120]				
CP length		Config 1,2,3	Norma	al			
TimeToTrigger	S	Config 1,2,3	0				
Filter coefficient		Config 1,2,3	0				L3 filtering is not used
DRX		Config 1,2,3	DRX .1	DRX .2	DRX .1	DRX .2	DRX is used
AoA setup		Config 1,2	Setu p 1	Setu p 1	Setu p 1	Setu p 1	As specified in clause A.9
Time offset between serving and neighbour cells		Config 1	3ms				Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		Config 2,3	3μs				Synchronous cells.
T1	S	Config 1,2,3	5				
T2	S	Config 1,2,3	11 for PC1; 6.5 for othe r PCT BD	108 for PC1; 67 for othe r PCT BD	for PC1; 6.5 for othe r PCT BD	108 for PC1; 67 for other PCT BD	PC1 - power class 1 as specified in TS 38.101-2 [3] Table 6.2.1.0

Table 7.6.2.8.4-3: Test Environment parameters for SA inter-frequency event triggered reporting with SSB time index detection in DRX

Parameter	Value	Comment
Test environment	NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified by the test configuration selected fr	om Table 7.6.2.8.4.1-1.

Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	TBD	
Exceptions to connection diagram	TBD		

- 1. Message contents are defined in clause 7.6.2.8.4.3.
- 2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.
- 3. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

7.6.2.8.4.2 Test procedure

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 2 and NR cell 2 as neighbour cell in FR2 on NR RF channel 2.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 7.6.2.8.4.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #13 as defined in Table 7.6.2.8.4.1-2 is provided for UE that support per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

- 1. Ensure the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 2. Set the parameters according to T1 in Table 7.6.2.8.4.1-2. T1 starts.
- 3. The SS shall transmit an *RRCReconfiguration* message.
- 4. The UE shall transmit RRCReconfigurationComplete message.
- 5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 7.6.2.8.4.1-2.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 10080 ms for UE supporting power class 1, or 6240 ms for UE supporting other power class for Test 1 and Test 3 and 107520 ms for UE supporting power class 1, or 66560 ms for UE supporting other power class for Test 2 and Test 4 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.]
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),

or:

- switches off and on the UE and ensures the UE is in state RRC_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.
- 11. Repeat step 1-10 for each sub-test in Table 7.6.2.8.4.1-2 as appropriate.

7.6.2.8.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

Table 7.6.2.8.4.3-1: Common Exception messages SA inter frequency event triggered reporting with SSB time index detection in DRX

Default Message Contents					
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	TBD				

7.6.2.8.5 Test requirement

Table 7.6.2.8.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.2.8.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR2 with SSB time index detection in DRX

Parameter		Unit	Test	Ce	ell 1	Cell 2		
			configuratio	T1	T2	T1	T2	
NR RF Channe	el Number		Config 1,2,3	1		2		
Duplex mode			Config 1	FDD		TDD		
·			Config 2,3	TDD		TDD		
TDD configuration			Config 1	Not Ap	plicable	TDDC	Conf.3.1	
			Config 2		onf.1.1		Conf.3.1	
			Config 3		onf.2.1		conf.3.1	
BW _{channel}		MHz	Config 1		_{B,c} = 52		I _{RB,c} = 66	
			Config 2 Config 3		_{B,c} = 52 _{,c} = 106		I _{RB,c} = 66 I _{RB,c} = 66	
BWP BW		MHz	Config 1		$_{B,c} = 100$		I _{RB,c} = 66	
B * * * * * * * * * * * * * * * * * * *		141112	Config 2		_{B,c} = 52		I _{RB,c} = 66	
			Config 3	40: N _{RB}	_{,c} = 106	100: N	$I_{RB,c} = 66$	
BWP configuration	Initial DL BWP		3 -		VP.0.1		I/A	
comiguration	Dedicated DL		-	DI BV	VP.1.1		I/A	
	BWP		Config 1,2,3					
	Dedicated UL BWP			ULBV	VP.1.1	N	I/A	
OCNG Pattern A.3.2.1.1 (OP.1	L)		Config 1,2,3	OF	P.1	0	P.1	
PDSCH Refere			Config 1	SR.1.1 FDD		-		
measurement (channel		Config 2	SR.1.1 TDD		1		
			Config 3		1 TDD			
CORESET Ref	ference		Config 1	CR.1.1		_		
Channel			Config 2	CR.1.1 TDD		_		
OMTO A STANDARD LATERAL			Config 3	CR2.	1 TDD			
SMTC configuration defined in A.3.11.1 and A.3.11.2			Config 1	SMTC.2		SMTC.2		
			Config 2,3	SM	TC.1	SM	TC.1	
PDSCH/PDCC	H subcarrier	kHz	Config 1,2		.5	120		
spacing			Config 3	3	30	1	.20	
EPRE ratio of I	PSS to SSS							
EPRE ratio of I to SSS	PBCH DMRS							
EPRE ratio of I DMRS	PBCH to PBCH							
	PDCCH DMRS							
EPRE ratio of I	PDCCH to							
PDCCH DMRS			Config 1,2,3	(0		0	
EPRE ratio of I to SSS	PDSCH DMRS							
EPRE ratio of I PDSCH	PDSCH to							
EPRE ratio of (
to SSS(Note 1)								
EPRE ratio of OCNG to								
OCNG DMRS (Note 1)		dBm/15		N.	IA	_1/	04.7	
$N_{\scriptscriptstyle oc}$ Note2		kHz Note5		IN	ur\	-10	∪ † . I	
7A.T. Noto?		dBm/S	Config 1,2	N.	IA	_0	5.7	
$oldsymbol{N}_{oc}$ Note2		CS	Config 1,2		IA IA	-	15. <i>7</i> 15.7	
		Note4						
SS-RSRP Note 3		dBm/S	Config 1,2	NA	NA	-Infinity	-86.7	
		CS Note5	Config 3	NA	NA	-Infinity	-86.7	
Ê /I		dB	Config 1,2,3	NA	NA	-Infinity	9	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		uБ	Coming 1,2,3	i N/T	1 1 1 1 1	iiiiiiity	<i>-</i>	

\hat{E}_s/N_{oc}	dB	Config 1,2,3	NA	NA	-Infinity	9
Io ^{Note3}	dBm/9. 36MHz	Config 1,2	NA	NA	-	-
		Config 2	NIA	NIA		
	dBm/38	Config 3	NA	NA	-	-
	.16MHz					
	dBm/95	Config 1,2,3	-	-	-66.7	-57.2
	.04					
	MHz					
	Note5					
Propagation Condition		Config 1,2,3		A۱	WGN	

- Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.
- Note 5: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone
- Note 6: As observed with OdBi gain antenna at the centre of the quiet zone

In test 1 with per-UE gap and in test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X1 ms from the beginning of time period T2, where X1 is

10080 for UE supporting power class 1, or

6240 for UE supporting other power class.

In test 2 with per-UE gap and in test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X2 ms from the beginning of time period T2, where X2 is

107520 for UE supporting power class 1, or

66560 for UE supporting other power class.

In test 1, 2, 3 and 4 UE is required to report SSB time index. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.3 L1-RSRP measurement for beam reporting

7.6.3.0 Minimum conformance requirements for L1-RSRP measurement for beam reporting

TBD

The normative reference for this requirement is TS 38.133 [6] clause TBD.

7.6.3.1 NR SA FR2 SSB-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD
- Message content is TBD
- Test procedure is TBD

- Minimum conformance requirements contain [] and TBDs (RAN4 Pending)
- Test requirement contains TBDs (RAN4 Pending)
- Initial conditions contain TBDs (RAN4 Pending)

7.6.3.1.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

7.6.3.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.3.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.3.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.3.1.

7.6.3.1.4 Test description

7.6.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.3.1.4.1-1.

Table 7.6.3.1.4.1-1: NR SA FR2 SSB-based L1-RSRP measurement in non-DRX supported test configurations

Test Case ID	Description	
7.6.3.1-1	NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode	
7.6.3.1-2 NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
Note: The UE is only required to be tested in one of the supported test configurations		

Table 7.6.3.1.4.1-2: General test parameters for NR SA FR2 SSB-based L1-RSRP measurement in non-DRX

Parameter	Config	Unit	Value
SSB GSCN	1~2		freq1
Duplex mode	1~2		TDD
TDD Configuration	1~2		TDDConf.3.1
BW _{channel}	1~2	MHz	100: N _{RB,c} = 66
PDSCH Reference measurement channel	1~2		SR.3.1 TDD
RMSI CORESET Reference Channel	1~2		CR.3.1 TDD
Dedicated CORESET Reference Channel	1~2		CCR.3.1 TDD
SSP configuration	1		SSB.1 FR2
SSB configuration	2		SSB.2 FR2

OCNG Patterns	1~2		OP.1
Initial BWP Configuration	1~2		DLBWP.0.1
Illitial BWF Cornigulation	1 -2		ULBWP.0.1
Dedicated BWP configuration	1~2		DLBWP.1.3
			ULBWP.1.3
SMTC configuration	1~2		SMTC.1
TRS Configuration	1~2		TRS.2.1 TDD
PDCCH/PDSCH TCI	1~2		TCI.State.2
Configuration	4.0		
DRX configuration	1~2		Off
reportConfigType	1~2		periodic
reportQuantity	1~2		ssb-Index-RSRP
Number of reported RS	1~2		2
L1-RSRP reporting period	1~2	slot	640
T1	1~2	S	5
T2	1~2	S	1
Propagation condition	1~2		AWGN
EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS to			
SSS			
EPRE ratio of PBCH to PBCH			
DMRS			
EPRE ratio of PDCCH DMRS			
to SSS			
EPRE ratio of PDCCH to			
PDCCH DMRS	1~2	dB	0
EPRE ratio of PDSCH DMRS			
to SSS			
EPRE ratio of PDSCH to			
PDSCH DMRS			
EPRE ratio of OCNG DMRS to			
SSS ^{Note 1}			
EPRE ratio of OCNG to OCNG DMRS Note 1			
	1.0		AVACAL
Propagation condition	1~2	 	AWGN
Note 1: OCNG shall be used s		•	
constant total transmitted power spectral density is achieved for all			

Table 7.6.3.1.4-3: Test Environment parameters for NR SA FR2 SSB-based L1-RSRP measurement in non-DRX

Parameter	Value		Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	I in Annex E, Table E.2-1 and TS 38	3.508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified by the test configuration selected from Table 7.6.3.1		from Table 7.6.3.1.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to connection diagram	TBD	1	

1. Message contents are defined in clause 7.6.3.1.4.3.

OFDM symbols.

2. TBD

7.6.3.1.4.2 Test procedure

TBD

7.6.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.3.1.4.3-1: Common Exception messages NR SA FR2 SSB-based L1-RSRP measurement in non-DRX

Default Message Contents	
Common contents of system information blocks	
exceptions	
Default RRC messages and information	TBD
elements contents exceptions	

7.6.3.1.5 Test requirement

Table 7.6.3.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.3.1.5-1: Cell specific test parameters for NR SA FR2 SSB-based L1-RSRP measurement in non-DRX

Parameter	Config	Unit	SS	SSB#0		SSB#1	
Parameter	Config	Unit	T1	T2	T1	T2	
Angle of arrival configuration			Set	up 1 accord	ling to A.3.	15.1	
$N_{_{oc}}$ Note2	1~2	dBm/15kHz		-105	5+TT		
N Note2	1	dBm/SSB SCS		-96	+TT		
$N_{_{OC}}^{^{\mathrm{Note2}}}$	2	UBIII/55B 5C5		-93	+TT		
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	1~2	dB	0+TT	0+TT	-Infinity	9+TT	
SSB RSRP Note3	1	dBm/SSB SCS	-96+TT	-96+TT	-Infinity	-87+TT	
SSB RSRI	2	ubiii/33b 303	-93+TT	-93+TT	-Infinity	-84+TT	
lo Note3	1	dDay/OF OAMUL	- 67.5+T T	- 67.5+T T	- 71.1+T T	- 60.7+T T	
10	2	dBm/95.04MHz	- 67.5+T T	- 67.5+T T	- 71.1+T T	- 60.7+T T	
\hat{E}_s/N_{oc}	1~2	dB	0+TT	0+TT	-Infinity	9+TT	
Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2. Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.							
Note 3: SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.							

The UE shall send L1-RSRP report every 640 slots. No later than X ms plus 640 slots from the beginning of time period T2, UE shall send L1-RSRP report including the results for both SSB#0 and SSB#1 while meeting the accuracy requirements defined in clause 10.1.20.1, where X is

- 1680 for UE supporting power class 1
- 1200 for UE supporting power class 2,3 or 4.

The reported L1-RSRP value shall include the Rx antenna gain in the range of $[-10 \sim +20]$ dB.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.3.2 NR SA FR2 SSB-based L1-RSRP measurement in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD
- Message content is TBD
- Test procedure is TBD
- Minimum conformance requirements contain [] and TBDs (RAN4 Pending)
- Test requirement contains TBDs (RAN4 Pending)
- Initial conditions contain TBDs (RAN4 Pending)

7.6.3.2.1 Test purpose

TBD

7.6.3.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.3.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.3.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.3.2.

7.6.3.2.4 Test description

7.6.3.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.3.2.4.1-1.

Table 7.6.3.2.4.1-1: NR SA FR2 SSB-based L1-RSRP measurement in DRX supported test configurations

Test Case ID	Description
7.6.3.2-1	NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode
7.6.3.2-2	NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode
Note: The UE is only re	equired to be tested in one of the supported test configurations

Table 7.6.3.2.4.1-2: General test parameters for NR SA FR2 SSB-based L1-RSRP measurement in DRX

Parameter	Config	Unit	Value
SSB GSCN	1~2		freq1
Duplex mode	1~2		TDD
TDD Configuration	1~2		TDDConf.3.1
BW _{channel}	1~2	MHz	100: N _{RB,c} = 66
PDSCH Reference measurement channel	1~2		SR.3.1 TDD
RMSI CORESET Reference Channel	1~2		CR.3.1 TDD
Dedicated CORESET Reference Channel	1~2		CCR.3.1 TDD
SSB configuration	2		SSB.1 FR2 SSB.2 FR2
OCNG Patterns	1~2		OP.1
Initial BWP Configuration	1~2		DLBWP.0.1 ULBWP.0.1
Dedicated BWP configuration	1~2		DLBWP.1.3 ULBWP.1.3
SMTC configuration	1~2		SMTC.1
TRS Configuration	1~2		TRS.2.1 TDD
PDCCH/PDSCH TCI Configuration	1~2		TCI.State.2
DRX configuration	1~2		DRX.3
reportConfigType	1~2		periodic
reportQuantity	1~2		ssb-Index-RSRP
Number of reported RS	1~2		2
L1-RSRP reporting period	1~2	slot	640
T1	1~2	S	5
T2	1~2	S	1
Propagation condition	1~2		AWGN
EPRE ratio of PSS to SSS EPRE ratio of PBCH DMRS to SSS			
EPRE ratio of PBCH to PBCH DMRS			
EPRE ratio of PDCCH DMRS to SSS			
EPRE ratio of PDCCH to PDCCH DMRS	1~2	dB	0
EPRE ratio of PDSCH DMRS to SSS			
EPRE ratio of PDSCH to PDSCH DMRS			
EPRE ratio of OCNG DMRS to SSS ^{Note 1}			
EPRE ratio of OCNG to OCNG DMRS Note 1			
Propagation condition	1~2		AWGN
Note 1: OCNG shall be used s	such that hot	h cells are fully a	allocated and a

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 7.6.3.2.4-3: Test Environment parameters for NR SA FR2 SSB-based L1-RSRP measurement in DRX

Parameter	Value	Comment
Test environment	NC	As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.	
Channel	As specified by the test configuration selected from Table 7.6.3.2.4.1-1.	

bandwidth			
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection Diagram	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
	DUT Part	TBD	
Exceptions to connection diagram	TBD		

1. Message contents are defined in clause 7.6.3.2.4.3.

2. TBD

7.6.3.2.4.2 Test procedure

TBD

7.6.3.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.3.2.4.3-1: Common Exception messages NR SA FR2 SSB-based L1-RSRP measurement in DRX

Default Message Contents		
Common contents of system information blocks		
exceptions		
Default RRC messages and information	TBD	
elements contents exceptions		

7.6.3.2.5 Test requirement

Table 7.6.3.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.3.2.5-1: Cell specific test parameters for NR SA FR2 SSB-based L1-RSRP measurement in DRX

Parameter	Config	Unit	Unit SSB#0		SSB#1	
Parameter	Config	Coming	T1	T2	T1	T2
Angle of arrival configuration			Setu	up 1 accord	ling to A.3.	15.1
N_{oc} Note2	1~2	dBm/15kHz		-105	5+TT	
$N_{oc}^{$	1	dPm/SSD SCS	-96+TT			
1 oc	2	dBm/SSB SCS	-93+TT			
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	1~2	dB	0+TT	0+TT	-Infinity	9+TT
SSB RSRP Note3	1	dBm/SSB SCS	-96+TT	-96+TT	-Infinity	-87+TT
COBINON	2		-93+TT	-93+TT	-Infinity	-84+TT
Io Note3	1	dBm/95.04MHz	- 67.5+T T	- 67.5+T T	- 71.1+T T	- 60.7+T T
	2	GBHI/93.04IVINZ	- 67.5+T T	- 67.5+T T	- 71.1+T T	- 60.7+T T

\hat{E}_s/N	oc	1~2	dB	0+TT	0+TT	-Infinity	9+TT
Note 1:	Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period						
	T2.	12.					
Note 2:	e 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for						
	N_{oc}	N_{oc} to be fulfilled.					
Note 3:		SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.					
	rney a	ire not settable pa	rameters themselves.				

The UE shall send L1-RSRP report every 640 slots. No later than X ms plus 640 slots from the beginning of time period T2, UE shall send L1-RSRP report including the results for both SSB#0 and SSB#1 while meeting the accuracy requirements defined in clause 10.1.20.1, where X is

- 2880 for UE supporting power class 1
- 1920 for UE supporting power class 2,3 or 4.

The reported L1-RSRP value shall include the Rx antenna gain in the range of $[-10 \sim +20]$ dB.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.3.3 NR SA FR2 CSI-RS-based L1-RSRP measurement in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD
- Message content is TBD
- Test procedure is TBD
- Minimum conformance requirements contain [] and TBDs (RAN4 Pending)
- Test requirement contains TBDs (RAN4 Pending)
- Initial conditions contain TBDs (RAN4 Pending)

7.6.3.3.1 Test purpose

TBD

7.6.3.3.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.3.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.3.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.3.3.

7.6.3.3.4 Test description

7.6.3.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.3.3.4.1-1.

Table 7.6.3.3.4.1-1: NR SA FR2 CSI-RS-based L1-RSRP measurement in non-DRX supported test configurations

Test Case ID	Description
7.6.3.4-1	NR 120 kHz CSI-RS SCS, 100 MHz bandwidth, TDD duplex mode

Table 7.6.3.3.4.1-2: General test parameters for NR SA FR2 CSI-RS-based L1-RSRP measurement in non-DRX

Parameter	Config	Unit	Value
SSB GSCN	1		freq1
Duplex mode	1		TDD
TDD Configuration	1		TDDConf.3.1
BW _{channel}	1	MHz	100: N _{RB,c} = 66
PDSCH Reference	1		SR.3.1 TDD
measurement channel	1		3R.3.1 1DD
RMSI CORESET Reference Channel	1		CR.3.1 TDD
Dedicated CORESET Reference Channel	1		CCR.3.1 TDD
SSB configuration	1		SSB.1 FR2
CSI-RS configuration	1		CSI-RS.3.3 TDD
OCNG Patterns	1		OP.1
Initial BWP Configuration	1		DLBWP.0.1 ULBWP.0.1
Dedicated BWP configuration	1		DLBWP.1.3 ULBWP.1.3
SMTC configuration	1		SMTC.1
TRS Configuration	1		TRS.2.1 TDD
PDCCH/PDSCH TCI Configuration	1		TCI.State.2
DRX configuration	1		Off
reportConfigType	1		aperiodic
reportQuantity	1		cri-RSRP
Number of reported RS	1		2
qcl-Info	1		SSB#0 for resource#0 SSB#1 for resource#1
reportSlotOffsetList	1		26
Propagation condition	1		AWGN
T1	1	S	5
EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS to SSS			
EPRE ratio of PBCH to PBCH DMRS			
EPRE ratio of PDCCH DMRS to SSS			
EPRE ratio of PDCCH to	1		
PDCCH DMRS	1	dB	0
EPRE ratio of PDSCH DMRS to SSS			
EPRE ratio of PDSCH to PDSCH DMRS	1		
EPRE ratio of OCNG DMRS to SSS ^{Note 1}	1		
EPRE ratio of OCNG to OCNG DMRS Note 1			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Table 7.6.3.3.4-3: Test Environment parameters for NR SA FR2 CSI-RS-based L1-RSRP measurement in non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.2-1 and TS 38.	508-1 [14] clause 4.3.1 and 4.4.2.
Channel bandwidth	As specified by the test configuration selected from Table 7.6.3.3.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.2.
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to connection diagram	TBD		

1. Message contents are defined in clause 7.6.3.3.4.3.

2. TBD

7.6.3.3.4.2 Test procedure

TBD

7.6.3.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.3.3.4.3-1: Common Exception messages NR SA FR2 CSI-RS-based L1-RSRP measurement in non-DRX

Default Message Contents		
Common contents of system information blocks		
exceptions		
Default RRC messages and information	TBD	
elements contents exceptions		

7.6.3.3.5 Test requirement

Table 7.6.3.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.3.3.5-1: Cell specific test parameters for NR SA FR2 CSI-RS-based L1-RSRP measurement in non-DRX

Parameter	Config	Unit	CSI-RS#0	CSI-RS#1	
Angle of arrival configuration	1		Setup 1 according to A.3.15.1		
N_{oc} Note1	1	dBm/15kHz	-105+TT		
N_{oc} Note1	1	dBm/SSB SCS	-95.97+TT		
$\mathbf{\hat{E}}_{s}/\mathrm{I}_{ot}$	1	dB	0+TT 9+TT		
CSI-RS RSRP	1	dBm/SSB SCS	-95.97+TT	-86.97+TT	
Io Note2	1	dBm/95.04MHz	-63.97+TT	-57.47+TT	
\hat{E}_s/N_{oc}	1	dB	0+TT	9+TT	

Note 1: Void

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for

 N_{oc} to be fulfilled.

Note 3: CSI-RS RSRP and lo levels have been derived from other parameters for information

purposes. They are not settable parameters themselves.

After 160ms from the beginning of the test, the UE shall send L1-RSRP report at slot 26 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in clause 10.1.20.1. The reported L1-RSRP value shall include the Rx antenna gain in the range of $[-10 \sim +20]$ dB.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.6.3.4 NR SA FR2 CSI-RS-based L1-RSRP measurement in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The Test tolerances and Test system uncertainties applicable to this test are undefined.
- Antenna diagram is TBD
- Message content is TBD
- Test procedure TBD
- Minimum conformance requirements contain [] and TBDs (RAN4 Pending)
- Test requirement contains TBDs (RAN4 Pending)
- Initial conditions contain TBDs (RAN4 Pending)

7.6.3.4.1 Test purpose

TBD

7.6.3.4.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

7.6.3.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 7.6.3.0.

The normative reference for this requirement is TS 38.133 [6] clause A.7.6.3.4.

7.6.3.4.4 Test description

7.6.3.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.6.3.4.4.1-1.

Table 7.6.3.4.4.1-1: NR SA FR2 CSI-RS-based L1-RSRP measurement in DRX supported test configurations

Test Case ID	Description
7.6.3.4-1	NR 120 kHz CSI-RS SCS, 100 MHz bandwidth, TDD duplex mode

Table 7.6.3.4.4.1-2: General test parameters for NR SA FR2 CSI-RS-based L1-RSRP measurement in DRX

Parameter	Config	Unit	Value
SSB GSCN	1		freq1
Duplex mode	1		TDD
TDD Configuration	1		TDDConf.3.1
BW _{channel}	1	MHz	100: N _{RB,c} = 66
PDSCH Reference measurement channel	1		SR.3.1 TDD
RMSI CORESET Reference Channel	1		CR.3.1 TDD
Dedicated CORESET Reference Channel	1		CCR.3.1 TDD
SSB configuration	1		SSB.1 FR2
CSI-RS configuration	1		CSI-RS.3.3 TDD
OCNG Patterns	1		OP.1
Initial BWP Configuration	1		DLBWP.0.1 ULBWP.0.1
Dedicated BWP configuration	1		DLBWP.1.3 ULBWP.1.3
SMTC configuration	1		SMTC.1
TRS Configuration	1		TRS.2.1 TDD
PDCCH/PDSCH TCI Configuration	1		TCI.State.2
DRX configuration	1		DRX.3
reportConfigType	1		aperiodic
reportQuantity	1		cri-RSRP
Number of reported RS	1		2
qcl-Info	1		SSB#0 for resource#0 SSB#1 for resource#1

reportSlotOffsetList	1		26
Propagation condition	1		AWGN
T1	1	S	5
EPRE ratio of PSS to SSS			
EPRE ratio of PBCH DMRS to			
SSS			
EPRE ratio of PBCH to PBCH			
DMRS			
EPRE ratio of PDCCH DMRS			
to SSS			
EPRE ratio of PDCCH to			
PDCCH DMRS	1	dB	О
EPRE ratio of PDSCH DMRS			
to SSS			
EPRE ratio of PDSCH to			
PDSCH DMRS			
EPRE ratio of OCNG DMRS to			
SSS ^{Note 1}			
EPRE ratio of OCNG to OCNG			
DMRS Note 1			
Note 1: OCNG shall be used s	uch that bot	h cells are fi	ully allocated and a
constant total transmitted power spectral density is achieved for all			
OFDM symbols.			
z. z zyz			

Table 7.6.3.4.4-3: Test Environment parameters for NR SA FR2 CSI-RS-based L1-RSRP measurement in DRX

Parameter		Value	Comment	
Test environment	NC		As specified in TS 38.508-1 [14] clause 4.1.	
Test frequencies	As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.			
Channel	As specified by the test configuration selected from Table 7.6.3.4.4.1-1.			
bandwidth				
Propagation	AWGN		As specified in Annex C.2.2.	
conditions				
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	TBD		
Exceptions to	TBD			
connection				
diagram				

1. Message contents are defined in clause 7.6.3.4.4.3.

2. TBD

7.6.3.4.4.2 Test procedure

TBD

7.6.3.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 7.6.3.4.4.3-1: Common Exception messages NR SA FR2 CSI-RS-based L1-RSRP measurement in DRX

Default Message Contents		
Common contents of system information blocks		
exceptions		
Default RRC messages and information	TBD	
elements contents exceptions		

7.6.3.4.5 Test requirement

Table 7.6.3.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 7.6.3.4.5-1: Cell specific test parameters for NR SA FR2 CSI-RS-based L1-RSRP measurement in DRX

Parameter	Config	Unit	CSI-RS#0	CSI-RS#1	
Angle of arrival configuration	1		Setup 1 according to A.3.15.1		
N_{oc} Note1	1	dBm/15kHz	-105+TT		
N_{oc} Note1	1	dBm/SSB SCS	-95.97+TT		
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	1	dB	0+TT	9+TT	
CSI-RS RSRP	1	dBm/SSB SCS	-95.97+TT	-86.97+TT	
lo Note2	1	dBm/95.04MHz	-63.97+TT -57.47+T7		
\hat{E}_{s}/N_{oc}	1	dB	0+TT	9+TT	

Note 1: Void

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be fulfilled.

Note 3: CSI-RS RSRP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

After 480ms from the beginning of the test, the UE shall send L1-RSRP report at slot 26 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in clause 10.1.20.1. The reported L1-RSRP value shall include the Rx antenna gain in the range of $[-10 \sim +20]$ dB.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

7.7 Measurement performance requirements

7.7.1 SS-RSRP

- 7.7.1.1 Intra-frequency measurements
- 7.7.1.2 Inter-frequency measurements
- 7.7.1.3 Inter-frequency measurements between FR1 and FR2
- 7.7.1.3.1 NR SA FR1-FR2 SS-RSRP absolute measurement accuracy

Editor's Note:

- Test tolerance analysis is missing.
- Message contents are TBD.
- Connection diagram is TBD.
- Cell mapping is TBD.
- Table 7.7.1.3.1.5-3 of reported value is FFS

7.7.1.3.1.1 Test Purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP absolute measurement accuracy with FR1 serving cell and FR2 target cell.

7.7.1.3.1.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.7.1.3.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.7.7.1.3.

7.7.1.3.1.4 Test description

7.7.1.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.7.1.3.1.4.1-1.

Table 7.7.1.3.1.4.1-1: Applicable NR configurations for FR1 inter-frequency SS-RSRP accuracy test

Config	Description of serving cell	Description of target cell				
1	LTE FDD, NR 15 kHz SSB SCS, 10MHz					
	bandwidth, FDD duplex mode					
2	LTE FDD, NR 15 kHz SSB SCS, 10MHz	120 kHz SSB SCS, 100MHz				
	bandwidth, TDD duplex mode	bandwidth, TDD duplex mode				
3	LTE FDD, NR 30kHz SSB SCS, 40MHz					
	bandwidth, TDD duplex mode					

Configure the test equipment and the DUT according to the parameters in Table 7.7.1.3.1.4.1-2.

Table 7.7.1.3.1.4.1-2: Initial conditions for NR SA FR1-FR2 SS-RSRP absolute measurement accuracy

Parameter		Value	Comment		
Test environment	NC, TL/VL,	TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.		
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.5	508-1 [14] clause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 7.7.1.3.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.2.		
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	A.3.TBD			
Exceptions to connection diagram	N/A				

- 1. Message contents are defined in clause 7.7.1.3.1.4.3.
- 2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR FR2 neighbour cell (the target cell for SS-RSRP measurements) on a different frequency than the PCell. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

7.7.1.3.1.4.2 Test procedure

Same as in clause 6.7.1.2.1.4.2 but replacing Table 6.7.1.2.1.5-1 and 6.7.1.2.1.5-2 with 7.7.1.3.1.5-1 and 7.7.1.3.1.5-2, respectively.

7.7.1.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

7.7.1.3.1.5 Test requirement

Table 7.7.1.3.1.5-1 and Table 7.7.1.3.1.5-2 define the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 7.7.1.3.1.5-1 and 7.7.1.3.1.5-2 shall meet the corresponding absolute accuracy requirements in Table 7.7.1.3.1.5-3.

Table 7.7.1.3.1.5-1: SS-RSRP inter-frequency test parameters

Parameter	Config	Unit	Tes	st 1	Tes	st 2
Parameter	Coming	Unit	Cell 1	Cell 2	Cell 1	Cell 2

SSB ARFCN	1~3		freq1	freq2	freq1	freq2
	1		10:		10:	
			N _{RB,c} = 52	100	N _{RB,c} = 52	100
BW _{channel}	2	MHz	10: N _{RB,c} = 52	100: N _{RB,c} = 66	10: N _{RB,c} = 52	100: N _{RB.c} = 66
			40:	INRB,c — OO	40:	INRB,c = 00
	3		N _{RB,c} = 106		N _{RB,c} = 106	
	1		FDD		FDD	
Duplex mode	2		TDD	TDD	TDD	TDD
	3		TDD		TDD	
	1		N/A		N/A	
	2		TDDConf.	TDDConf.	TDDConf.	TDDConf.3
TDD configuration			1.1	3.1	1.1	.1
	3		TDDConf.	0.1	TDDConf.	
			2.1		2.1	
PDSCH Reference	1		SR.1.1 FDD		SR.1.1 FDD	
measurement channel	2		SR.1.1 TDD	-	SR.1.1 TDD	-
	3		SR.2.1 FDD		SR.2.1 FDD	
RMSI CORESET	1		CR.1.1 FDD	-	CR.1.1 FDD	-
Reference Channel	2		CR.1.1 TDD	-	CR.1.1 TDD	-
	3		CR.2.1 FDD	-	CR.2.1 FDD	-
Dedicated CORESET	1		CCR.1.1 FDD	-	CCR.1.1 FDD	-
Reference Channel	2		CCR.1.1 TDD	-	CCR.1.1 TDD	-
	3		CCR.2.1 TDD	-	CCR.2.1 TDD	-
	1		SSB.1 FR1		SSB.1 FR1	
			SSB.1	SSB.1	SSB.1	
SSB configuration	2		FR1	FR2	FR1	SSB.1 FR2
			SSB.2	1112	SSB.2	
	3		FR1		FR1	
OCNG Patterns	1~3		OI	P.1	OF	P.1
DL BWP	1~3		DLB	WP.1	DLB	WP.1
UL BWP	1~3		ULB'	WP.1	ULB	WP.1
SMTC configuration	1~3		SM	ΓC.1	SMT	ΓC.1
EPRE ratio of PSS to SSS						
EPRE ratio of PBCH	<u>.</u>					
DMRS to SSS						
EPRE ratio of PBCH to						
PBCH DMRS						
EPRE ratio of PDCCH						
DMRS to SSS EPRE ratio of PDCCH to	-					
PDCCH DMRS	1~3	dB	0	0	0	0
EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG						
	-					
DMRS to SSS ^{Note 1}						
EPRE ratio of OCNG to						
OCNG DMRS Note 1						
Propagation condition	1~3	-		'GN	AW	'GN
Nete 1. OONO electibe		la dia attanti	aalla ara fullur			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power

for $\frac{N_{oc}}{}$ to be fulfilled.

Table 7.7.1.3.1.5-2: SS-RSRP inter-frequency OTA related test parameters

Parameter		Config	Unit	Tes	st 1	Tes	st 2
		Config	Onit	Cell 1	Cell 2	Cell 1	Cell 2
$N_{oc}^{ m Not}$ e2	NR_FDD_FR1_A, NR_TDD_FR1_A	1~3 dBm/15 kHz	TBD		TBD	TBD	
	NR_FDD_FR1_B		KIIZ				TBD
	NR_TDD_FR1_C						TBD

	NR_FDD_FR1_D,						TBD
	NR_TDD_FR1_D NR_FDD_FR1_E,						TBD
	NR_TDD_FR1_E						
	NR_FDD_FR1_G NR FDD FR1 H						TBD TBD
	NR_FDD_FR1_A,						TBD
	NR_TDD_FR1_A						
	NR_FDD_FR1_B NR TDD FR1 C					TBD	TBD TBD
	NR_FDD_FR1_D,	1,2,4,5		TBD			TBD
	NR_TDD_FR1_D NR_FDD_FR1_E,	1,2,4,5		100			100
	NR_FDD_FR1_E						TBD
No.	NR_FDD_FR1_G						TBD
$N_{oc}^{ m Not}$ e2	NR_FDD_FR1_H NR_FDD_FR1_A,		dBm/SS B SCS		TBD		TBD
	NR_TDD_FR1_A		B 3C3				TBD
	NR_FDD_FR1_B						TBD
	NR_TDD_FR1_C NR_FDD_FR1_D.						TBD
	NR_FDD_FR1_D,	3		TBD		TBD	TBD
	NR_FDD_FR1_E,						TBD
	NR_TDD_FR1_E NR_FDD_FR1_G						TBD
	NR_FDD_FR1_H						TBD
	$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	1~3	dB	TBD	TBD	TBD	TBD
	NR_FDD_FR1_A, NR_TDD_FR1_A						TBD
	NR_FDD_FR1_B						TBD
	NR_TDD_FR1_C						TBD
	NR_FDD_FR1_D, NR TDD FR1 D	1,2,4,5		TBD		TBD	TBD
	NR_FDD_FR1_E,						TBD
	NR_TDD_FR1_E						TBD
SS-	NR_FDD_FR1_G NR_FDD_FR1_H dBm/SC		TBD				
RSR P ^{Note3}	NR_FDD_FR1_A,	3	S		TBD	TBD	TBD
'	NR_TDD_FR1_A NR_FDD_FR1_B			TBD			TBD
	NR_TDD_FR1_C						TBD
	NR_FDD_FR1_D,						TBD
	NR_TDD_FR1_D NR_FDD_FR1_E,						TDD
	NR_TDD_FR1_E						TBD
	NR_FDD_FR1_G NR FDD FR1 H						TBD TBD
	NR_FDD_FR1_A,					т.	3D
	NR_TDD_FR1_A						3D
	NR_FDD_FR1_B NR TDD FR1 C						3D
	NR_FDD_FR1_D,	1,2,4,5	dBm/ 9.36MH	N/A			3D
	NR_TDD_FR1_D NR_FDD_FR1_E,	1,2,7,5	Z Z	14/7-4			
	NR_TDD_FR1_E					TE	3D
	NR_FDD_FR1_G					TBD	
	NR_FDD_FR1_H NR_FDD_FR1_A,				1		BD .
	NR_TDD_FR1_A						3D
Io ^{Note3}	NR_FDD_FR1_B						3D
	NR_TDD_FR1_C NR_FDD_FR1_D,		dBm/				3D
	NR_TDD_FR1_D NR_FDD_FR1_E,	3	38.16M Hz	N/A			3D
	NR_TDD_FR1_E						3D
	NR_FDD_FR1_G						3D
	NR_FDD_FR1_H NR_TDD_FR2_A						3D 3D
	NR_TDD_FR2_B		dBm/				
	NR_TDD_FR2_F	1~3	95.04M	N/A	TBD	TBD TBD	
	NR_TDD_FR2_G		Hz				3D
	NR_TDD_FR2_T					L TE	3D

1	NR_TDD_FR2_Y					TE	3D	
\hat{E}_{s}/N_{oc}		1~3	dB	TBD	TBD	TBD	TBD	
Note 1:	Note 1: RSRP and lo levels have been derived from other parameters for information purposes.							
	They are not settable parameters themselves.							
Note 2:	·							
	at each receive	er antenna	port.					

Table 7.7.1.3.1.5-3: SS-RSRP inter-frequency absolute accuracy requirements for the reported values

FFS

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

7.7.1.3.2 NR SA FR1-FR2 SS-RSRP relative measurement accuracy

Editor's Note:

- Test tolerance analysis is missing.
- Message contents are TBD.
- Connection diagram is TBD.
- Cell mapping is TBD.
- Table 7.7.1.3.2.5-3 of reported value is FFS

7.7.1.3.2.1 Test Purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP relative measurement accuracy with FR1 serving cell and FR2 target cell.

7.7.1.3.2.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

7.7.1.3.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.4

The normative reference for this requirement is TS 38.133 [6] clause A.7.7.1.3.

7.7.1.3.2.4 Test description

7.7.1.3.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 7.7.1.3.2.4.1-1.

Table 7.7.1.3.2.4.1-1: Applicable NR configurations for FR1 inter-frequency SS-RSRP accuracy test

Config	Description of serving cell	Description of target cell
1	LTE FDD, NR 15 kHz SSB SCS, 10MHz	
	bandwidth, FDD duplex mode	
2	LTE FDD, NR 15 kHz SSB SCS, 10MHz	120 kHz SSB SCS, 100MHz
	bandwidth, TDD duplex mode	bandwidth, TDD duplex mode
3	LTE FDD, NR 30kHz SSB SCS, 40MHz	
	bandwidth, TDD duplex mode	

Configure the test equipment and the DUT according to the parameters in Table 7.7.1.3.2.4.1-2.

Table 7.7.1.3.2.4.1-2: Initial conditions for NR SA FR1-FR2 SS-RSRP relative measurement accuracy

Parameter		Value	Comment				
Test environment	NC, TL/VL,	TL/VH, TH/VL, TH/VH	As specified in TS 38.508-1 [14] clause 4.1.				
Test frequencies	As specified	in Annex E, table E.4-1 and TS 38.9	508-1 [14] clause 4.3.1.				
Channel bandwidth	As specified	As specified by the test configuration selected from Table 7.7.1.3.2.4.1-1.					
Propagation conditions	AWGN		As specified in Annex C.2.2.				
Connection	TE Part	A.3.TBD	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	A.3.TBD					
Exceptions to connection diagram	N/A						

- 1. Message contents are defined in clause 7.7.1.3.2.4.3.
- 2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR FR2 neighbour cell (the target cell for SS-RSRP measurements) on a different frequency than the PCell. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

7.7.1.3.2.4.2 Test procedure

Same as in clause 6.7.1.2.2.4.2 but replacing Table 6.7.1.2.2.5-1 and 6.7.1.2.2.5-2 with 7.7.1.3.2.5-1 and 7.7.1.3.2.5-2, respectively.

7.7.1.3.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause TBD with the following exceptions:

TBD

7.7.1.3.2.5 Test requirement

Table 7.7.1.3.2.5-1 and Table 7.7.1.3.2.5-2 define the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 7.7.1.3.2.5-1 and 7.7.1.3.2.5-2 shall meet the corresponding relative accuracy requirements in Table 7.7.1.3.2.5-3.

Table 7.7.1.3.2.5-1: SS-RSRP inter-frequency test parameters

Doromotor	Config Unit	Test 1		Test 2		
Parameter	Config	Unit	Cell 1	Cell 2	Cell 1	Cell 2

SSB ARFCN	1~3		freq1	freq2	freq1	freq2
	1		10:		10:	
			N _{RB,c} = 52	100	N _{RB,c} = 52	100
BW _{channel}	2	MHz	10: N _{RB,c} = 52	100: N _{RB,c} = 66	10: N _{RB,c} = 52	100: N _{RB.c} = 66
			40:	INRB,c — OO	40:	INRB,c = 00
	3		N _{RB,c} = 106		N _{RB,c} = 106	
	1		FDD		FDD	
Duplex mode	2		TDD	TDD	TDD	TDD
	3		TDD		TDD	
	1		N/A		N/A	
	2		TDDConf.	TDDConf.	TDDConf.	TDDConf.3
TDD configuration			1.1	3.1	1.1	.1
	3		TDDConf.	0.1	TDDConf.	
			2.1		2.1	
PDSCH Reference	1		SR.1.1 FDD		SR.1.1 FDD	
measurement channel	2		SR.1.1 TDD	-	SR.1.1 TDD	-
	3		SR.2.1 FDD		SR.2.1 FDD	
RMSI CORESET	1		CR.1.1 FDD	-	CR.1.1 FDD	-
Reference Channel	2		CR.1.1 TDD	-	CR.1.1 TDD	-
	3		CR.2.1 FDD	-	CR.2.1 FDD	-
Dedicated CORESET	1		CCR.1.1 FDD	-	CCR.1.1 FDD	-
Reference Channel	2		CCR.1.1 TDD	-	CCR.1.1 TDD	-
	3		CCR.2.1 TDD	-	CCR.2.1 TDD	-
	1		SSB.1 FR1		SSB.1 FR1	
			SSB.1	SSB.1	SSB.1	
SSB configuration	2		FR1	FR2	FR1	SSB.1 FR2
			SSB.2	1112	SSB.2	
	3		FR1		FR1	
OCNG Patterns	1~3		OI	P.1	OF	P.1
DL BWP	1~3		DLB	WP.1	DLB	WP.1
UL BWP	1~3		ULB'	WP.1	ULB	WP.1
SMTC configuration	1~3		SM	ΓC.1	SMT	ΓC.1
EPRE ratio of PSS to SSS						
EPRE ratio of PBCH	<u>.</u>					
DMRS to SSS						
EPRE ratio of PBCH to						
PBCH DMRS						
EPRE ratio of PDCCH						
DMRS to SSS EPRE ratio of PDCCH to	-					
PDCCH DMRS	1~3	dB	0	0	0	0
EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG						
	-					
DMRS to SSS ^{Note 1}						
EPRE ratio of OCNG to						
OCNG DMRS Note 1						
Propagation condition	1~3	-		'GN	AW	'GN
Nete 1. OONO electibe		la dia attanti	aalla ara fullur			

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power

for $\frac{N_{oc}}{}$ to be fulfilled.

Table 7.7.1.3.2.5-2: SS-RSRP inter-frequency OTA related test parameters

Parameter		Config	Unit	Test 1		Test 2	
				Cell 1	Cell 2	Cell 1	Cell 2
$N_{oc}^{ m Not}$ e2	NR_FDD_FR1_A, NR_TDD_FR1_A	1~3 dBm/15 kHz	TBD		TBD	TBD	
	NR_FDD_FR1_B		KIIZ				TBD
	NR_TDD_FR1_C						TBD

	NR_FDD_FR1_D,						TBD
	NR_TDD_FR1_D NR_FDD_FR1_E,						TBD
	NR_TDD_FR1_E						
	NR_FDD_FR1_G NR FDD FR1 H						TBD TBD
	NR_FDD_FR1_A,			TBD		TBD	
	NR_TDD_FR1_A						TBD
	NR_FDD_FR1_B NR TDD FR1 C						TBD TBD
	NR_FDD_FR1_D,	1,2,4,5					TBD
	NR_TDD_FR1_D NR_FDD_FR1_E,						100
	NR_TDD_FR1_E						TBD
N_{oc} Not	NR_FDD_FR1_G						TBD
e2	NR_FDD_FR1_H NR_FDD_FR1_A,		dBm/SS B SCS		TBD		TBD
	NR_TDD_FR1_A		D 303				TBD
	NR_FDD_FR1_B	3		TBD			TBD
	NR_TDD_FR1_C NR_FDD_FR1_D,						TBD
	NR_TDD_FR1_D					TBD	TBD
	NR_FDD_FR1_E, NR TDD FR1 E						TBD
	NR_FDD_FR1_G						TBD
	NR_FDD_FR1_H						TBD
	$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	1~3	dB	TBD	TBD	TBD	TBD
	NR_FDD_FR1_A, NR_TDD_FR1_A						TBD
	NR_FDD_FR1_B	1,2,4,5		TBD		TBD	TBD
	NR_TDD_FR1_C NR FDD FR1 D,						TBD
	NR_FDD_FR1_D, NR_TDD_FR1_D						TBD
	NR_FDD_FR1_E, NR_TDD_FR1_E						TBD
66	NR_FDD_FR1_G						TBD
SS- RSR	NR_FDD_FR1_H		dBm/SC		TBD		TBD
P ^{Note3}	NR_FDD_FR1_A, NR_TDD_FR1_A		S				TBD
	NR_FDD_FR1_B	3		TBD		TBD	TBD
	NR_TDD_FR1_C NR_FDD_FR1_D,						TBD
	NR_TDD_FR1_D						TBD
	NR_FDD_FR1_E, NR_TDD_FR1_E						TBD
	NR_FDD_FR1_G						TBD
Io ^{Note3}	NR_FDD_FR1_H NR_FDD_FR1_A,						TBD
10	NR_TDD_FR1_A					TBD	
	NR_FDD_FR1_B	1,2,4,5	dBm/ 9.36MH z	N/A	_	TBD	
	NR_TDD_FR1_C NR_FDD_FR1_D,					TBD	
	NR_TDD_FR1_D NR_FDD_FR1_E,					TBD	
	NR_TDD_FR1_E					TBD	
	NR_FDD_FR1_G					TBD	
	NR_FDD_FR1_H NR_FDD_FR1_A,					TBD TBD	
	NR_TDD_FR1_A						
	NR_FDD_FR1_B NR TDD FR1 C	3	dBm/ 38.16M Hz	N/A		TBD TBD	
	NR_FDD_FR1_D,					TBD	
	NR_TDD_FR1_D NR_FDD_FR1_E,					TBD	
	NR_TDD_FR1_E NR_FDD_FR1_G					TBD	
	NR_FDD_FR1_H						3D
	NR_TDD_FR2_A	1~3	dBm/	N/A	TBD		3D
	NR_TDD_FR2_B NR_TDD_FR2_F	<u> </u> -	95.04M Hz			TBD TBD	
	NR_TDD_FR2_G					TBD	
	NR_TDD_FR2_T						3D

	NR_TDD_FR2_Y					TE	3D
\hat{E}_s/N_{oc}		1~3	dB	TBD	TBD	TBD	TBD
Note 1:	e 1: RSRP and lo levels have been derived from other parameters for information purposes.						
	They are not settable parameters themselves.						
Note 2:	: RSRP minimum requirements are specified assuming independent interference and noise						
	at each receiver antenna port.						

Table 7.7.1.3.2.5-3: SS-RSRP inter-frequency relative accuracy requirements for the reported values

FFS

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

7.7.2 SS-RSRQ

7.7.3 SS-SINR

8 E-UTRA – NR inter-RAT with E-UTRA serving cell

This section contains test scenarios for E-UTRA – NR inter-RAT with the serving cell in E-UTRA. The NR cells can be in FR1, FR2 or both.

For conformance testing involving FR2 test cases in this specification, the UE under test shall disable UL Tx diversity schemes.

8.1 Void

8.2 RRC_IDLE state mobility

8.2.1 Inter-RAT cell re-selection

8.2.1.0 Minimum conformance requirements

8.2.1.0.1 Minimum conformance requirements for E-UTRA-NR FR1 inter-RAT cell reselection

[TS 36.133, clause 4.2.1]

When the UE is in either *Camped Normally* state or *Camped on Any Cell* state on a cell, the UE shall attempt to detect, synchronise, and monitor intra-frequency, inter-frequency and inter-RAT cells indicated by the serving cell. UE measurement activity is also controlled by measurement rules defined in TS36.304, allowing the UE to limit its measurement activity.

[TS 36.133, clause 4.2.2]

The UE shall search every layer of higher priority at least every $T_{higher_priority_search} = (60 * N_{layers})$ seconds when the UE is not configured with eDRX_IDLE cycle, and at least every $T_{higher_priority_search} = MAX(60 * N_{layers})$, one eDRX_IDLE cycle) when UE is configured with eDRX_IDLE cycle, where N_{layers} is the total number of configured higher priority E-UTRA, UTRA FDD, UTRA TDD, CDMA2000 1x, HRPD and NR carrier frequencies and is additionally increased by one if one or more groups of GSM frequencies is configured as a higher priority.

[TS 36.133, clause 4.2.2.5.6]

If $Srxlev > S_{nonIntraSearchP}$ and $Squal > S_{nonIntraSearchQ}$ then the UE shall search for inter-RAT NR layers of higher priority at least every $T_{higher_priority_search}$ where $T_{higher_priority_search}$ is described in TS 36.133 clause 4.2.2.

If $Srxlev \le S_{nonIntraSearchP}$ or $Squal \le S_{nonIntraSearchQ}$ then the UE shall search for and measure inter-RAT NR layers of higher, lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority inter-RAT NR layers shall be the same as that defined below for lower priority RATs.

The requirements in this section apply for inter-RAT NR measurements. When the measurement rules indicate that inter-RAT NR cells are to be measured, the UE shall measure SS-RSRP and SS-RSRQ of detected NR cells in the neighbour frequency list at the minimum measurement rate specified in this section. The parameter $N_{NR_carrier}$ is the total number of configured NR carriers in the neighbour frequency list. The UE shall filter SS-RSRP and SS-RSRQ measurements of each measured NR cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least half the minimum specified measurement period.

The UE shall be able to evaluate whether a newly detectable inter-RAT NR cell meets the reselection criteria defined in TS 36.304 within $(N_{NR_carrier})$ * $T_{detectNR}$ when $Srxlev \le S_{nonIntraSearchP}$ or $Squal \le S_{nonIntraSearchQ}$ when $T_{reselection} = 0$ provided that the reselection criteria is met by a margin of at least 5 dB in FR1 or [6.5] dB in FR2 for reselections based on ranking or 6 dB in FR1 or [7.5] dB in FR2 for SS-RSRP reselections based on absolute priorities or 4 dB in FR1 and [4] dB in FR2 for SS-RSRQ reselections based on absolute priorities.

When higher priority cells are found by the higher priority search, they shall be measured at least every $T_{\text{measure},NR}$. If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this section shall still be met by the UE before it makes any determination that it may stop measuring the cell.

If the UE detects on an inter-RAT NR carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall not consider an inter-RAT NR cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

Cells which have been detected shall be measured at least every $(N_{NR_carrier}) * T_{measureNR}$ when $Srxlev \le S_{nonIntraSearchP}$ or $Squal \le S_{nonIntraSearchQ}$.

For a cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that an already identified inter-RAT NR cell has met reselection criterion defined in TS 36.304 [1] within $(N_{NR_carrier}) * T_{evaluateNR}$ when $T_{reselection} = 0$ as specified in Table 8.2.1.0.1-1 provided that the reselection criteria is met by a margin of at least 5dB in FR1 or [6.5] dB in FR2 for reselections based on ranking or 6 dB in FR1 or [7.5] dB in FR2 for SS-RSRP reselections based on absolute priorities or 4 dB in FR1 and [4] dB in FR2 for SS-RSRQ reselections based on absolute priorities.

If $T_{reselection}$ timer has a non zero value and the inter-RAT NR cell is satisfied with the reselection criteria which are defined in TS 36.304 [1], the UE shall evaluate this NR cell for the $T_{reselection}$ time. If this cell remains satisfied with the reselection criteria within this duration, then the UE shall reselect that cell.

DRX cycle Scaling Factor (N1) $T_{detect,NR}$ [s] T_{measure,NR} [s] $T_{\text{evaluate,NR}}$ length [s] (number of DRX (number of DRX [s] (number of DRX FR1 FR2Note1 cycles) cycles) cycles) 0.32 8 11.52 x 1.5 x N1 1.28 x 1.5 x N1 5.12 x 1.5 x N1 (36 x 1.5 x N1) (4 x 1.5 x N1) (16 x 1.5 x N1) 0.64 5 17.92 x N1 1.28 x N1 5.12 x N1 $(28 \times N1)$ $(2 \times N1)$ (8 x N1) 1 1.28 4 32 x N1 1.28 x N1 6.4 x N1 $(25 \times N1)$ $(1 \times N1)$ (5 x N1) 3 2.56 58.88 x N1 2.56 x N1 7.68 x N1 $(23 \times N1)$ $(1 \times N1)$ $(3 \times N1)$

Table 8.2.1.0.1-1: Tdetect,NR, TmeasureNR, and Tevaluate, NR

NOTE 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.

The normative reference for this requirement is TS 36.133 clause 4.2.1, 4.2.2, 4.2.2.5.6.

8.2.1.1 E-UTRA – NR FR1 cell re-selection to higher priority NR target cell

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.

8.2.1.1.1 Test purpose

The purpose of this test is:

- To verify the requirement for the E-UTRAN to NR inter-RAT cell reselection requirements specified in TS 36.133 [23] clause 4.2.2.5.6.

8.2.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

8.2.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.2.1.0.

The normative reference for this requirement is TS 38.133 [6] clause A.8.2.1.1.

8.2.1.1.4 Test description

There are two cells configured in this test, the E-UTRA Cell 1 and NR Cell 2. E-UTRA Cell 1 is the PCell and NR Cell 2 is the neighbour cell. This test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. E-UTRA Cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than cell 1.

8.2.1.1.4.1 Initial conditions

This test shall be tested under any of the test configuration in Table 8.2.1.1.4.1-1.

Table 8.2.1.1.4.1-1: Supported test configurations

Configuration	Description					
8.2.1.1-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.2.1.1-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.2.1.1-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
8.2.1.1-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.2.1.1-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.2.1.1-6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
Note: The UE i	Note: The UE is only required to be tested in one of the supported test configurations					

Configure the test requirement and the DUT according to the parameters in Table 8.2.1.1.4.1-2.

Table 8.2.1.1.4.1-2: Initial conditions for E-UTRA – NR FR1 cell re-selection to higher priority NR target cell

Parameter		Value	Comment		
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.		
Test frequencies		in Annex E, Table E.6-1 and TS 38.			
Channel	As specified	by the test configuration selected fr	om Table 8.2.1.1.4.1-1.		
bandwidth					
Propagation	AWGN		As specified in Annex C.2.1		
conditions					
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to	N/A				
connection					
diagram					

- 1. The general test parameter settings are set up according to Table 8.2.1.1.4.1-3.
- 2. Message contents are defined in clause 8.2.1.1.4.3.
- 3. The test scenario comprises of one NR cell and one E-UTRAN cell. E-UTRA Cell 1 is the PCell and Cell 2 is the neighbour cell. E-UTRA Cell 1 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1 and Cell 2 is configured according to Annex C.1.1 and C.1.2.

Table 8.2.1.1.4.1-3: General test parameters for E-UTRA – NR FR1 cell re-selection to higher priority NR target cell

Parameter		Unit	Test	Value	Comment
			configuration		
Initial	Active cell		1, 2, 3, 4, 5, 6	Cell1	The UE camps on cell 1 in the initial phase
condition					and during T3 period the UE reselects to cell 2
T3 end	Active cell		1, 2, 3, 4, 5, 6	Cell2	The UE shall perform reselection to cell 2
condition	Neighbour cells		1, 2, 3, 4, 5, 6	Cell1	during T3
	Neighbour cells		1, 2, 3, 4, 5, 6	Cell2	
RF Channe	el Number		1, 2, 3, 4, 5, 6	1, 2	E-UTRAN radio channel (1) and NR radio channel (2) are used for this test
Time offset	between cells		1, 4	3 ms	Asynchronous cells
			2, 5	3 μs	Synchronous cells
			3, 6	3 μs	Synchronous cells
Access Bar	Access Barring Information		1, 2, 3, 4, 5, 6	Not Sent	No additional delays in random access procedure.
DRX cycle length		S	1, 2, 3, 4, 5, 6	1.28	The value shall be used for all cells in the test.
NR PRACE	I configuration index		1, 2, 3, 4, 5, 6	87	The detailed configuration is specified in TS 38.211 clause 6.3.3.2
T1		S	1, 2, 3, 4, 5, 6	15	T1 needs to be defined so that cell reselection reaction time is taken into account.
T2		S	1, 2, 3, 4, 5, 6	>7	During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3.
Т3		S	1, 2, 3, 4, 5, 6	75	T3 needs to be defined so that cell reselection reaction time is taken into account.

8.2.1.1.4.2 Test procedure

Two cells are deployed in the test, which are one E-UTRA PCell (E-UTRA Cell 1) and a neighbour cell (Cell 2). The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. E-UTRA Cell 1 is already identified by the UE prior to the start of the test. Cell 2 is of higher priority than E-UTRA Cell 1.

Before T1 the UE is camped on to E-UTRA Cell 1. During T1, Cell 2 shall be powered off. At the start of T2 the UE is expected to detect Cell 2, send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Routing Area Update procedure on Cell 2. At the start of T3 E-UTRA Cell 1 becomes weaker than Cell 2, and the UE reselects to Cell 2.

In the following test procedure "UE responds" means "UE starts transmitting preamble on PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure.

- 1. Ensure the UE is in State 2A-RF according to TS 36.508 [25] clause 7.2A.2.
- 2. Set the parameters according to T1 in Table 8.2.1.1.5-1 and 8.2.1.1.5-2, T1 starts.
- 3. During T1, Cell 2 shall be powered off and set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for one iteration of the test procedure loop.
- 4. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 8.2.1.1.5-1 and 8.2.1.1.5-2.
- 5. The SS waits for random access requests information from the UE to perform cell re-selection to a higher priority cell, Cell 2.
- 6. If the UE responds on Cell 2 during time duration T2 within 68 seconds from the beginning of time period T2, then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 7. If the UE has re-selected Cell 2 within T2, after the re-selection or when T2 expires, continue with step 8. Otherwise, if T2 expires and the UE has not yet re-selected Cell 2, skip to step 11.
- 8. The SS shall switch the power setting from T2 to T3 as specified in Table 8.2.1.1.5-1 and 8.2.1.1.5-2.
- 9. The SS waits for random access requests information from the UE to perform cell re-selection to a lower priority cell, E-UTRA Cell 1.
- 10. If the UE has re-selected Cell 1 within T3, after the re-selection or when T3 expires, skip to step 12. Otherwise, if T3 expires and the UE has not yet re-selected Cell 1, continue with step 11.
- 11. Switch off and on the UE and ensure the UE is in state RRC_IDLE with generic procedure parameters Connectivity NR according to TS 38.508-1 [14] clause 4.5.
- 12. Repeat step 2-11 until a test verdict has been achieved.

8.2.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 8.2.1.1.4.3-1: Common Exception messages

Default Message Contents					
Common contents of system information	TBD				
blocks exceptions					
Default RRC messages and information	TBD				
elements contents exceptions					

8.2.1.1.5 Test requirement

Tables 8.2.1.1.4.1-3, 8.2.1.1.5-1 and 8.2.1.1.5-2 define the primary level settings including test tolerances for higher priority E-UTRA cell re-selection test case.

Table 8.2.1.1.5-1: Cell specific test parameters for NR Cell 2

Parameter	Unit	Test	Cell 2		
		configuration	T1	T2	T3
TDD configuration		1, 4	N/A		
		2, 5	TDDConf.1.1		

		3, 6		TDDConf.2.1			
PDSCH Reference		1, 4	SR.1.1 FDD				
measurement channel		2, 5		SR.1.1 TDD			
		3, 6	SR.2.1 TDD				
RMSI CORESET		1, 4	CR.1.1 FDD				
Reference Channel		2, 5		CR.1.1 TDD			
		3, 6		CR.2.1 TDD			
RMC CORESET		1, 4		CCR.1.1 FDD			
Reference Channel		2, 5		CCR.1.1 TDD			
		3, 6		CCR.2.1 TDD			
OCNG Patterns		1, 2, 3, 4, 5, 6		OP.1			
SMTC configuration		1, 2, 3, 4, 5, 6		SMTC.1			
SSB configuration		1, 4		SSB.1 FR1			
CC2 comigaration		2, 5		SSB.1 FR1			
		3, 6		SSB.2 FR1			
Initial DL BWP		1, 2, 3, 4, 5, 6		DLBWP.0.1			
configuration		1, 2, 0, 1, 0, 0		DLD111.0.1			
Initial UL BWP		1, 2, 3, 4, 5, 6		ULBWP.0.1			
configuration				0121111011			
RLM-RS		1, 2, 3, 4, 5, 6		SSB			
Qrxlevmin	dBm/SCS	1, 2, 4, 5		-140			
4	42,	3, 6	-137				
Pcompensation	dB	1, 2, 3, 4, 5, 6	0				
Qhyst _s	dB	1, 2, 3, 4, 5, 6	0				
Qoffset _{s, n}	dB	1, 2, 3, 4, 5, 6	0				
Cell_selection_and_		1, 2, 3, 4, 5, 6					
reselection quality m		1, 2, 0, 4, 0, 0	SS-RSRP				
easurement			SO NON				
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 4	-4	-infinity	12		
L' _s /I _{ot}	42	2, 5	·				
		3, 6					
N_{oc} Note2	dBm/SCS	1, 4		-98			
1 voc	42,	2, 5		-98			
		3, 6		-95			
$N_{_{oC}}$ Note2	dBm/15 kHz	1, 4		-98			
TV _{oc}	dBiii/10 kiil2	2, 5		•			
		3, 6					
f: /N	dB	1, 4	-4	-infinity	12		
\hat{E}_s/N_{oc}	45	2, 5	·				
		3, 6					
SS-RSRP Note3	dBm/SCS	1, 4	-102	-infinity	-86		
33 1(3)(1	ubili/303	2, 5	-102	-infinity	-86		
		3, 6	-99	-infinity	-83		
lo	dBm/9.36 MHz	1, 4	-68.60	-infinity	-57.78		
	dBm/9.36 MHz	2, 5	-68.60	-infinity	-57.78		
	dBm/38.16 MHz	3, 6	-62.50	-infinity	-51.69		
Treselection	S S	1, 2, 3, 4, 5, 6	0 0 0				
Snonintrasearch	dB	1, 2, 3, 4, 5, 6	U	Not sent	U		
Thresh _{x, high}	dB	1, 2, 3, 4, 5, 6	Not sent 48				
Thresh _{serving, low}	dB	1, 2, 3, 4, 5, 6	= = = = = = = = = = = = = = = = = = = =				
Thresh _{x, low}	dВ	1, 2, 3, 4, 5, 6	<u>44</u> 50				
Propagation Condition	uD	1, 2, 3, 4, 5, 6					
Fropagation Condition	<u> </u>	1, 2, 3, 4, 5, 0	AWGN				

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 8.2.1.1.5-2: Cell specific test parameters for E-UTRA Cell 1

Parameter	Unit	Cell 1		
		T1	T2	T3

E-UTRA RF Channel number			1		
BW _{channel}	MHz	10			
OCNG Patterns defined in TS 36.133 [15]		OP.2 TDD for test configuration 1, 2,		ation 1, 2, 3;	
clause A.3.2		OP.2 FDD for test configuration 4, 5, 6			
PBCH RA	dB				
PBCH RB	dB				
PSS_RA	dB				
SSS_RA	dB				
PCFICH_RB	dB				
PHICH_RA	dB				
PHICH_RB	dB		0		
PDCCH_RA	dB				
PDCCH_RB	dB				
PDSCH_RA	dB				
PDSCH_RB	dB				
OCNG_RA ^{Note 1}	dB				
OCNG_RB ^{Note 1}	dB				
Qrxlevmin	dBm	-140			
$N_{_{oC}}^{}$ Note 2	dBm/15 kHz		-98		
RSRP Note 3	dBm/15 KHz	-84	-84	-84	
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	14	14	14	
\hat{E}_s/N_{oc}	dB	14	14	14	
Treselection _{EUTRAN}	S		0		
Snonintrasearch	dB		50		
Thresh _{x, high}	dB	48			
Thresh _{serving, low}	dB	44			
Thresh _{x, low}	dB	50			
Propagation Condition			AWGN		
Note 1: OCNG shall be used such that both spectral density is achieved for all C	FDM symbols.				

Interference from other cells and noise sources not specified in the test is assumed to be constant Note 2: over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{ac} to be

RSRP levels have been derived from other parameters for information purposes. They are not Note 3: settable parameters themselves.

The cell reselection delay to a higher priority NR cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRCSetupRequest message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to a higher priority cell shall be less than 68 s.

The rate of correct cell reselections observed during repeated tests shall be at least 90%.

The cell re-selection delay to a higher priority cell can be expressed as: Thigher_priority_search + Tevaluate, NR + TSI- $_{NR}$, and to a lower priority cell can be expressed as: $T_{evaluate, NR} + T_{SI-NR}$,

Where:

Thigher priority search See clause 4.2.2 in TS 36.133 [23]

T_{evaluate, NR} See Table 4.2.2.5.6-1 in clause 4.2.2.5.6 in TS 36.133 [23]

T_{SI-NR} Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s, allow 68 s for the cell re-selection delay to a higher priority NR cell and 7.68 s for the cell re-selection delay to a lower priority cell in the test case, which we allow 8 s.

8.3 RRC_CONNECTED state mobility

8.3.1 Inter-RAT cell handover

8.3.1.0 Minimum conformance requirements

8.3.1.0.1 Minimum conformance requirements for E-UTRA – NR FR1 handover

[TS 36.133, clause 5.3.4.2]

When the UE receives a RRC message implying inter-RAT handover to the UE shall be ready to start the transmission of the uplink PRACH channel in NR within D_{handover} seconds from the end of the last TTI containing the RRC command. D_{handover} is defined as

$$D_{handover} = T_{RRC_procedure_delay} + T_{interruption}$$

Where:

 $T_{RRC_procedure_delay}$: it is the RRC procedure delay which is [50] ms.

 $T_{interruption}$: it is the time between end of the last TTI containing the RRC command on the PDSCH in E-UTRAN and the time the UE starts transmission of the PRACH in NR, excluding $T_{RRC_procedure_delay}$. $T_{interruption}$ is defined in TS 36.133 clause 5.3.4.3.

[TS 36.133, clause 5.3.4.3]

When inter-RAT handover to NR is commanded, the interruption time shall be less than T_{interruption}

$$T_{interruption} = T_{search} + T_{IU} + T_{rs} + 20 \text{ ms}$$

Where:

 T_{search} is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then $T_{\text{search}} = 0$ ms. If the target cell is an unknowncell and target cell Es/Iot \geq [-2] dB, then $T_{\text{search}} = 3 \cdot T_{rs} + 2$ ms. Regardless of whether DRX is in use by the UE, T_{search} shall still be based on non-DRX target cell search times.

 T_{IU} is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. T_{IU} can be up to the summation of SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213.

NOTE: The actual value of T_{IU} shall depend upon the PRACH configuration used in the target cell.

 T_{rs} is the SMTC period of the target NR cell if the UE has been provided with an SMTC configuration for the target cell prior to, or in the handover command, otherwise T_{rs} is the target cell SSB transmission period, if such is provided. If the UE is not provided with an SMTC configuration or SSB transmission period, the requirement in this section is applied with Trs = 5 ms assuming the SSB transmission periodicity is 5ms. There is no requirement if the SSB transmission periodicity is not 5ms. If UE is provided with both SMTC configuration and SSB transmission period the requirement shall be based on SMTC periodicity.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in clause 8.1.2.4.21 and 8.1.2.4.22.

The normative reference for this requirement is TS 38.133 [6] clause 5.3.4.2 and 5.3.4.3.

8.3.1.1 E-UTRA – NR FR1 handover with known target cell

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.

- TT analysis is missing.

8.3.1.1.1 Test purpose

The purpose of this test is:

- To verify the E-UTRAN to NR FR1 handover requirements as specified in TS 36.133 [23] clause 5.3.4.

8.3.1.1.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR measurements.

8.3.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.3.1.0.

The normative reference for this requirement is TS 38.133 [6] clause A.8.3.1.1.

8.3.1.1.4 Test description

The test comprises of one E-UTRA carrier and one NR carrier. There are two cells and one cell on each carrier. Cell 1 is the E-UTRAN PCell and Cell 2 is an inter-RAT NR neighbour cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 of TS 36.133 [23] is configured before T2 begins to enable inter-RAT frequency monitoring.

8.3.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.3.1.1.4.1-1.

Table 8.3.1.1.4.1-1: Supported test configurations for E-UTRA – NR FR1 handover with unknown target cell

Configuration	Description
8.3.1.1-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
8.3.1.1-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
8.3.1.1-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
8.3.1.1-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
8.3.1.1-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
8.3.1.1-6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
Note: The UE i	s only required to be tested in one of the supported test configurations

Configure the test requirement and the DUT according to the parameters in Table 8.3.1.1.4.1-2.

Table 8.3.1.1.4.1-2: Initial conditions for E-UTRA - NR FR1 handover with unknown target cell

Parameter		Value	Comment		
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 8.3.1.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.1		
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to connection diagram	N/A				

1. The general test parameter settings are set up according to Table 8.3.1.1.4.1-3.

- 2. Message contents are defined in clause 8.3.1.1.4.3.
- 3. There are two carriers and two cells specified in the test, where E-UTRA Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. E-UTRA Cell 1 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 8.3.1.1.4.1-3: General test parameters for E-UTRA – NR FR1 handover with unknown target cell

Parameter		Value	Comment
NR RF Channel Number		1	1 NR carrier frequency is used in
			the test
umber		2	1 E-UTRAN carrier frequency is
			used in the test
Active cell		Cell 1	E-UTRAN cell
Neighbouring cell		Cell 2	NR cell
Active cell		Cell 2	
quantity		SS-RSRP	
ement quantity		RSRP	
	dBm	-84	Absolute E-UTRAN RSRP
			threshold for event B2
	dBm	As specified in Table	Absolute NR SS-RSRP threshold
		A.8.3.1.1-4	for event B2
Hysteresis		0	
	S	0	
		0	L3 filtering is not used
		OFF	Non-DRX test
ormation	-	Not sent	No additional delays in random
			access procedure
n cells		3 ms	Asynchronous cells
uration Id		0	As specified in Table 8.1.2.1-1
			started before T2 starts [23]
	S	5	
	S	≤5	
	S	1	
	umber Active cell Neighbouring cell	Active cell Neighbouring cell Active cell quantity ment quantity dBm dBm dB s ormation - n cells uration Id s s	Active cell

8.3.1.1.4.2 Test procedure

The test comprises of one E-UTRA carrier and one NR carrier. There are two cells and one cell on each carrier. Cell 1 is the E-UTRAN and Cell 2 is an inter-RAT NR neighbour cell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 8.3.1.1.4.1-3, 8.3.1.1.5-1 and 8.3.1.1.5-2, respectively.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of Cell 2. Starting T2, Cell 2 becomes detectable and the UE is expected to detect and send a measurement report. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 of TS 36.133 [23] is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2 after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain Cell 2 as the target cell.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 2. Set the parameters of Cell 1 and Cell 2 according to T1 in Table 8.3.1.1.5-1 and Table 8.3.1.1.5-2 respectively, T1 starts.
- 3. The SS shall transmit an RRCConnectionReconfiguration message.
- 4. The UE shall transmit an *RRCConnectionReconfigurationComplete* message.
- 5. When T1 expires, the SS shall switch the parameters setting from T1 to T2 as specified in Table 8.3.1.1.5-1 and Table 8.3.1.1.5-2 respectively. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event B2.
- 7. SS shall transmit an *RRCConnectionReconfiguration* message implying handover to Cell 2.

- 8. The start of T3 is the instant when the last TTI containing the *RRCConnectionReconfiguration* message implying handover is sent to the UE, at that instant the SS shall switch the power setting from T2 to T3 as specified in Table 8.3.1.1.5-1 and Table 8.3.1.1.5-2.
- 9. The UE shall transmit an RRCConnectionReconfigurationComplete message.
- 10. If the UE transmits the uplink PRACH channel to Cell 2 less than 260 ms from the beginning of time period T3 then the number of successful tests is increased by one. Otherwise, the number of failure tests is increased by one.
- 11. After T3 expires, cause UE handover back to E-UTRA Cell 1 (if the handover fails, switch off the UE) or switch off the UE. Then ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3. E-UTRA Cell 1 is the active cell.
- 12. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved

8.3.1.1.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.3.1.1.4.3-1: Common Exception messages for E-UTRA – NR FR1 handover with unknown target cell

Default Message Contents					
Common contents of system information	TBD				
blocks exceptions					
Default RRC messages and information	TBD				
elements contents exceptions					

8.3.1.1.5 Test requirement

Table 8.3.1.1.4.1-3, 8.3.1.1.5-1 and 8.3.1.1.5-2 define the primary level settings including test tolerances for E-UTRA – NR FR1 handover with unknown target cell.

Table 8.3.1.1.5-1: E-UTRAN PCell specific test parameters for E-UTRA – NR FR1 handover with unknown target cell

Parameter	Unit	Configuration	Cell 1			
			T1	T2	Т3	
RF channel number		1, 2, 3, 4, 5, 6		2		
Duplex mode		1, 2, 3		FDD		
		4, 5, 6		TDD		
TDD special subframe configuration ^{Note1}		4, 5, 6		6		
TDD uplink-downlink configuration ^{Note1}		4, 5, 6	1			
BW _{channel}	MHz	1, 2, 3, 4, 5, 6		5 MHz: N _{RB,c} = 25	5	
			10 MHz: $N_{RB,c} = 50$			
			2	$20 \text{ MHz: } N_{RB,c} = 10$	00	
PRACH Configuration ^{Note2}		1, 2, 3	4			
		4, 5, 6		53		
PDSCH parameters:		1, 2, 3		5 MHz: R.7 FDD		
DL Reference Measurement				10 MHz: R.3 FDD)	
Channel ^{Note3}				20 MHz: R.6 FDD)	
		4, 5, 6		5 MHz: R.4 TDD		
				10 MHz: R.0 TDD)	
				20 MHz: R.3 TDD)	
PCFICH/PDCCH/PHICH		1, 2, 3	5 MHz: R.11 FDD			
parameters:				10 MHz: R.6 FDD)	
				20 MHz: R.10 FDI	OD	

DL Reference Measurement		4, 5, 6		5 MHz: R.11 TDD)	
Channel ^{Note3}				10 MHz: R.6 TDD)	
			2	20 MHz: R.10 TD	D	
OCNG Patterns ^{Note3}		1, 2, 3	Ĺ	MHz: OP.20 FD	D	
			1	0 MHz: OP.10 FD	D	
			2	0 MHz: OP.17 FD	D	
		4, 5, 6		5 MHz: OP.9 TDE)	
				LO MHz: OP.1 TD	D	
			2	20 MHz: OP.7 TD	D	
PBCH_RA		1, 2, 3, 4, 5, 6				
PBCH_RB						
PSS_RA						
SSS_RA						
PCFICH_RB						
PHICH_RA						
PHICH_RB	dB			0		
PDCCH_RA						
PDCCH_RB						
PDSCH_RA						
PDSCH_RB						
OCNG_RA ^{Note4}						
OCNG_RB ^{Note4}						
N _{oc} ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6		-98		
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	7	7	7	
Ê _s /I _{ot} ^{Note6}	dB	1, 2, 3, 4, 5, 6	7	7	7	
RSRP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-91	-91	-91	
SCH_RP ^{Note6}	dBm/15kHz	1, 2, 3, 4, 5, 6	-91	-91	-91	
Io ^{Note6}	dBm/9MHz	1, 2, 3, 4, 5, 6	-62.43	-62.43	-62.43	
Propagation Condition		1, 2, 3, 4, 5, 6		AWGN		
Antenna Configuration and		1, 2, 3, 4, 5, 6		1x2 Low		
Correlation Matrix Note7						
Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].						

- Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].
- Note 2: PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211 [23].
- Note 3: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.
- Note 4: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 5: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 6: Ê_s/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 7: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [27].

Table 8.3.1.1.5-2: NR neighbour cell specific test parameters for E-UTRA – NR FR1 handover with unknown target cell

Parameter		Unit	Configuration		Cell 2	
				T1	T2	Т3
RF channel numbe	r		1, 2, 3, 4, 5, 6		1	
Duplex mode			1, 4		FDD	
			2, 3, 5, 6	TDD		
TDD Configuration			2, 5		TDDConf.1.1	
			3, 6		TDDConf.1.2	
BW _{channel}		MHz	1, 4	10	: N _{RB,c} = 52 (FD	D)
			2, 5	10	: N _{RB,c} = 52 (TD	D)
			3, 6	40: N _{RB,c} = 106 (TDD)		
PDSCH reference	measurement		1, 4		SR.1.1 FDD	
channel			2, 5		SR.1.1 TDD	
			3, 6		SR.2.1 TDD	
CORSET reference channel			1, 4		CR.1.1 FDD	
			2, 5		CR.1.1 TDD	
			3, 6		CR.2.1 TDD	
OCNG pattern ^{Note1}			1, 2, 3, 4, 5, 6		OP.1	
BWP	Initial DL BWP		1, 2, 3, 4, 5, 6		DLBWP.0.1	
	Dedicated DL BWP				DLBWP.1.1	

	Initial UL BWP				ULBWP.0.1	
	Dedicated UL BWP				ULBWP.1.1	
SMTC configuration			1, 2, 3, 4, 5, 6		SMTC.1	
SSB configuration			1, 2, 4, 5		SSB.1 FR1	
			3, 6		SSB.2 FR1	
b2-Threshold2NR		dBm	1, 2, 4, 5		-105	
		ubili	3, 6		-103	
EPRE ratio of PSS	to SSS		1, 2, 3, 4, 5, 6			
EPRE ratio of PBC	H_DMRS to SSS					
EPRE ratio of PBC	H to PBCH_DMRS					
EPRE ratio of PDC	CH_DMRS to SSS					
EPRE ratio of PDC	CH to					
PDCCH_DMRS		dB			0	
EPRE ratio of PDS	_					
	EPRE ratio of PDSCH to					
PDSCH_DMRS						
EPRE ratio of OCN						
	G to OCNG DMRS					
N _{oc} ^{Note2}		dBm/15 KHz	1, 2, 3, 4, 5, 6		-98	
N _{oc} Note2		dBm/SCS	1, 2, 4, 5		-98	
			3, 6		-95	
Ê _s /N _{oc}		dB	1, 2, 3, 4, 5, 6	-infinity	0	0
Ê _s /I _{ot} Note3		dB	1, 2, 3, 4, 5, 6	-infinity	0	0
SS-RSRP ^{Note3}		dBm/SCS	1, 2, 4, 5	-infinity	-98	-98
			3, 6	-infinity	-95	-95
		dBm/9.36 MHz	1, 2, 4, 5	-70.05	-67.04	-67.04
Io ^{Note3}		dBm/38.16	3, 6	-63.96	-60.94	-60.94
		MHz				
Propagation conditi			1, 2, 3, 4, 5, 6		AWGN	
	tion and Correlation		1, 2, 3, 4, 5, 6		1x2 Low	
Matrix						

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: \hat{E}_s/I_{ot} , SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

The UE shall start to transmit the PRACH to Cell 2 less than 260 ms from the beginning of time period T3.

The rate of correct handovers observed during repeated tests shall be at least 90%.

NOTE: The handover delay can be expressed as: RRC procedure delay + T_{interrupt}, where:

RRC procedure delay = 50 ms and is specified in TS36.331 [23].

 $T_{interrupt}$ = 210 ms in the test; $T_{interrupt}$ is defined in TS36.133 [23] clause 5.3.4.3.

This gives a total of 260 ms.

8.4 Measurement procedures

8.4.1 SFTD measurement delay

8.4.1.0 Minimum conformance requirements

8.4.1.0.1 Minimum conformance requirements for E-UTRA – NR FR1 SFTD measurement delay

[TS 36.133, clause 8.1.2.4.25.1]

The UE shall perform inter-RAT SFTD measurement and report SFTD result with/without SS-RSRP after the network requests with *reportSFTD-Meas* set to *neighborCells*. The overall delay includes RRC procedure delay to be defined in clause 11.2 in TS 36.331 and SFTD measurement reporting delay in TS 36.133 clause 8.1.2.4.25.3.

[TS 36.133, clause 8.1.2.4.25.2]

The requirements on SFTD measurement delay defined in this section are applicable under the side condition SCH \hat{E} s/Iot \geq -3 dB for the NR cell. Depending on configuration, the SFTD measurement may be carried out with or without the support of configured measurement gaps. In the current release, indication on whether to carry out the SFTD measurement with or without measurement gaps is implicit and depending on whether measurement gaps are configured.

The UE shall be able to detect, identify and measure SFTD of up to 3 of the strongest NR cells on the carrier frequency provided in the SFTD measurement configuration. Further depending on the SFTD measurement configuration, the UE shall additionally report SS-RSRP for the one or more NR cells. The UE may or may not be configured with *cellsForWhichToReportSFTD*. The UE does not expect *cellsForWhichToReportSFTD* to change during an ongoing SFTD measurement.

When no measurement gaps are provided, the UE shall be capable of finding the NR cell regardless of its SSB position in the SMTC period. The SFTD measurement shall be conducted with sustained connection to the E-UTRA PCell and activated SCell(s), however, the UE may be allowed to cause a certain amount of interruptions for reconfiguration of the radio receiver, as specified in TS 36.133 clause 7.35.

When measurement gaps are provided, the UE shall be capable of finding the NR cell under the additional condition that the SSB at least occasionally falls within the measurement gap.

When no MCG DRX is used, the UE shall be capable of determining SFTD within a physical layer measurement period of $T_{measure\ SFTD1}$ as follows:

- For SFTD measurements without measurement gaps, and without additional SS-RSRP reporting:
 - For NR carrier in FR1: $T_{measure SFTD1} = [14]$ SMTC periods
- For SFTD measurements in measurement gaps, and without additional SS-RSRP reporting:
 - For NR carrier in FR1: $T_{measure_SFTD1} = [N_{freq} \times 8 \times max(MGRP, SMTC period)]$
- For SFTD measurements without measurement gaps, and with additional SS-RSRP reporting:
 - For NR carrier in FR1: T_{measure_SFTD1} = [19] SMTC periods
- For SFTD measurements in measurement gaps, and with additional SS-RSRP reporting:
 - For NR carrier in FR1: $T_{\text{measure_SFTD1}} = [N_{\text{freq}} \times 13 \times \text{max}(\text{MGRP, SMTC period})]$

Where N_{freq} is the number of carriers monitored in measurement gaps.

When MCG DRX is used, the same $T_{measure_SFTD1}$ as for non-DRX applies, but the reporting delay depends on the DRX cycle length in use.

In case an NR PSCell is added, the UE shall terminate the inter-RAT SFTD measurement.

In case PCell is changed due to handover, the UE shall terminate the inter-RAT SFTD measurement.

[TS 36.133, clause 8.1.2.4.25.3]

The SFTD measurement reporting delay is defined as the time between a command that will trigger an SFTD measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTI_{DCCH}. This measurement reporting delay excludes any delay caused by no UL resources for UE to send the measurement report. When the UE is configured to perform SRS carrier-based switching, an additional delay can be expected.

The SFTD measurement reporting delay shall be less than T_{measure_SFTD1} defined in TS 36.133, clause 8.1.2.4.25.2.

8.4.1.1 E-UTRA – NR FR1 SFTD measurement delay in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.

8.4.1.1.1 Test purpose

The purpose of this test is:

- To partly verify that measurement reporting delay for SFTD between E-UTRA PCell and inter-RAT NR neighbour cell in FR1 is within the requirements stated in clauses 8.1.2.4.25 and 8.1.2.4.26 of TS 36.133 [23] for E-UTRA FDD and TDD, respectively, when no measurement gaps are provided and no DRX is configured.

8.4.1.1.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR measurements.

8.4.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.1.0.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.1.1.

8.4.1.1.4 Test description

Two carriers are used in this test: one E-UTRA carrier with the PCell (Cell 1), and one NR carrier with the NR neighbour cell (Cell 2).

This test consists of a single time period of duration T1. Prior to the start of time duration T1, the UE is connected to Cell 1 and configured to carry out intra-frequency measurements only. The point in time at which the UE receives, at the UE antenna connector(s), a RRC message containing a measurement configuration for SFTD measurements on RF channel 2 defines the start of time duration T1. Following the start of T1 the UE shall detect Cell 2, determine the SFN and frame time difference of Cell 2 relative to Cell 1, and send a measurement report. No measurement gaps are provided and no DRX is configured in this test.

8.4.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.1.1.4.1-1.

Table 8.4.1.1.4.1-1: Supported test configurations for E-UTRA – NR FR1 SFTD measurement delay in non-DRX

Config	Description				
8.4.1.1-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode				
8.4.1.1-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode				
8.4.1.1-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode				
8.4.1.1-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode				
8.4.1.1-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode				
8.4.1.1-6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode				
Note: The UE is only required to be tested in one of the supported test configurations					

Configure the test requirement and the DUT according to the parameters in Table 8.4.1.1.4.1-2.

Table 8.4.1.1.4.1-2: Initial conditions for E-UTRA – NR FR1 SFTD measurement delay in non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 8.4.1.1.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.1
conditions			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 8.4.1.1.4.1-3.
- 2. Message contents are defined in clause 8.4.1.1.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup for this test. E-UTRA Cell 1 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 8.4.1.1.4.1-3: General test parameters for E-UTRA – NR FR1 SFTD measurement delay in non-DRX

Parameter	Unit	Test	Value		Comment
		configuration	Test 1	Test 2	
E-UTRA RF Channel		Config		1	One E-UTRAN TDD carrier
Number		1,2,3,4,5,6	•	-	frequencies is used.
NR RF Channel Number		Config		1	One NR FR1 carrier frequencies is
		1,2,3,4,5,6		_	used.
Active cell		Config	Ce	II 1	Cell 1 is on E-UTRA RF channel
	ļ	1,2,3,4,5,6			number 1.
Neighbour cell		Config 1,2,3,4,5,6	Ce	ell 2	Cell 2 is on NR RF channel number 1.
SMTC-SSB parameters		Config 1,4	SSB.	1 FR1	As specified in TS 38.133 [6] clause A.3.10.1
		Config 2,5	SSB.	1 FR1	As specified in TS 38.133 [6] clause A.3.10.1
		Config 3,6	SSB.	2 FR1	As specified in TS 38.133 [6] clause A.3.10.1
CP length		Config 1,2,3,4,5,6	Noi	mal	Applicable to both cells.
DRX		Config 1,2,3,4,5,6	0	FF	DRX is not used
Frame time offset between serving and neighbour cells	ms	Config 1,2,3,4	3	7	Asynchronous cells. The timing of Cell 2 relative to the timing of Cell 1.
	μs	Config 5,6	3		Synchronous cells.
SFN offset between serving and neighbour cells		Config 1,2,3,4,5,6	0	1	SFN of Cell 2 relative to SFN of Cell 1.
T1	S	Config 1,2,3,4,5,6	:	1	

8.4.1.1.4.2 Test procedure

Two cells are deployed in the test, which are E-UTRA PCell (Cell 1) on the E-UTRA carrier and a FR1 NR neighbour cell (Cell 2) on NR carrier. The general test parameters is given in Table 8.4.1.1.4.1-3. Cell specific test parameters for the E-UTRA PCell and neighbour cell are given in Table 8.4.1.1.5-1 and 8.4.1.1.5-2, respectively.

In the measurement control information, it is indicated to the UE that inter-RAT SFTD measurement on Cell 2 is used. This test consists of single time period with time duration of T1. Prior to the start of time duration T1, the UE is connected to Cell 1 and configured to carry out intra-frequency measurements only.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 2. Set the parameters of Cell 2 according to T1 in Table 8.4.1.1.5-2, T1 starts.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.
- 6. UE shall transmit a *MeasurementReport* message triggered by SFTD measurement reporting. If the overall delays measured from the beginning of time period T1 is less than TBD ms then the number of successful tests is increased by one. If the UE fails to report within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit an *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 [25] clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3),

Or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.4.1.1.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.1.1.4.3-1: Common Exception messages for E-UTRA – NR FR1 SFTD measurement delay in non-DRX

	Default Message Contents
Common contents of system information	
blocks exceptions	
Default RRC messages and information	FFS
elements contents exceptions	

8.4.1.1.5 Test requirement

Table 8.4.1.1.4.1-3, 8.4.1.1.5-1 and 8.4.1.1.5-2 define the primary level settings including test tolerances for E-UTRA – NR FR1 SFTD measurement delay in non-DRX.

Table 8.4.1.1.5-1: E-UTRA Cell specific test parameters for E-UTRA – NR FR1 SFTD measurement delay in non-DRX

Parameter	Unit	E-UTRAN Cell1
E-UTRA RF Channel Number		1
Duplex mode		FDD or TDD
TDD special subframe configuration ^{Note1}		6
TDD uplink-downlink configuration ^{Note1}		1

BW_charmel S MHz: Neac = 25 10 MHz: Neac = 50 20 MHz: Neac = 50 20 MHz: Neac = 50 20 MHz: Neac = 100 20 MHz: Neac = 100 20 MHz: R.5 FDD 5 MHz: R.3 FDD 20 MHz: R.6 FDD 5 MHz: R.1 TDD 10 MHz: R.0 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.10 FDD 5 MHz: R.11 FDD 10 MHz: R.6 FDD 20 MHz: R.10 FDD 5 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: CP.10 FDD 20 MHz: CP.10 FDD 20 MHz: CP.10 FDD 20 MHz: CP.17			
10 MHz: Nasa_c = 50	BW _{channel}		5 MHz: N _{RB.c} = 25
PDSCH parameters: DL Reference Measurement Channel Nome			10 MHz: N _{RB,c} = 50
DL Reference Measurement Channel Note2 20 MHz: R.3 FDD 20 MHz: R.6 FDD 5 MHz: R.4 TDD 10 MHz: R.0 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.1 TDD 10 MHz: R.6 FDD 20 MHz: R.10 FDD 5 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 FDD 20			20 MHz: N _{RB,c} = 100
20 MHz; R.6 FDD 5 MHz; R.4 TDD 10 MHz; R.0 TDD 10 MHz; R.0 TDD 20 MHz; R.3 TDD 20 MHz; R.3 TDD 20 MHz; R.3 TDD 20 MHz; R.3 TDD 20 MHz; R.11 FDD 10 MHz; R.6 FDD 20 MHz; R.10 FDD 5 MHz; R.11 TDD 10 MHz; R.6 TDD 20 MHz; R.11 TDD 10 MHz; R.6 TDD 20 MHz; R.10 TDD 20 MHz; R.10 TDD 20 MHz; R.10 TDD 20 MHz; CP.10 FDD 20 MHz; CP.17 FDD 5 MHz; CP.17 FDD 5 MHz; CP.9 TDD 10 MHz; CP.17 TDD 20 MHz; CP.10 FDD 20 MHz; CP.17 TDD 20 MHz; CP.17 TDD 20 MHz; CP.17 TDD 20 MHz; CP.17 TDD 20 MHz; CP.10 FDD 20 MHz; CP.17 TDD 20 MHz; CP.10 FDD PDSCH parameters:		5 MHz: R.7 FDD	
S MHz: R.4 TDD 10 MHz: R.0 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.3 TDD 20 MHz: R.11 FDD 10 MHz: R.6 FDD 20 MHz: R.11 FDD 10 MHz: R.6 FDD 20 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.10 TDD 5 MHz: R.10 TDD 5 MHz: OP.10 FDD 20 MHz: OP.10 FDD 20 MHz: OP.17 FDD 5 MHz: OP.17 FDD 5 MHz: OP.17 FDD 5 MHz: OP.17 TDD 20 MHz: OP.7 TD	DL Reference Measurement Channel ^{Note2}		10 MHz: R.3 FDD
10 MHz; R.0 TDD 20 MHz; R.3 TDD			20 MHz: R.6 FDD
PCFICH/PDCCH/PHICH parameters:			5 MHz: R.4 TDD
DCFICH/PDCCH/PHICH parameters: DL Reference Measurement Channel Note2 10 MHz: R.16 FDD 20 MHz: R.10 FDD 5 MHz: R.11 TDD 10 MHz: R.6 FDD 20 MHz: R.10 TDD 5 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: OP.20 FDD 10 MHz: OP.10 FDD 20 MHz: OP.17 FDD 20 MHz: OP.17 FDD 20 MHz: OP.17 TDD 20 MHz: OP.7			10 MHz: R.0 TDD
DL Reference Measurement Channel Note2 20 MHz: R.10 FDD 20 MHz: R.10 FDD 5 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: OP.20 FDD 10 MHz: OP.20 FDD 10 MHz: OP.17 FDD 5 MHz: OP.9 TDD 10 MHz: OP.1 TDD 20 MHz: OP.17 TDD 20 MHz: OP.7 TDD 20 MH			20 MHz: R.3 TDD
20 MHz: R.10 FDD 5 MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 10 MHz: OP.20 FDD 11 MHz: OP.10 FDD 20 MHz: OP.17 FDD 5 MHz: OP.9 TDD 10 MHz: OP.1 TDD 20 MHz: OP.7 TDD 20 MHz: OP.			5 MHz: R.11 FDD
S MHz: R.11 TDD 10 MHz: R.6 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: OP.20 FDD 10 MHz: OP.10 FDD 20 MHz: OP.17 FDD 5 MHz: OP.9 TDD 10 MHz: OP.1 TDD 20 MHz: OP.7 TDD 20 MHz: OP.	DL Reference Measurement Channel ^{Note2}		10 MHz: R.6 FDD
10 MHz: R.6 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 20 MHz: R.10 TDD 5 MHz: OP.20 FDD 10 MHz: OP.10 FDD 20 MHz: OP.10 FDD 20 MHz: OP.17 FDD 5 MHz: OP.9 TDD 10 MHz: OP.1 TDD 20 MHz: OP.7 TDD 20 MHz: OP			20 MHz: R.10 FDD
20 MHz: R.10 TDD			5 MHz: R.11 TDD
OCNG Patterns ^{Note2} 5 MHz: OP.20 FDD 10 MHz: OP.10 FDD 20 MHz: OP.17 FDD 20 MHz: OP.1 FDD 10 MHz: OP.1 TDD 10 MHz: OP.1 TDD 20 MHz: OP.7 TDD PBCH_RA dB PSS_RA dB PSS_RA dB PCFICH_RB dB PHICH_RA dB PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RA dB OCNG_RA ^{Note3} dB OCNG_RB ^{Note3} dB No. Note4 dBM/15 kHz -104 Ê_JIot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -59.13+10log(N _{RB,C} /50)			10 MHz: R.6 TDD
10 MHz: OP.10 FDD 20 MHz: OP.17 FDD 20 MHz: OP.17 FDD 5 MHz: OP.9 TDD 10 MHz: OP.1 TDD 10 MHz: OP.1 TDD 20 MHz: OP.7 TDD 20 MHz: O			20 MHz: R.10 TDD
20 MHz: OP.17 FDD 5 MHz: OP.9 TDD 10 MHz: OP.1 TDD 20 MHz: OP.7 TDD 20 MHz: OP.	OCNG Patterns ^{Note2}		5 MHz: OP.20 FDD
S MHz: OP.9 TDD 10 MHz: OP.1 TDD 20 MHz: OP.7			10 MHz: OP.10 FDD
10 MHz: OP.1 TDD 20 MHz: OP.7 TDD			20 MHz: OP.17 FDD
20 MHz: OP.7 TDD			
PBCH_RA dB PBCH_RB dB PSS_RA dB SSS_RA dB PCFICH_RB dB PHICH_RA dB PHICH_RB dB PDCCH_RA dB PDCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote3 dB OCNG_RBNote3 dB NocNote4 dBM/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N_RB,C_/50)			10 MHz: OP.1 TDD
PBCH_RB dB PSS_RA dB SSS_RA dB PCFICH_RB dB PHICH_RA dB PHICH_RB dB O 0 PDCCH_RB dB PDCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote3 dB OCNG_RBNote3 dB NocNote4 dBM/15 kHz -104 Ês/Noc dB 17 RSRP_Note5 dBm/15 kHz -87 SCH_RP_Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N_RB,c /50)			20 MHz: OP.7 TDD
PSS_RA dB SSS_RA dB PCFICH_RB dB PHICH_RA dB PHICH_RB dB PDCCH_RB dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote3 dB OCNG_RBNote3 dB NocNote4 dBM/15 kHz Es/Noc dB dB 17 RSRP Note5 dBm/15 kHz SCH_RP Note5 dBm/15 kHz Io Note5 dBm/Ch BW -59.13+10log(N _{RB,c} /50)	PBCH_RA	dB	
SSS_RA dB PCFICH_RB dB PHICH_RA dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RA^Note3 dB OCNG_RBNote3 dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N_RB,c /50)	PBCH RB	dB	
PCFICH_RB dB PHICH_RA dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RA^Note3 dB OCNG_RBNote3 dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,C} /50)	PSS RA	dB	
PHICH_RA dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote3 dB OCNG_RBNote3 dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,C} /50)	SSS RA	dB	
PHICH_RA dB PHICH_RB dB PDCCH_RA dB PDCCH_RB dB PDSCH_RA dB PDSCH_RB dB OCNG_RANote3 dB OCNG_RBNote3 dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,C} /50)	PCFICH RB	dB	
PHICH_RB dB 0 PDCCH_RA dB 0 PDCCH_RB dB 0 PDSCH_RA dB 0 PDSCH_RB dB 0 OCNG_RANote3 dB 0 OCNG_RBNote3 dB 1 NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,C} /50)		dB	
PDCCH_RB		dB	0
PDSCH_RA dB PDSCH_RB dB OCNG_RA ^{Note3} dB OCNG_RB ^{Note3} dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,C} /50)	PDCCH RA	dB	
PDSCH_RA dB PDSCH_RB dB OCNG_RA ^{Note3} dB OCNG_RB ^{Note3} dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,C} /50)	PDCCH RB	dB	
PDSCH_RB dB OCNG_RA ^{Note3} dB OCNG_RB ^{Note3} dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,C} /50)		-	
OCNG_RANote3 dB OCNG_RBNote3 dB NocNote4 dBm/15 kHz -104 Ês/Noc dB 17 Ês/Iot dB 17 RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N_RB,c /50)			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Noc Note4		-104
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			
RSRP Note5 dBm/15 kHz -87 SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,c} /50)			
SCH_RP Note5 dBm/15 kHz -87 Io Note5 dBm/Ch BW -59.13+10log(N _{RB,c} /50)			
Io Note5 dBm/Ch BW -59.13+10log(N _{RB,c} /50)		+	
3(1.0,0 1.7)			_ ·
i ropagation Condition		abili/Cli bw	
Antenna Configuration 1x2			
Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].		nlink configuration	

Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].

Note 2: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 [23] respectively.

Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 5: E_s/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 8.4.1.1.5-2: NR Cell specific test parameters for E-UTRA – NR FR1 SFTD measurement delay in non-DRX

Parameter	Unit	Test configuration	Cell 2
NR RF Channel Number		Config 1,2,3,4,5,6	1
Duplex mode		Config 1,4	FDD
Duplex mode		Config 2,3,5,6	TDD
		Config 1,4	10: N _{RB,c} = 52
BW _{channel}	MHz	Config 2,5	10: N _{RB,c} = 52
		Config 3,6	40: N _{RB,c} = 106
TDD configuration		Config 2,5	TDDConf.1.1
		Config 3,6	TDDConf.2.1
OCNG Pattern defined in A.3.2.1.1		Config 1,2,3,4,5,6	OP.1
SMTC configuration defined in		Config 1,4	SMTC.2
A.3.2.11.1 and A.3.2.11.2		Config 2,3,5,6	SMTC.1
PDSCH/PDCCH subcarrier	kHz	Config 1,2,4,5	15
spacing		Config 3,6	30
EPRE ratio of PSS to SSS	dB		
EPRE ratio of PBCH DMRS to SSS	dB		
EPRE ratio of PBCH to PBCH DMRS	dB	Config 1,2,3,4,5,6	0
EPRE ratio of OCNG DMRS to SSS Note 1	dB		
EPRE ratio of OCNG to OCNG DMRS Note 1	dB		
N _{oc} Note2	dBm/15kHz		-98
Note2	-ID/COC	Config 1,2,4,5	-98
N _{oc} Note2	dBm/SCS	Config 3,6	-95
SS-RSRP Note 3, 4	dBm/SCS	Config 1,2,4,5	-94
33-R3RP	ubili/3C3	Config 3,6	-91
Ês/I _{ot}	dB	Config 1,2,3,4,5,6	4
Ê _s /N _{oc}	dB	Config 1,2,3,4,5,6	4
IO Note 3	dBm/9.36MHz	Config 1,2,4,5	-67.11
10	dBm/38.16MHz	Config 3,6	-62.27
Propagation Condition		Config 1,2,3,4,5,6	AWGN
Note 1: OCNG shall be used su is achieved for all OFD	M symbols.		otal transmitted power spectral density

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

The overall delays measured is defined as the time from the beginning of time period T1, to the moment the UE send one SFTD measurement triggered measurement report.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

 $Measurement \ reporting \ delay = T_{RRC_procedure_delay} + T_{measure_SFTD1}$

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

 $T_{RRC_procedure_delay}$ = 10 ms, is the RRC procedure delay for RRC reconfiguration, which is defined in TS 38.331 [13] Clause 12

T_{measure_SFTD1} = TBD ms, is the SFTD measurement report delay defined in TS 36.133 [23] clause 8.1.2.4.25 and 8.1.2.4.26 for FDD and TDD E-UTRA Cell 1, respectively.

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of TBD ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.4.1.2 E-UTRA – NR FR1 SFTD measurement delay in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.
- RAN4 dependency: test requirement is TBD.

8.4.1.2.1 Test purpose

The purpose of this test is:

- To partly verify that measurement reporting delay for SFTD between E-UTRA PCell and inter-RAT NR neighbour cell in FR1 is within the requirements stated in clauses 8.1.2.4.25 and 8.1.2.4.26 of TS 36.133 [23] for E-UTRA FDD and TDD, respectively, when no measurement gaps are provided and DRX is configured.

8.4.1.2.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR measurements.

8.4.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.1.0.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.1.2.

8.4.1.2.4 Test description

Two carriers are used in this test: one E-UTRA carrier with the PCell (Cell 1), and one NR carrier with the NR neighbour cell (Cell 2).

This test consists of a single time period of duration T1. Prior to the start of time duration T1, the UE is connected to Cell 1 and configured to carry out intra-frequency measurements only. The point in time at which the UE receives, at the UE antenna connector(s), a RRC message containing a measurement configuration for SFTD measurements on RF channel 2 defines the start of time duration T1. Following the start of T1 the UE shall detect Cell 2, determine the SFN and frame time difference of Cell 2 relative to Cell 1, and send a measurement report. No measurement gaps are provided and DRX is configured in this test.

8.4.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.1.2.4.1-1.

Table 8.4.1.2.4.1-1: Supported test configurations for E-UTRA – NR FR1 SFTD measurement delay in DRX

Config	Description				
8.4.1.2-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode				
8.4.1.2-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode				
8.4.1.2-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode				
8.4.1.2-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode				
8.4.1.2-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode				
8.4.1.2-6 LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
Note: The	Note: The UE is only required to be tested in one of the supported test configurations				

Configure the test requirement and the DUT according to the parameters in Table 8.4.1.2.4.1-2.

Table 8.4.1.2.4.1-2: Initial conditions for E-UTRA - NR FR1 SFTD measurement delay in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel bandwidth	As specified	by the test configuration selected fr	om Table 8.4.1.2.4.1-1.
Propagation conditions	AWGN		As specified in Annex C.2.1
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to connection diagram	N/A		

- 1. The general test parameter settings are set up according to Table 8.4.1.2.4.1-3.
- 2. Message contents are defined in clause 8.4.1.2.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup for this test. E-UTRA Cell 1 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

Table 8.4.1.2.4.1-3: General test parameters for E-UTRA - NR FR1 SFTD measurement delay in DRX

Parameter	Unit	Test	Va	ue	Comment
		configuration	Test 1	Test 2	1
E-UTRA RF Channel		Config	,		One E-UTRAN TDD carrier
Number		1,2,3,4,5,6	=	<u> </u>	frequencies is used.
NR RF Channel Number		Config 1,2,3,4,5,6	-	L	One NR FR1 carrier frequencies is used.
Active cell		Config 1,2,3,4,5,6	Ce	II 1	Cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		Config 1,2,3,4,5,6	Ce	II 2	Cell 2 is on NR RF channel number 1.
SMTC-SSB parameters		Config 1,4	SSB.:	l FR1	As specified in TS 38.133 [6] clause A.3.10.1
		Config 2,5	SSB.:	L FR1	As specified in TS 38.133 [6] clause A.3.10.1
		Config 3,6	SSB.	2 FR1	As specified in TS 38.133 [6] clause A.3.10.1

CP length		Config 1,2,3,4,5,6	Noi	rmal	Applicable to both cells.
DRX		Config 1,2,3,4,5,6	DR	XX.4	DRX configuration as specified in TS 38.133 [6] clause A.3.3.4
Frame time offset between serving and neighbour cells	ms	Config 1,2,3,4	3	7	Asynchronous cells. The timing of Cell 2 relative to the timing of Cell 1.
	μs	Config 5,6	;	3	Synchronous cells.
SFN offset between serving and neighbour cells		Config 1,2,3,4,5,6	0	1	SFN of Cell 2 relative to SFN of Cell 1.
T1	S	Config 1,2,3,4,5,6	:	1	

8.4.1.2.4.2 Test procedure

Two cells are deployed in the test, which are E-UTRA PCell (Cell 1) on the E-UTRA carrier and a FR1 NR neighbour cell (Cell 2) on NR carrier. The general test parameters is given in Table 8.4.1.2.4.1-3. Cell specific test parameters for the E-UTRA PCell and neighbour cell are given in Table 8.4.1.2.5-1 and 8.4.1.2.5-2, respectively.

In the measurement control information, it is indicated to the UE that inter-RAT SFTD measurement on Cell 2 is used. This test consists of single time period with time duration of T1. Prior to the start of time duration T1, the UE is connected to Cell 1 and configured to carry out intra-frequency measurements only.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 2. Set the parameters of Cell 2 according to T1 in Table 8.4.1.2.5-2, T1 starts.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.
- 6. UE shall transmit a *MeasurementReport* message triggered by SFTD measurement reporting. If the overall delays measured from the beginning of time period T1 is less than TBD ms then the number of successful tests is increased by one. If the UE fails to report within the overall delays measured requirement then the number of failure tests is increased by one.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit an *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 [25] clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3),

Or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.4.1.2.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.1.2.4.3-1: Common Exception messages for E-UTRA – NR FR1 SFTD measurement delay in DRX

Default Message Contents		
Common contents of system information		
blocks exceptions		
Default RRC messages and information	FFS	
elements contents exceptions		

8.4.1.2.5 Test requirement

Table 8.4.1.2.4.1-3, 8.4.1.2.5-1 and 8.4.1.2.5-2 define the primary level settings including test tolerances for E-UTRA – NR FR1 SFTD measurement delay in DRX.

Table 8.4.1.2.5-1: E-UTRA Cell specific test parameters for E-UTRA – NR FR1 SFTD measurement delay in DRX

Parameter	Unit	E-UTRAN Cell1
E-UTRA RF Channel Number		1
Duplex mode		FDD or TDD
TDD special subframe configuration ^{Note1}		6
TDD uplink-downlink configuration ^{Note1}		1
BW _{channel}		5 MHz: N _{RB,c} = 25
		10 MHz: N _{RB,c} = 50
		20 MHz: N _{RB,c} = 100
PDSCH parameters:		5 MHz: R.7 FDD
DL Reference Measurement Channel ^{Note2}		10 MHz: R.3 FDD
		20 MHz: R.6 FDD
		5 MHz: R.4 TDD
		10 MHz: R.0 TDD
		20 MHz: R.3 TDD
PCFICH/PDCCH/PHICH parameters:		5 MHz: R.11 FDD
DL Reference Measurement Channel ^{Note2}		10 MHz: R.6 FDD
		20 MHz: R.10 FDD
		5 MHz: R.11 TDD
		10 MHz: R.6 TDD
Note:		20 MHz: R.10 TDD
OCNG Patterns ^{Note2}		5 MHz: OP.20 FDD
		10 MHz: OP.10 FDD
		20 MHz: OP.17 FDD
		5 MHz: OP.9 TDD 10 MHz: OP.1 TDD
		20 MHz: OP.1 TDD
PBCH RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	0
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA ^{Note3}	dB	
OCNG_RB ^{Note3}	dB	
N _{oc} ^{Note4}	dBm/15 kHz	-104
Ê _s /N _{oc}	dB	17
\hat{E}_s/I_{ot}	dB	17
RSRP Note5	dBm/15 kHz	-87
SCH_RP Note5	dBm/15 kHz	-87
IO Note5	dBm/Ch BW	-59.13+10log(N _{RB,c} /50)
Propagation Condition		AWGN
Antenna Configuration		1x2

Note 1:	Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].
Note 2:	DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 [23]
	respectively.
Note 3:	OCNG shall be used such that all cells are fully allocated and a constant total transmitted power
	spectral density is achieved for all OFDM symbols.
Note 4:	Interference from other cells and noise sources not specified in the test is assumed to be constant
	over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
Note 5:	E _s /I _{ot} , RSRP, SCH_RP and Io levels have been derived from other parameters for information
	purposes. They are not settable parameters themselves.

Table 8.4.1.2.5-2: NR Cell specific test parameters for E-UTRA – NR FR1 SFTD measurement delay in DRX

Parameter	Unit	Test configuration	Cell 2
NR RF Channel Number		Config 1,2,3,4,5,6	1
Duploy mode		Config 1,4	FDD
Duplex mode		Config 2,3,5,6	TDD
		Config 1,4	10: N _{RB,c} = 52
BW _{channel}	MHz	Config 2,5	10: N _{RB,c} = 52
		Config 3,6	40: N _{RB,c} = 106
TDD configuration		Config 2,5	TDDConf.1.1
TDD comiguration		Config 3,6	TDDConf.2.1
OCNG Pattern defined in A.3.2.1.1		Config 1,2,3,4,5,6	OP.1
SMTC configuration defined in		Config 1,4	SMTC.2
A.3.2.11.1 and A.3.2.11.2		Config 2,3,5,6	SMTC.1
PDSCH/PDCCH subcarrier	kHz	Config 1,2,4,5	15
spacing	KMZ	Config 3,6	30
EPRE ratio of PSS to SSS	dB		
EPRE ratio of PBCH DMRS to SSS	dB		
EPRE ratio of PBCH to PBCH DMRS	dB	Config 1,2,3,4,5,6	0
EPRE ratio of OCNG DMRS to SSS Note 1	dB		
EPRE ratio of OCNG to OCNG DMRS Note 1	dB		
N _{oc} Note2	dBm/15kHz		-98
N _{oc} Note2	dDm/CCC	Config 1,2,4,5	-98
IN _{OC}	dBm/SCS	Config 3,6	-95
SS-RSRP Note 3, 4	dBm/SCS	Config 1,2,4,5	-94
33-K3KF 1	uBili/SCS	Config 3,6	-91
Ê _s /I _{ot}	dB	Config 1,2,3,4,5,6	4
Ê _s /N _{oc}	dB	Config 1,2,3,4,5,6	4
L. Note 3	dBm/9.36MHz	Config 1,2,4,5	-67.11
Io Note 3	dBm/38.16MHz	Config 3,6	-62.27
Propagation Condition		Config 1,2,3,4,5,6	AWGN

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

The overall delays measured is defined as the time from the beginning of time period T1, to the moment the UE send one SFTD measurement triggered measurement report.

The overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{RRC_procedure_delay} + T_{measure_SFTD1}$

 $T_{RRC_procedure_delay}$ = 10 ms, is the RRC procedure delay for RRC reconfiguration, which is defined in TS 38.331 [13] Clause 12

 $T_{\text{measure_SFTD1}}$ = TBD ms, is the SFTD measurement report delay defined in TS 36.133 [23] clause 8.1.2.4.25 and 8.1.2.4.26 for FDD and TDD E-UTRA Cell 1, respectively. When MCG DRX is used, the reporting delay depends on the DRX cycle length in use.

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of TBD ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.4.2 Inter-RAT measurements

8.4.2.0 Minimum conformance requirements

8.4.2.0.1 Minimum conformance requirements for E-UTRA – NR event-triggered measurement

The UE shall be able to identify new inter-RAT E-UTRAN – NR cells and perform SS-RSRP, SS-RSRQ, and SS-SINR measurements of identified inter-RAT cells if carrier frequency information is provided by the PCell, even if no explicit neighbour list with physical layer cell identities is provided.

When measurement gaps are scheduled, the UE shall be able to identify a new detectable cell within $T_{identify_irat_without_index}$ if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (reportQuantityRsIndexes or maxNrofRSIndexesToReport is not configured). Otherwise, UE shall be able to identify a new detectable irat frequency cell within $T_{identify_irat_with_index}$. The UE shall be able to identify a new detectable irat frequency SS block of an already detected cell within $T_{identify_irat_without_index}$.

$$T_{identify_irat_without_index} = \left(T_{PSS/SSS_sync_irat} + T_{SSB_measurement_period_irat}\right) ms$$

$$T_{identify_irat_with_index} = \left(T_{PSS/SSS_sync_irat} + T_{SSB_measurement_period_irat} + T_{SSB_time_index_irat}\right) ms$$

Where:

T_{PSS/SSS} sync irat: it is the time period used in PSS/SSS detection given in table 8.4.2.0.1-1 and table 8.4.2.0.1-2.

 $T_{SSB_time_index_irat}$: it is the time period used to acquire the index of the SSB being measured given in table 8.4.2.0.1-3 and table 8.4.2.0.1-4.

 $T_{SSB_measurement_period_irat}$: equal to a measurement period of SSB based measurement given in table 8.4.2.0.1-5 and table 8.4.2.0.1-6.

 M_{pss/sss_sync_irat} : For a UE supporting FR2 power class 1, M_{pss/sss_sync_ira} =64 samples. For a UE supporting FR2 power class 2 (vehicle mounted), M_{pss/sss_sync_irat} =40 samples. For a UE supporting FR2 power class 3 (handheld), M_{pss/sss_sync_irat} =40 samples. For a UE supporting FR2 power class 4, M_{pss/sss_sync_irat} =[40] samples.

 $M_{SSB_index_irat}$: For a UE supporting power class 1, $M_{SSB_index_irat}$ =[40] samples. For a vehicle mounted UE supporting power class 2 (vehicle mounted), M_{pss/sss_sync_irat} =[24] samples. For a UE supporting power class 3 (handheld), $M_{SSB_index_irat}$ =[24] samples. For a UE supporting power class 4, $M_{meas_period_irat}$ =[24] samples.

 $M_{meas_period_irat}$: For a UE supporting FR2 power class 1, $M_{meas_period_irat}$ =64 samples. For a vehicle mounted UE supporting FR2 power class 2 (vehicle mounted), M_{pss/sss_sync_irat} =40 samples. For a UE supporting FR2 power class 3 (handheld), $M_{meas_period_irat}$ =40 samples. For a UE supporting FR2 power class 4, $M_{meas_period_irat}$ =[40] samples.

 N_{freq} is defined in TS 36.133 [23] clause 8.1.2.1.1.

For per-FR measurement gap capable UE, when serving cells are in E-UTRA and measurement objects are only in FR2,

- UE can perform such measurements without gap, and
- UE fulfils the requirements for FR2 measurement objects based on effective MGRP = 20 ms.

Table 8.4.2.0.1-1: Time period for PSS/SSS detection, (Frequency range FR1)

Condition NOTE1,2	T _{PSS/SSS_sync_irat}	
No DRX	max[600ms, [8] x max(MGRP, SMTC period)] x N _{freq}	
DRX cycle ≤ 320ms	max[600ms, ceil(8x1.5) x max(MGRP, SMTC period,	
	DRX cycle)] x N _{freq}	
DRX cycle > 320ms	[8] x DRX cycle x N _{freq}	
NOTE 1: DRX or non DRX requirements apply according to the conditions described in TS 36.133 [23] section 3.6.1		
IOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in TS 36.133 [23] section 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.		

Table 8.4.2.0.1-2: Time period for PSS/SSS detection, (Frequency range FR2)

Condition NOTE1,2		T _{PSS/SSS_sync_irat}	
No DRX		max[600ms, M _{pss/sss_sync_irat} x max(MGRP, SMTC period)]	
		x N _{freq}	
DRX cycle ≤ 320ms		max[600ms, (1.5 x M _{pss/sss_sync_irat}) x max(MGRP, SMTC	
		period, DRX cycle)] x N _{freq}	
DRX cycle > 320ms		M _{pss/sss_sync_irat} x DRX cycle x N _{freq}	
NOTE 1: DRX or non DRX requirements apply according to the conditions described in TS 36.133 [23] secti			
	3.6.1		
NOTE 2:	NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in TS 36.133 [23]		
section 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell			
	group.		

Table 8.4.2.0.1-3: Time period for time index detection (Frequency range FR1)

Condition NOTE1,2		T _{SSB_time_index_irat}	
No DRX		max[120ms, [3] x max(MGRP, SMTC period)] x N _{freq}	
	DRX cycle ≤ 320ms	max[120ms, ceil(3 x 1.5) x max(MGRP, SMTC period,	
		DRX cycle)] x N _{freq}	
DRX cycle > 320ms		[3] x DRX cycle x N _{freq}	
NOTE 1: DRX or non DRX requirements apply according to the conditions described in TS 36.133 [23] section			
	3.6.1		
	NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in TS 36.133 [23]		
section 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cel			
	group.		

Table 8.4.2.0.1-4: Time period for time index detection (Frequency range FR2)

Condition NOTE1,2		T _{SSB_time_index_irat}		
No DRX		max[200ms, M _{SSB_index_irat} x max(MGRP, SMTC period)] x		
		N_{freq}		
	DRX cycle ≤ 320ms	max[200ms, (1.5 x M _{SSB_index_irat}) x max(MGRP, SMTC		
		period, DRX cycle)] x N _{freq}		
DRX cycle > 320ms		M _{SSB_index_irat} x DRX cycle x N _{freq}		
NOTE 1: DRX or non DRX requirements apply according to the conditions described in TS 36.133 [23] se				
	3.6.1			
	NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in TS 36.133 [23]			
section 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell				
	group.			

In the requirements, an NR cell is considered to be detectable when:

- NR SS-RSRP related conditions in the accuracy requirements in Section 9.11.1 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 of TS 38.133 [6],
- NR SS-RSRQ related conditions in the accuracy requirements in Section 9.11.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 of TS 38.133 [6],
- NR SS-SINR related conditions in the accuracy requirements in Section 9.11.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 of TS 38.133 [6].

When measurement gaps are scheduled for NR measurements the UE physical layer shall be capable of reporting NR SS-RSRP, SS-RSRQ, and SS-SINR measurements to higher layers with measurement accuracy as specified in TS 36.133 [23] clause 9.11, with measurement period as shown in table 8.4.2.0.1-5 and table 8.4.2.0.1-6:

Table 8.1.2.4.21.1.1-5: Measurement period for irat-frequency measurements (Frequency FR1)

Condition NOTE1,2		T SSB_measurement_period_irat	
No DRX		max[200ms, [8] x max(MGRP, SMTC period)] x N _{freq}	
	DRX cycle ≤ 320ms	max[200ms, ceil(8 x 1.5) x max(MGRP, SMTC period,	
		DRX cycle)] x N _{freq}	
DRX cycle > 320ms		[8] x DRX cycle x N _{freq}	
NOTE 1:	NOTE 1: DRX or non DRX requirements apply according to the conditions described in TS 36.133 [23] section		
	3.6.1		
NOTE 2:	NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in TS 36.133 [23]		
	section 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell		
	group.		

Table 8.1.2.4.21.1.1-6: Measurement period for irat-frequency measurements (Frequency FR2)

Condition NOTE1,2		T _{SSB_measurement_period_irat}
No DRX		max[400ms, M _{meas_period_irat} x max(MGRP, SMTC period)]
		x N _{freq}
DF	RX cycle ≤ 320ms	max[400ms, (1.5 x M _{meas_period_irat}) x max(MGRP, SMTC
		period, DRX cycle)] x N _{freq}
DF	RX cycle > 320ms	M _{meas period irat} x DRX cycle x N _{freq}
NOTE 1: DRX or non DRX requirements apply according to the conditions described in TS 36.133 [23] section		
3.6.1		
NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in TS 36.133 [23]		
section 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary ce		
group.		

The UE shall be capable of performing SS block based SS-RSRP, SS-RSRQ, and SS-SINR for up to [7] NR carrier frequencies.

For each RAT E-UTRAN - NR layer on FR1 or FR2, the UE shall be capable of monitoring at least 4 cells.

For each RAT E-UTRA - NR layer on FR1, during each layer 1 measurement period, the UE shall be capable of monitoring at least 7 SSBs with different SSB index and/or PCI on the RAT E-UTRA -NR.

For each RAT E-UTRA - NR layer on FR2, during each layer 1 measurement period, the UE shall be capable of monitoring at least 10 SSBs with different SSB index and/or PCI on the RAT E-UTRA - NR layer. The UE shall be capable of monitoring at least one SSB per cell.

The NR SS-RSRP measurement accuracy for all measured cells shall be as specified in TS 36.133 [23] clause 9.11.1. The NR SS-RSRQ measurement accuracy for all measured cells shall be as specified in TS 36.133 [23] clause 9.11.2. The NR SS-SINR measurement accuracy for all measured cells shall be as specified in TS 36.133 [23] clause 9.11.3.

Reported measurements in event triggered measurement reports shall meet the requirements in TS 36.133 [23] clause 9.

The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.

The measurement reporting delay is defined as the time between any events that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is twice the TTI of the uplink DCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{identify_irat_without_index}$ or $T_{identify_irat_with_index}$ for the minimum requirements. When L3 filtering is used or IDC autonomous denial or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, or the UE is configured to perform SRS carrier based switching, an additional delay can be expected.

If a cell which has been detectable at least for the time period $T_{identify_irat_without_index}$ or $T_{identify_irat_with_index}$ for the minimum requirements and then triggers the measurement report as per TS 36.331 [2], the event triggered measurement reporting delay shall be less than $T_{measurement_NR_FDD}$ provided the timing to that cell has not changed more than ± 3200 Tc while measurement gap has not been available and the L3 filter has not been used. When L3 filtering is used or IDC autonomous denial is configured or the UE is performing reception and/or transmission for ProSe Direct Discovery and/or ProSe Direct Communication, or the UE is configured to perform SRS carrier based switching, an additional delay can be expected.

The normative reference for this requirement is TS 36.133 [23] clause 8.1.2.4.21 and 8.1.2.4.22.

8.4.2.0.2 Void

8.4.2.1 E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.

8.4.2.1.1 Test purpose

The purpose of this test is:

- To verify that the UE makes correct reporting of an event.
- To verify partly the NR inter-RAT cell search requirements for E-UTRA FDD NR FR1 measurements given in TS 36.133 [23] clause 8.1.2.4.21 and for E-UTRAN TDD NR FR1 measurements given in TS 36.133 [23] clause 8.1.2.4.22.

8.4.2.1.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR measurements.

8.4.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.1.

8.4.2.1.4 Test description

The test consists of two sub-tests with two cells configured, the E-UTRA PCell and NR neighbour cell; the difference between the two sub-tests is whether per-FR measurement gap is configured or not. Each sub-test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR neighbour cell. In all sub-tests the UE is not required to report SSB time index.

8.4.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.1.4.1-1.

Table 8.4.2.1.4.1-1: Supported test configurations for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX

Configuration	Description					
8.4.2.1-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.4.2.1-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.4.2.1-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
8.4.2.1-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.4.2.1-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.4.2.1-6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
Note 1: The UE is only	Note 1: The UE is only required to be tested in one of the supported test configurations.					

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.1.4.1-2.

Table 8.4.2.1.4.1-2: Initial conditions for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX

Parameter		Value	Comment		
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.		
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.		
Channel bandwidth	As specified by the test configuration selected from Table 8.4.2.1.4.1-1.				
Propagation conditions	AWGN		As specified in Annex C.2.1		
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.		
Diagram	DUT Part	TBD			
Exceptions to connection diagram	N/A				

- 1. The general test parameter settings are set up according to Table 8.4.2.1.4.1-3.
- 2. Message contents are defined in clause 8.4.2.1.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.1.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.1.4.1-3: General test parameters for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX

Parameter	Unit	Test	Value		Comment
		configurati on	Test 1	Test 2	
RF Channel Numbers		1, 2, 3, 4, 5,	2		One LTE and one FR1 NR carrier
		6			frequencies are used.
Active cell		1, 2, 3, 4, 5, 6	E-UTRA cell	1 (PCell)	E-UTRA cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		1, 2, 3, 4, 5, 6	NR cell 2		NR cell 2 is on NR RF channel number 1.
Gap Pattern Id		1, 2, 3, 4, 5, 6	0	4	As specified in clause Table 8.1.2.1-1 of TS 36.133 [15].
Measurement gap offset		1, 2, 3, 4, 5, 6	39	19	As specified in TS 36.331 [16].
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6	Note 1	1	E-UTRA RSRP threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16]
b2-Threshold2NR	dBm	1, 2, 3, 4, 5, 6	Note 2		SS-RSRP threshold for SS-RSRP measurement on cell 2 for event B2 [16]
Hysteresis	dB	1, 2, 3, 4, 5,	0		
CP length		1, 2, 3, 4, 5, 6	Normal		
TimeToTrigger	S	1, 2, 3, 4, 5, 6	0		
Filter coefficient		1, 2, 3, 4, 5, 6	0		L3 filtering is not used
DRX		1, 2, 3, 4, 5, 6	OFF		DRX is not used
Time offset between serving and neighbour cells		1, 4	3ms		Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.
		2, 3, 5, 6	3µs		Synchronous cells.
T1	S	1, 2, 3, 4, 5, 6	5		
T2	S	1, 2, 3, 4, 5, 6	1	1	
		shold1 is defined shold2NR is defi			

8.4.2.1.4.2 Test procedure

Two cells are deployed in the test, which are E-UTRA PCell (Cell 1) on the E-UTRA carrier and a FR1 NR neighbour cell (Cell 2) on NR carrier. The general and cell specific test parameters for PCell and neighbour cell are given in Table 8.4.2.1.4.1-3, 8.4.2.1.5-1 and 8.4.2.1.5-2, respectively.

In sub-test 1 measurement gap pattern configuration #0 as defined in Table 8.4.2.1.4.1-3 is provided for UE that does not support per-FR gap and in sub-test 2 measurement gap pattern configuration #4 as defined in Table 8.4.2.1.4.1-3 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 2. Set the parameters of Cell 1 and Cell 2 according to T1 in Table 8.4.2.1.5-1 and Table 8.4.2.1.5-2 respectively, T1 starts.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.

- 5. When T1 expires, the SS shall switch the parameters setting from T1 to T2 as specified in Table 8.4.2.1.5-1 and Table 8.4.2.1.5-2 respectively. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than X ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X is,
 - 922 for sub-test 1,
 - 802 for sub-test 2.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit an *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3),

Or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.4.2.1.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.1.4.3-1: Common Exception messages for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX

Default Message Contents					
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	FFS				

8.4.2.1.5 Test requirement

Table 8.4.2.1.4.1-3, 8.4.2.1.5-1 and 8.4.2.1.5-2 define the primary level settings including test tolerances for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX.

Table 8.4.2.1.5-1: E-UTRAN PCell specific test parameters for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX

Parameter	Unit	Configuratio	Cell 1		
		n	T1	T2	
RF channel number		1, 2, 3, 4, 5, 6	1		
Duplex mode		1, 2, 3	FDD)	
		4, 5, 6	TDD		
TDD special subframe configuration ^{Note1}		4, 5, 6	6		
TDD uplink-downlink configuration ^{Note1}		4, 5, 6	1		
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5 MHz: $N_{RB,c} = 25$ 10 MHz: $N_{RB,c} = 50$ 20 MHz: $N_{RB,c} = 100$		

PDSCH parameters: DL Reference Measurement		1, 2, 3	5 MHz: R. 10 MHz: R			
Channel ^{Note2}			20 MHz: R			
Chambi		4, 5, 6	5 MHz: R.4 TDD			
		., 0, 0	10 MHz: R			
			20 MHz: R.3 TDD			
PCFICH/PDCCH/PHICH		1, 2, 3	5 MHz: R.:	l1 FDD		
parameters:			10 MHz: R	.6 FDD		
DL Reference Measurement			20 MHz: R.10 FDD			
Channel ^{Note2}		4, 5, 6	5 MHz: R.:	l1 TDD		
			10 MHz: R	.6 TDD		
			20 MHz: R.			
OCNG Patterns ^{Note2}		1, 2, 3	5 MHz: OP.			
			10 MHz: OF			
			20 MHz: OF			
		4, 5, 6	5 MHz: OF			
			10 MHz: OI			
h2 Throphold1	dDas	1 2 2 4 5 6	20 MHz: OI			
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6	-79			
PBCH_RA PBCH_RB		1, 2, 3, 4, 5, 6				
PSS RA						
	_					
SSS_RA PCFICH RB	dB		0			
PHICH RA	— ub		0			
PHICH_RB	_					
PDCCH RA	_					
PDCCH_RB	_					
PDSCH RA						
PDSCH_RB						
OCNG RA ^{Note3}						
OCNG RB ^{Note3}						
N _{oc} ^{Note4}	dBm/15kHz	1, 2, 3, 4, 5, 6	-104	1		
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	17		
Ê _s /I _{ot} Note5	dB	1, 2, 3, 4, 5, 6	-Infinity	17		
RSRP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87		
SCH RP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87		
Io ^{Note5}	dBm/9MHz	1, 2, 3, 4, 5, 6	-76.22+10log (N _{RB,c} /50)	-59.13+10log (N _{RB,c} / 50)		
Propagation Condition Note6		1, 2, 3, 4, 5, 6	/			
Antenna Configuration and Correlation Matrix Note6		1, 2, 3, 4, 5, 6	1x2 Lo	OW		
Note 1: Special subframe and u Note 2: DL RMCs and OCNG pa	atterns are speci ch that all cells a	fied in clauses A 3 are fully allocated	specified in table 4.2-1 in TS 3.1 and A 3.2 of TS 36.133 [and a constant total transmi	15] respectively.		
			ied in the test is assumed to	be constant over		

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 5: Ê₃/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [27].

Table 8.4.2.1.5-2: NR neighbour cell specific test parameters for E-UTRA - NR FR1 event-triggered reporting without SSB time index detection in non-DRX

Parameter	Unit Test		Cell 2		
		configuration	T1	T2	
NR RF Channel Number		1, 2, 3, 4, 5, 6	1		
Duplex mode		1, 4		DD	
		2, 3, 5, 6	TDD		
TDD configuration		2, 5		onf.1.1	
		3, 6		onf.2.1	
BW _{channel}	MHz	1, 2, 4, 5	10: N _R	в,с = 52	
		3, 6		_{,c} = 106	
OCNG Patterns defined in A.3.2.1.1 (OP.1)		1, 2, 3, 4, 5, 6	0	P.1	
SMTC configuration defined in A.3.11.1		1, 4	SM [*]	TC.2	
and A.3.11.2		2, 3, 5, 6	SM [*]	TC.1	
PDSCH/PDCCH subcarrier spacing	kHz	1, 2, 4, 5	1	.5	
, ,		3, 6	3	30	
o2-Threshold2NR	dBm/SCS	1, 2, 4, 5	-(99	
		3, 6	-(96	
EPRE ratio of PSS to SSS		1, 2, 3, 4, 5, 6			
EPRE ratio of PBCH DMRS to SSS					
EPRE ratio of PBCH to PBCH DMRS					
EPRE ratio of PDCCH DMRS to SSS					
EPRE ratio of PDCCH to PDCCH DMRS					
EPRE ratio of PDSCH DMRS to SSS				0	
EPRE ratio of PDSCH to PDSCH					
EPRE ratio of OCNG DMRS to SSS (Note					
1)					
EPRE ratio of OCNG to OCNG DMRS					
(Note 1)					
$N_{oc}^{ m Note2}$	dBm/15kHz	1, 2, 3, 4, 5, 6	-;	98	
N_{oc} Note2	dBm/SCS	1, 2, 4, 5	-9	98	
oc oc		3, 6		95	
SS-RSRP Note 3	dBm/SCS	1, 2, 4, 5	-Infinity	-91	
		3, 6	-Infinity	-88	
$\mathbf{\hat{E}}_{_{\mathrm{s}}}/\mathrm{I}_{_{\mathrm{ot}}}$	dB	1, 2, 3, 4, 5, 6	-Infinity	7	
\hat{E}_s/N_{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	7	
O ^{Note3}	dBm/9.36MHz	1 2 4 5	-Infinity	-65.38	
U	dBm/38.16MH	1, 2, 4, 5 3, 6	-Infinity	-61.06	
	Z	3, 0	-iiiiiiity	-01.00	
Propagation Condition		1, 2, 3, 4, 5, 6	ET	U70	
Antenna Configuration and Correlation		1, 2, 3, 4, 5, 6		Low	
Matrix		, , , , , , , , ,			

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not Note 3: settable parameters themselves.

SS-RSRP minimum requirements are specified assuming independent interference and noise at each Note 4: receiver antenna port.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B2 triggered measurement report.

The overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_irat_without_index}$

 $T_{identify_irat_without_index} = T_{PSS/SSS_sync_irat} + T_{SSB_measurement_period_irat}$

 $T_{PSS/SSS \text{ sync intra}} = 600 \text{ ms}$

 $T_{SSB_measurement_period_irat} =$

- 320 ms for sub-test 1
- 200 ms for sub-test 2

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms for sub-test 1 and 802 ms for sub-test 2.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.4.2.2 E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.

8.4.2.2.1 Test purpose

The purpose of this test is:

- To verify that the UE makes correct reporting of an event.
- To verify partly the NR inter-RAT cell search requirements given in clause 8.1.2.4.21 of TS 36.133 for E-UTRAN FDD-NR measurements and clause 8.1.2.4.22 of TS 36.133 for E-UTRAN TDD-NR measurements.

8.4.2.2.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR measurements.

8.4.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.2.

8.4.2.2.4 Test description

The test consists of four sub-tests with two cells configured, the E-UTRA PCell and NR neighbour cell; the difference between the four sub-tests is whether per-FR measurement gap is configured or not and the DRX configuration parameters. Each sub-test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR neighbour cell. In all sub-tests the UE is not required to report SSB time index.

8.4.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.2.4.1-1.

Table 8.4.2.2.4.1-1: Supported test configurations for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX

Configuration	Description					
8.4.2.2-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.4.2.2-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.4.2.2-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
8.4.2.2-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.4.2.2-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.4.2.2-6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
Note 1: The UE is only	Note 1: The UE is only required to be tested in one of the supported test configurations.					

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.2.4.1-2.

Table 8.4.2.2.4.1-2: Initial conditions for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 8.4.2.2.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.1
conditions			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 8.4.2.2.4.1-3.
- 2. Message contents are defined in clause 8.4.2.2.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.2.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.2.4.1-3: General test parameters for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX

Parameter	Unit	Test	Value			Comment	
		configuratio n	Test 3	Test 2	Test 3	Test 4	
RF Channel		1, 2, 3, 4, 5, 6			2		One LTE and 1 FR1 NR carrier
Number							frequencies are used.
Active cell		1, 2, 3, 4, 5, 6	E-UTRA	cell 1 (PCe	ll)		E-UTRA cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		1, 2, 3, 4, 5, 6	NR cell 2				NR cell 2 is on NR RF channel number 1.
Gap Pattern Id		1, 2, 3, 4, 5, 6	0		4		As specified in clause Table 8.1.2.1-1 of TS 36.133 [15].
Measurement gap offset		1, 2, 3, 4, 5, 6	39		19		As specified in TS 36.331 [16].
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6	Note 1	Note 1			E-UTRA RSRP threshold for E- UTRA RSRP measurement on cell 1 for event B2 [16]
b2- Threshold2NR	dBm	1, 2, 3, 4, 5, 6	Note 2	Note 2			SS-RSRP threshold for SS- RSRP measurement on cell 2 for event B2 [16]
Hysteresis	dB	1, 2, 3, 4, 5, 6	0				
CP length		1, 2, 3, 4, 5, 6	Normal				
TimeToTrigger	S	1, 2, 3, 4, 5, 6	0				
Filter coefficient		1, 2, 3, 4, 5, 6	0				L3 filtering is not used
DRX		1, 2, 3, 4, 5, 6	DRX.9	DRX.10	DRX.9	DRX.10	As specified in clause A.3.3
Time offset		1, 4	3ms				Asynchronous cells.
between serving							The timing of Cell 2 is 3ms later
and neighbour							than the timing of Cell 1.
cells		2, 3, 5, 6	3μs				Synchronous cells.
T1	S	1, 2, 3, 4, 5, 6	5				
T2	S	1, 2, 3, 4, 5, 6	2	11	2	11	
Note 1: The value of b2-Threshold1 is defined in Table A.8.4.2.2.1-3 Note 2: The value of b2-Threshold2NR is defined in Table A.8.4.2.2.1-4							

8.4.2.2.4.2 Test procedure

Two cells are deployed in the test, which are E-UTRA PCell (Cell 1) on the E-UTRA carrier and a FR1 NR neighbour cell (Cell 2) on NR carrier. The general and cell specific test parameters for PCell and neighbour cell are given in Table 8.4.2.2.4.1-3, 8.4.2.2.5-1 and 8.4.2.2.5-2, respectively.

In sub-test 1 and sub-test 2 measurement gap pattern configuration #0 as defined in Table 8.4.2.2.4.1-3 is provided for UE that does not support per-FR gap and in sub-test 2 and sub-test 4 measurement gap pattern configuration #4 as defined in Table 8.4.2.2.4.1-3 is provided for UE that supports per-FR gap.

DRX cycle = 40 ms is used in sub-test 1 and sub-test 3, DRX cycle = 640 ms is used in sub-test 2 and sub-test 4. In all sub-tests UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 2. Set the parameters of Cell 1 and Cell 2 according to T1 in Table 8.4.2.2.5-1 and Table 8.4.2.2.5-2 respectively, T1 starts.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.

- 5. When T1 expires, the SS shall switch the parameters setting from T1 to T2 as specified in Table 8.4.2.2.5-1 and Table 8.4.2.2.5-2 respectively. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than X ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X is,
 - 1082 for sub-test 1 and sub-test 3,
 - 10242 for sub-test 2 and sub-test 4.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 [25] clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3),

or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.4.2.2.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.2.4.3-1: Common Exception messages for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX

Default Message Contents					
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	FFS				

8.4.2.2.5 Test requirement

Table 8.4.2.2.4.1-3, 8.4.2.2.5-1 and 8.4.2.2.5-2 define the primary level settings including test tolerances for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX.

Table 8.4.2.2.5-1: E-UTRAN PCell specific test parameters for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX

Parameter	Unit	Configuratio	Cell 1		
		n	T1	T2	
RF channel number		1, 2, 3, 4, 5, 6	1		
Duplex mode		1, 2, 3	FDD)	
		4, 5, 6	TDD		
TDD special subframe configuration ^{Note1}		4, 5, 6	6		
TDD uplink-downlink configuration ^{Note1}		4, 5, 6	1		
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5 MHz: $N_{RB,c} = 25$ 10 MHz: $N_{RB,c} = 50$ 20 MHz: $N_{RB,c} = 100$		

PDSCH parameters:		1, 2, 3	5 MHz: R.	7 FDD	
DL Reference Measurement			10 MHz: R	.3 FDD	
Channel ^{Note2}			20 MHz: R		
		4, 5, 6	5 MHz: R.	4 TDD	
			10 MHz: R	-	
			20 MHz: R		
PCFICH/PDCCH/PHICH		1, 2, 3	5 MHz: R.:		
parameters:			10 MHz: R		
DL Reference Measurement			20 MHz: R.10 FDD		
Channel ^{Note2}		4, 5, 6	_	5 MHz: R.11 TDD	
			10 MHz: R		
OON IO Data and Note?		1 0 0	20 MHz: R.		
OCNG Patterns ^{Note2}		1, 2, 3	5 MHz: OP.		
			10 MHz: OF		
		4 5 6	20 MHz: OF 5 MHz: OF		
		4, 5, 6	10 MHz: OF		
			20 MHz: OI		
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6	-79		
PBCH RA	uDiii	1, 2, 3, 4, 5, 6	13		
PBCH RB		1, 2, 0, 4, 0, 0			
PSS RA					
SSS RA					
PCFICH RB					
PHICH RA					
PHICH RB	dB		0		
PDCCH RA					
PDCCH RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA ^{Note3}					
OCNG_RB ^{Note3}					
N _{oc} Note4	dBm/15kHz	1, 2, 3, 4, 5, 6	-104	1	
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	17	
Ê _s /I _{ot} ^{Note5}	dB	1, 2, 3, 4, 5, 6	-Infinity	17	
RSRP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87	
SCH_RP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87	
IO ^{Note5}	dBm/9MHz	1, 2, 3, 4, 5, 6	-76.22+10log (N _{RB,c} /50)	-59.13+10log (N _{RB,c} / 50)	
Propagation Condition Note6		1, 2, 3, 4, 5, 6	ETU70		
Antenna Configuration and Correlation Matrix Note6		1, 2, 3, 4, 5, 6	1x2 L	ow	

Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].

Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.

Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N₀c to be fulfilled.

Note 5: \hat{E}_s/I_{ot} , RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [27].

Note 3:

Note 4:

Table 8.4.2.2.5-2: NR neighbour cell specific test parameters for E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX

Parameter	Unit	Test	Cell 2	
		configuration	T1	T2
NR RF Channel Number		1, 2, 3, 4, 5, 6		1
Duplex mode		1, 4		DD
		2, 3, 5, 6		DD
TDD configuration		2, 5	TDDConf.1.1	
		3, 6	TDDConf.2.1	
BW _{channel}	MHz	1, 2, 4, 5	10: N _{RB,c} = 52	
		3, 6	40: N _{RB,c} = 106	
OCNG Patterns defined in A.3.2.1.1 (OP.1)		1, 2, 3, 4, 5, 6	OP.1	
SMTC configuration defined in A.3.11.1		1, 4	SMTC.2	
and A.3.11.2		2, 3, 5, 6	SMTC.1	
PDSCH/PDCCH subcarrier spacing	kHz	1, 2, 4, 5	15	
			3, 6 30	
b2-Threshold2NR	dBm/SCS	1, 2, 4, 5	-99	
		3, 6	-	96
EPRE ratio of PSS to SSS		1, 2, 3, 4, 5, 6		
EPRE ratio of PBCH DMRS to SSS				
EPRE ratio of PBCH to PBCH DMRS]		
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS				
EPRE ratio of PDSCH DMRS to SSS				0
EPRE ratio of PDSCH to PDSCH				
EPRE ratio of OCNG DMRS to SSS (Note 1)				
EPRE ratio of OCNG to OCNG DMRS (Note 1)				
$N_{_{OC}}$ Note2	dBm/15kHz	1, 2, 3, 4, 5, 6	-98	
$N_{_{OC}}$ Note2	dBm/SCS	1, 2, 4, 5	-98	
		3, 6 -95		95
SS-RSRP Note 3	dBm/SCS	1, 2, 4, 5	-Infinity	-91
		3, 6	-Infinity	-88
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 2, 3, 4, 5, 6	-Infinity	7
\hat{E}_s/N_{oc} lo $^{ m Note3}$	dB	1, 2, 3, 4, 5, 6	-Infinity	7
IO ^{Note3}	dBm/9.36MHz	1, 2, 4, 5	-Infinity	-65.38
	dBm/38.16MH	1, 2, 4, 5 3, 6	-Infinity	-61.06
	Z	'-	-3	
Propagation Condition		1, 2, 3, 4, 5, 6	ETU70	
Antenna Configuration and Correlation Matrix		1, 2, 3, 4, 5, 6 1, 2, 3, 4, 5, 6	1x2 Low	
Note 1: OCNG shall be used such that the density is achieved for all OFDM s	symbols.			
Note 2: Interference from other cells and r subcarriers and time and shall be		· •		
Subcarriers and time and shall be				~ J Tammou.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B2 triggered measurement report.

SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not

SS-RSRP minimum requirements are specified assuming independent interference and noise at each

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

settable parameters themselves.

receiver antenna port.

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_irat_without_index}$

 $T_{identify_irat_without_index} = T_{PSS/SSS_sync_irat} + T_{SSB_measurement_period_irat}$

 $T_{PSS/SSS \ sync \ intra} =$

600 ms for sub-test 1 and sub-test 3

5120 ms for sub-test 2 and sub-test 4

T _{SSB measurement period irat} =

480 ms for sub-test 1 and sub-test 3

5120 ms for sub-test 2 and sub-test 4

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 1082 ms for sub-test 1 and sub-test 3, and shall be less than a total of 10242 ms for sub-test 2 and sub-test 4.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.4.2.3 E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.

8.4.2.3.1 Test purpose

The purpose of this test is:

- To verify that the UE makes correct reporting of an event.
- To verify partly the NR inter-RAT cell search requirements for E-UTRA FDD NR FR1 measurements given in TS 36.133 [23] clause 8.1.2.4.21 and for E-UTRAN TDD NR FR1 measurements given in TS 36.133 [23] clause 8.1.2.4.22.

8.4.2.3.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

8.4.2.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.3.

8.4.2.3.4 Test description

The test consists of two sub-tests with two cells configured, the E-UTRA PCell and NR neighbour cell; the difference between the two sub-tests is whether per-FR measurement gap is configured or not. Each sub-test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR neighbour cell. In the measurement configuration the UE shall be indicated to report the SSB index of the identified NR cell.

8.4.2.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.3.4.1-1.

Table 8.4.2.3.4.1-1: Supported test configurations for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX

Configuration	Description					
8.4.2.3-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.4.2.3-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.4.2.3-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
8.4.2.3-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode					
8.4.2.3-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode					
8.4.2.3-6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode					
Note 1: The UE is only						

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.3.4.1-2.

Table 8.4.2.3.4.1-2: Initial conditions for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.
Channel	As specified	by the test configuration selected fr	om Table 8.4.2.3.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.1
conditions			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 8.4.2.3.4.1-3.
- 2. Message contents are defined in clause 8.4.2.3.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.3.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.3.4.1-3: General test parameters for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX

Parameter	Parameter Unit Test Value		Comment		
		configurati on	Test 1	Test 2	
RF Channel Numbers		1, 2, 3, 4, 5,		2	One LTE and one FR1 NR carrier
		6			frequencies are used.
Active cell		1, 2, 3, 4, 5, 6	E-UTRA ce	ll 1 (PCell)	E-UTRA cell 1 is on E-UTRA RF channel number 1.
Neighbour cell		1, 2, 3, 4, 5, 6	NR cell 2		NR cell 2 is on NR RF channel number 1.
Gap Pattern Id		1, 2, 3, 4, 5, 6	0	4	As specified in clause Table 8.1.2.1-1 of TS 36.133 [15].
Measurement gap offset		1, 2, 3, 4, 5, 6	39	19	As specified in TS 36.331 [16].
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6	Note 1		E-UTRA RSRP threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16]
b2-Threshold2NR	dBm	1, 2, 3, 4, 5, 6	Note 2		SS-RSRP threshold for SS-RSRP measurement on cell 2 for event B2 [16]
Hysteresis	dB	1, 2, 3, 4, 5, 6	0		
CP length		1, 2, 3, 4, 5, 6	Normal		
TimeToTrigger	S	1, 2, 3, 4, 5, 6	0		
Filter coefficient		1, 2, 3, 4, 5, 6	0		L3 filtering is not used
DRX		1, 2, 3, 4, 5, 6	OFF		DRX is not used
Time offset between serving and neighbour cells		1, 4	3ms		Asynchronous cells. The timing of Cell 2 is 3 ms later than the timing of Cell 1.
		2, 3, 5, 6	3µs	· · · · · · · · · · · · · · · · · · ·	Synchronous cells.
T1	S	1, 2, 3, 4, 5, 6	5		
T2	S	1, 2, 3, 4, 5, 6	2	1	
		shold1 is defined shold2NR is defi			

8.4.2.3.4.2 Test procedure

Two cells are deployed in the test, which are E-UTRA PCell (Cell 1) on the E-UTRA carrier and a FR1 NR neighbour cell (Cell 2) on NR carrier. The general and cell specific test parameters for PCell and neighbour cell are given in Table 8.4.2.3.4.1-3, 8.4.2.3.5-1 and 8.4.2.3.5-2, respectively.

In sub-test 1 measurement gap pattern configuration #0 as defined in Table 8.4.2.3.4.1-3 is provided for UE that does not support per-FR gap and in sub-test 2 measurement gap pattern configuration #4 as defined in Table 8.4.2.3.4.1-3 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 2. Set the parameters of Cell 1 and Cell 2 according to T1 in Table 8.4.2.3.5-1 and Table 8.4.2.3.5-2 respectively, T1 starts.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.

- 5. When T1 expires, the SS shall switch the parameters setting from T1 to T2 as specified in Table 8.4.2.3.5-1 and Table 8.4.2.3.5-2 respectively. T2 Starts.
- 6. UE shall transmit a *MeasurementReport* message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than X ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X is,
 - 1042 for sub-test 1,
 - 922 for sub-test 2.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit RRCConnectionRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 [25] clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3),

Or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.4.2.3.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.3.4.3-1: Common Exception messages for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX

Default Message Contents				
Common contents of system information blocks exceptions				
Default RRC messages and information elements contents exceptions	FFS			

8.4.2.3.5 Test requirement

Table 8.4.2.3.4.1-3, 8.4.2.3.5-1 and 8.4.2.3.5-2 define the primary level settings including test tolerances for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX.

Table 8.4.2.3.5-1: E-UTRAN PCell specific test parameters for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX

Parameter	Unit	Configuratio	Cell 1		
		n	T1	T2	
RF channel number		1, 2, 3, 4, 5, 6	1		
Duplex mode		1, 2, 3	FDD		
		4, 5, 6	TDD		
TDD special subframe		4, 5, 6	6		
configuration ^{Note1}					
TDD uplink-downlink configuration ^{Note1}		4, 5, 6	1		
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5 MHz: N _R		
			10 MHz: N _i		
			20 MHz: N _{RB,c} = 100		
PDSCH parameters:		1, 2, 3	5 MHz: R.		
DL Reference Measurement			10 MHz: R		
Channel ^{Note2}			20 MHz: R		
		4, 5, 6	5 MHz: R.		
			10 MHz: R		
DOELGI (DDGGCI (DI IIGI)		1 2 2	20 MHz: R		
PCFICH/PDCCH/PHICH		1, 2, 3	5 MHz: R.: 10 MHz: R		
parameters: DL Reference Measurement			20 MHz: R.		
Channel ^{Note2}		4, 5, 6	5 MHz: R.:		
Chamer		4, 5, 0	10 MHz: R		
			20 MHz: R.		
OCNG Patterns ^{Note2}		1, 2, 3	5 MHz: OP.		
o o i to i allomo		1, 2, 0	10 MHz: OP.10 FDD 20 MHz: OP.17 FDD		
		4, 5, 6	5 MHz: OP.9 TDD		
			10 MHz: OP.1 TDD		
			20 MHz: OI	P.7 TDD	
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6	-79		
PBCH_RA		1, 2, 3, 4, 5, 6			
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB	dB		0		
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB OCNG RA ^{Note3}	_				
OCNG_RANGE					
Noc Note4	dBm/15kHz	1, 2, 3, 4, 5, 6	-104	1	
Ê _s /N _{oc}	dBIII/13KHZ	1, 2, 3, 4, 5, 6	-10 ² -Infinity	17	
Ê _s /I _{ot} ^{Note5}	dB	1, 2, 3, 4, 5, 6	-Infinity	17	
RSRP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87	
SCH RP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87	
Io ^{Note5}	dBm/9MHz	1, 2, 3, 4, 5, 6	-76.22+10log (N _{RB,c} /50)	-57 -59.13+10log (N _{RB,c} , 50)	
Propagation Condition Note6		1, 2, 3, 4, 5, 6	ETU7		
Antenna Configuration and		1, 2, 3, 4, 5, 6	1x2 Lo		
	1	<u></u>		J V V	

Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.

Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 5: Ê_s/I_{ot}, RSRP, SCH_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [27].

Table 8.4.2.3.5-2: NR neighbour cell specific test parameters for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX

Parameter	Unit	Test	Ce	II 2
		configuration	T1	T2
NR RF Channel Number		1, 2, 3, 4, 5, 6		L
Duplex mode		1, 4	F	DD
·		2, 3, 5, 6	T	DD .
TDD configuration		2, 5	TDDC	onf.1.1
· ·		3, 6	TDDC	
BW _{channel}	MHz	1, 2, 4, 5	10: N _R	_{3,c} = 52
		3, 6	40: N _{RB}	
OCNG Patterns defined in A.3.2.1.1 (OP.1)		1, 2, 3, 4, 5, 6		P.1
SMTC configuration defined in A.3.11.1		1, 4	SM	ГС.2
and A.3.11.2		2, 3, 5, 6	SM	
PDSCH/PDCCH subcarrier spacing	kHz	1, 2, 4, 5		5
		3, 6		0
o2-Threshold2NR	dBm/SCS	1, 2, 4, 5	-9	
		3, 6		06
EPRE ratio of PSS to SSS		1, 2, 3, 4, 5, 6		
EPRE ratio of PBCH DMRS to SSS		_, _, _, ,, ,, ,		
EPRE ratio of PBCH to PBCH DMRS				
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS				
EPRE ratio of PDSCH DMRS to SSS			()
EPRE ratio of PDSCH to PDSCH				
EPRE ratio of OCNG DMRS to SSS (Note				
1)				
EPRE ratio of OCNG to OCNG DMRS				
(Note 1)				
N_{oc} Note2	dBm/15kHz	1, 2, 3, 4, 5, 6	-ć	8
$N_{oc}^{}$ Note2	dBm/SCS	1, 2, 4, 5	-6	08
oc		3, 6	-9	95
SS-RSRP Note 3	dBm/SCS	1, 2, 4, 5	-Infinity	-91
		3, 6	-Infinity	-88
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 2, 3, 4, 5, 6	-Infinity	7
\hat{E}_s/N_{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	7
O ^{Note3}	dBm/9.36MHz	1, 2, 4, 5	-Infinity	-65.38
	dBm/38.16MH	3, 6	-Infinity	-61.06
	Z	5,5		52.55
Propagation Condition	_	1, 2, 3, 4, 5, 6	ETI	J70
Antenna Configuration and Correlation		1, 2, 3, 4, 5, 6		Low
Matrix				

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B2 triggered measurement report.

The overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify irat with index}$

```
\begin{split} &T_{identify\_irat\_without\_index} = T_{PSS/SSS\_sync\_irat} + T_{SSB\_measurement\_period\_irat} + T_{SSB\_time\_index\_irat} \\ &T_{PSS/SSS\_sync\_intra} = 600 \text{ ms} \\ &T_{SSB\_measurement\_period\_irat} = \\ &320 \text{ ms for sub-test 1} \\ &200 \text{ ms for sub-test 2} \\ &T_{SSB\_time\_index\_ira} = 120 \text{ ms} \end{split}
```

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 1042 ms for sub-test 1 and 922 ms for sub-test 2.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.4.2.4 E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.

8.4.2.4.1 Test purpose

The purpose of this test is:

- To verify that the UE makes correct reporting of an event.
- To verify partly the NR inter-RAT cell search requirements for E-UTRA FDD NR FR1 measurements given in TS 36.133 [23] clause 8.1.2.4.21 and for E-UTRAN TDD NR FR1 measurements given in TS 36.133 [23] clause 8.1.2.4.22.

8.4.2.4.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

8.4.2.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.4.

8.4.2.4.4 Test description

The test consists of four sub-tests with two cells configured, the E-UTRA PCell and NR neighbour cell; the difference between the four sub-tests is whether per-FR measurement gap is configured or not and the DRX configuration. Each subtest consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR neighbour cell. In measurements configuration UE shall be indicated to report the SSB index of the identified NR cell.

8.4.2.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.4.4.1-1.

Table 8.4.2.4.4.1-1: Supported test configurations for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX

Configuration	Description
8.4.2.4-1	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
8.4.2.4-2	LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
8.4.2.4-3	LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
8.4.2.4-4	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode
8.4.2.4-5	LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode
8.4.2.4-6	LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode
Note 1: The UE is only	required to be tested in one of the supported test configurations.

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.4.4.1-2.

Table 8.4.2.4.4.1-2: Initial conditions for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX

Parameter		Value	Comment
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.
Test frequencies		in Annex E, Table E.6-1 and TS 38.	
Channel	As specified	by the test configuration selected fr	om Table 8.4.2.4.4.1-1.
bandwidth			
Propagation	AWGN		As specified in Annex C.2.1
conditions			
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.
Diagram	DUT Part	TBD	
Exceptions to	N/A		
connection			
diagram			

- 1. The general test parameter settings are set up according to Table 8.4.2.4.4.1-3.
- 2. Message contents are defined in clause 8.4.2.4.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.4.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.4.4.1-3: General test parameters for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX

Parameter	Unit	Test	Value		Comment	
		configuration	Test 1 Test 2	Test 3	Test 4	
RF Channel Number		1, 2, 3, 4, 5, 6		2		One LTE and 1 FR1 NR
						carrier frequencies are used.
Active cell		1, 2, 3, 4, 5, 6	E-UTRA cell 1 (PC	Cell)		E-UTRA cell 1 is on E-UTRA
						RF channel number 1.
Neighbour cell		1, 2, 3, 4, 5, 6	NR cell 2			NR cell 2 is on NR RF channel
						number 1.
Gap Pattern Id		1, 2, 3, 4, 5, 6	0	4		As specified in clause Table
						8.1.2.1-1 of TS 36.133 [15].
Measurement gap		1, 2, 3, 4, 5, 6	39	19		As specified in TS 36.331 [16].
offset	ID	1 0 0 1 5 0	Nistra			E LIEDA DODD III was bashi fa
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6	Note 1			E-UTRA RSRP threshold for E-UTRA RSRP measurement
b2-Threshold2NR	dBm	1, 2, 3, 4, 5, 6	Note 2			on cell 1 for event B2 [16] SS-RSRP threshold for SS-
b2-Thresholdzink	ubiii	1, 2, 3, 4, 5, 6	Note 2			RSRP measurement on cell 2
						for event B2 [16]
Hysteresis	dB	1, 2, 3, 4, 5, 6	0			lor event b2 [10]
CP length	ab	1, 2, 3, 4, 5, 6	Normal			
TimeToTrigger	S	1, 2, 3, 4, 5, 6	0			
Filter coefficient	3	1, 2, 3, 4, 5, 6	0			L3 filtering is not used
DRX		1, 2, 3, 4, 5, 6	DRX.9 DRX.10	DRX.9	DRX.10	As specified in clause A.3.3
Time offset between		1, 4	3ms	D10.00	D101120	Asynchronous cells.
serving and			Gillo			The timing of Cell 2 is 3ms
neighbour cells						later than the timing of Cell 1.
		2, 3, 5, 6	3μs			Synchronous cells.
T1	s	1, 2, 3, 4, 5, 6	5			
T2	S	1, 2, 3, 4, 5, 6	2 13	2	13	
	b2-Thr		in Table A.8.4.2.4.1	-3	_	
Note 2: The value of b2-Threshold2NR is defined in Table A.8.4.2.4.1-4						

8.4.2.4.4.2 Test procedure

Two cells are deployed in the test, which are E-UTRA PCell (Cell 1) on the E-UTRA carrier and a FR1 NR neighbour cell (Cell 2) on NR carrier. The general and cell specific test parameters for PCell and neighbour cell are given in Table 8.4.2.4.4.1-3, 8.4.2.4.5-1 and 8.4.2.4.5-2, respectively.

In sub-test 1 and sub-test 2 measurement gap pattern configuration #0 as defined in Table 8.4.2.4.4.1-3 is provided for UE that does not support per-FR gap and in sub-test 2 and sub-test 4 measurement gap pattern configuration #4 as defined in Table 8.4.2.4.4.1-3 is provided for UE that supports per-FR gap.

DRX cycle = 40 ms is used in sub-test 1 and sub-test 3, DRX cycle = 640 ms is used in sub-test 2 and sub-test 4. In all sub-tests UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 is used. The test consists of two successive time periods, with time duration of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 clause 7.2A.3.
- 2. Set the parameters of Cell 1 and Cell 2 according to T1 in Table 8.4.2.4.5-1 and Table 8.4.2.4.5-2 respectively, T1
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message.
- ${\it 4. The UE shall transmit $RRCConnection Reconfiguration Complete $message.}$
- 5. When T1 expires, the SS shall switch the parameters setting from T1 to T2 as specified in Table 8.4.2.4.5-1 and Table 8.4.2.4.5-2 respectively. T2 Starts.

- 6. UE shall transmit a *MeasurementReport* message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than X ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one. Where X is,
 - 1262 for sub-test 1 and sub-test 3,
 - 12162 for sub-test 2 and sub-test 4.
- 7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall transmit an *RRCConnectionRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.
- 8. Set Cell 2 physical cell identity = ((current Cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.
- 9. After the RRC connection release, the SS:
 - transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in State 3A according to TS 36.508 [25] clause 4.5.3A (if the paging fails, switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3),

or

- switches off and on the UE and ensures the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

8.4.2.4.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.4.4.3-1: Common Exception messages for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX

Default Message Contents					
Common contents of system information					
blocks exceptions					
Default RRC messages and information	FFS				
elements contents exceptions					

8.4.2.4.5 Test requirement

Table 8.4.2.4.4.1-3, 8.4.2.4.5-1 and 8.4.2.4.5-2 define the primary level settings including test tolerances for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX.

Table 8.4.2.4.5-1: E-UTRAN PCell specific test parameters for E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX

Parameter	Unit	Configuratio	Cell 1		
		n	T1	T2	
RF channel number		1, 2, 3, 4, 5, 6	1		
Duplex mode		1, 2, 3	FDD)	
		4, 5, 6	TDD)	
TDD special subframe configuration ^{Note1}		4, 5, 6	6		
TDD uplink-downlink configuration ^{Note1}		4, 5, 6	1		
BW _{channel}	MHz	1, 2, 3, 4, 5, 6	5 MHz: N _{RB,c} = 25		
			10 MHz: N _{RB,c} = 50		
			20 MHz: $N_{RB,c} = 100$		
PDSCH parameters:		1, 2, 3	5 MHz: R.7 FDD		
DL Reference Measurement			10 MHz: R.3 FDD		
Channel ^{Note2}			20 MHz: R	.6 FDD	

		4, 5, 6	5 MHz: R.	4 TDD	
			10 MHz: R.0 TDD		
			20 MHz: R.3 TDD		
PCFICH/PDCCH/PHICH		1, 2, 3	5 MHz: R.11 FDD		
parameters:			10 MHz: R		
DL Reference Measurement			20 MHz: R.		
Channel ^{Note2}		4, 5, 6	5 MHz: R.:		
			10 MHz: R	_	
			20 MHz: R.		
OCNG Patterns ^{Note2}		1, 2, 3	5 MHz: OP.		
			10 MHz: OF		
			20 MHz: OF		
		4, 5, 6	5 MHz: OF		
			10 MHz: OI		
			20 MHz: OI		
b2-Threshold1	dBm	1, 2, 3, 4, 5, 6			
PBCH_RA		1, 2, 3, 4, 5, 6			
PBCH_RB					
PSS_RA					
SSS_RA					
PCFICH_RB					
PHICH_RA					
PHICH_RB	dB		0		
PDCCH_RA					
PDCCH_RB					
PDSCH_RA					
PDSCH_RB					
OCNG_RA ^{Note3}					
OCNG_RB ^{Note3}					
N _{oc} Note4	dBm/15kHz	1, 2, 3, 4, 5, 6	-104	1	
Ê _s /N _{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	17	
Ê _s /I _{ot} ^{Note5}	dB	1, 2, 3, 4, 5, 6	-Infinity	17	
RSRP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87	
SCH_RP ^{Note5}	dBm/15kHz	1, 2, 3, 4, 5, 6	-Infinity	-87	
Io ^{Note5}	dBm/9MHz	1, 2, 3, 4, 5, 6	-76.22+10log (N _{RB,c} /50)	-59.13+10log (N _{RB,c} /	
			50)		
Propagation Condition Note6		1, 2, 3, 4, 5, 6	ETU	70	
Antenna Configuration and		1, 2, 3, 4, 5, 6			
Correlation Matrix Note6					

Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].

Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.

Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.

Note 5: Ê₃/I_{ot}, RSRP, SCH_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [27].

Table 8.4.2.4.5-2: NR neighbour cell specific test parameters for E-UTRA - NR FR1 event-triggered reporting with SSB time index detection in DRX

Parameter	Unit	Unit Test		Cell 2		
		configuration	T1	T2		
NR RF Channel Number		1, 2, 3, 4, 5, 6		1		
Duplex mode		1, 4	FDD			
		2, 3, 5, 6		DD		
TDD configuration		2, 5	TDDConf.1.1			
		3, 6		Conf.2.1		
BW _{channel}	MHz	1, 2, 4, 5		_{RB,c} = 52		
		3, 6		_{B,c} = 106		
OCNG Patterns defined in A.3.2.1.1 (OP.1)		1, 2, 3, 4, 5, 6		P.1		
SMTC configuration defined in A.3.11.1		1, 4		TC.2		
and A.3.11.2		2, 3, 5, 6		TC.1		
PDSCH/PDCCH subcarrier spacing	kHz	1, 2, 4, 5		15		
		3, 6		30		
b2-Threshold2NR	dBm/SCS	1, 2, 4, 5		99		
		3, 6	-	96		
EPRE ratio of PSS to SSS		1, 2, 3, 4, 5, 6				
EPRE ratio of PBCH DMRS to SSS						
EPRE ratio of PBCH to PBCH DMRS						
EPRE ratio of PDCCH DMRS to SSS						
EPRE ratio of PDCCH to PDCCH DMRS						
EPRE ratio of PDSCH DMRS to SSS				0		
EPRE ratio of PDSCH to PDSCH						
EPRE ratio of OCNG DMRS to SSS (Note						
1)						
EPRE ratio of OCNG to OCNG DMRS						
(Note 1)	15 (45)	1 2 2 1 5 2		•		
$N_{oc}^{$	dBm/15kHz	1, 2, 3, 4, 5, 6	-	98		
$N_{ m oc}$ Note2	dBm/SCS	1, 2, 4, 5	-	98		
		3, 6	-	95		
SS-RSRP Note 3	dBm/SCS	1, 2, 4, 5	-Infinity	-91		
		3, 6	-Infinity	-88		
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 2, 3, 4, 5, 6	-Infinity	7		
\widehat{E}_s/N_{oc}	dB	1, 2, 3, 4, 5, 6	-Infinity	7		
Io ^{Note3}	dBm/9.36MHz	1, 2, 4, 5	-Infinity	-65.38		
	dBm/38.16MH z	3, 6	-Infinity	-61.06		
Propagation Condition		1, 2, 3, 4, 5, 6	ETU70			
Antenna Configuration and Correlation Matrix		1, 2, 3, 4, 5, 6	1x2 Low			
Note 1: OCNG shall be used such that the density is achieved for all OFDM so Note 2: Interference from other cells and results are subservious and time and shall be	symbols. noise sources not	specified in the tes	t is assumed to be	e constant over		

subcarriers and time and shall be modelled as AWGN of appropriate power for $\,N_{oc}\,$ to be fulfilled.

SS-RSRP and lo levels have been derived from other parameters for information purposes. They are not Note 3: settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event B2 triggered measurement report.

The overall delays measured in the test may be up to 2xTTI_{DCCH} higher than the measurement reporting delays because of TTI insertion uncertainty of the measurement report in DCCH.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = $T_{identify_irat_with_index}$

$$\begin{split} T_{identify_irat_without_index} &= T_{PSS/SSS_sync_irat} + T_{SSB_measurement_period_irat} + T_{SSB_time_index_irat} \\ T_{PSS/SSS_sync_intra} &= \\ 600 \text{ ms for sub-test 1 and sub-test 3} \\ 5120 \text{ ms for sub-test 2 and sub-test 4} \\ T_{SSB_measurement_period_irat} &= \\ 480 \text{ ms for sub-test 1 and sub-test 3} \\ 5120 \text{ ms for sub-test 2 and sub-test 4} \end{split}$$

 $T_{SSB_time_index_irat} =$

180 ms for sub-test 1 and sub-test 3

1920 ms for sub-test 2 and sub-test 4

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 1292 ms for sub-test 1 and sub-test 3, and shall be less than a total of 12162 ms for sub-test 2 and sub-test 4.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

8.4.2.5 E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in non-DRX

Editor's notes: This test case is incomplete. The following aspects are either missing or TBD.

- Connection Diagram is TBD;
- Test procedure and Message content are TBD;
- Test tolerance analysis is missing;
- Test applicability Table in TS38.522 need to be updated.

8.4.2.5.1 Test purpose

To verify the UE's ability to make a correct reporting of an event without SSB time index detection in non-DRX within E-UTRA – NR FR2 cell search requirements.

8.4.2.5.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR FR2 measurements.

8.4.2.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.5.

8.4.2.5.4 Test description

8.4.2.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.5.4.1-1.

Table 8.4.2.5.4.1-1: NR inter-RAT event triggered reporting tests without SSB index reading for FR2 in non-DRX

Configuration	Description		
8.4.2.5-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
8.4.2.5-2	LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
Note 1: The UE is only required to be tested in one of the supported test configurations.			

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.5.4.1-2.

Table 8.4.2.5.4.1-2: Initial conditions for E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in non-DRX

Parameter		Value	Comment					
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.					
Test frequencies	As specified	As specified in Annex E, Table E.6-1 and TS 38.508-1 [14] clause 4.3.1.						
Channel	As specified by the test configuration selected from Table 8.4.2.5.4.1-1.							
bandwidth								
Propagation	AWGN		As specified in Annex C.2.1					
conditions								
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.					
Diagram	DUT Part	TBD						
Exceptions to	N/A							
connection								
diagram								

- 1. The general test parameter settings are set up according to Table 8.4.2.5.4.1-3.
- 2. Message contents are defined in clause 8.4.2.5.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR FR2 neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.5.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.5.4.1-3: General test parameters for NR inter-RAT event triggered reporting for FR2 without SSB time index detection in non-DRX

Parameter	Unit	Test	Value		Comment			
		configurati on	Test 1	Test 2				
RF Channel Numbers		1, 2	2		One LTE and one FR2 NR carrier frequencies are used.			
Active cell		1, 2	E-UTRA ce	ell 1 (PCell)	E-UTRA cell 1 is on E-UTRA RF channel number 1 as defined in clause A.6.1.2.			
Neighbour cell		1, 2	NR (cell 2	NR cell 2 is on NR RF channel number 1.			
Gap Pattern Id		1, 2	0	4	As specified in clause Table 8.1.2.1-1 of TS 36.133 [23].			
Measurement gap offset		1, 2	39	19	As specified in TS 36.331 [29].			
b1-ThresholdNR	dBm	1, 2	Note 1		SS-RSRP threshold for SS-RSRP measurement on cell 2 for event B1 [29].			
Hysteresis	dB	1, 2	(0				
CP length		1, 2	Noi	mal				
TimeToTrigger	S	1, 2	(0				
Filter coefficient		1, 2	0		L3 filtering is not used.			
DRX		1, 2	0	FF	DRX is not used.			
Time offset between serving and neighbour cells		1	3ms		Asynchronous cells. The timing of Cell 2 is 3ms later than the timing of Cell 1.			
		2	3	us	Synchronous cells.			
T1	S	1, 2	10					
T2	S	1, 2	6	3				
Note 1: The value of b1-ThresholdNR is defined in Table 8.4.2.5.5-1								

8.4.2.5.4.2 Test procedure

Same test procedure as described in section 8.4.2.1.4.2 with following exception:

- TBD

8.4.2.5.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.5.4.3-1: Common Exception messages for E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in non-DRX

Default Message Contents					
Common contents of system information blocks exceptions					
Default RRC messages and information elements contents exceptions	FFS				

8.4.2.5.5 Test requirement

Tables 8.4.2.5.4.1-3 and 8.4.2.5.5-1 define the primary level settings including test tolerances for E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in non-DRX.

Table 8.4.2.5.5-1: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR2 without SSB time index detection in non-DRX

Parameter	Unit	Test	C	ell 2
		configuration	T1	T2
NR RF Channel Number		1, 2	1	
Duplex mode		1, 2	TDD	
TDD configuration		1, 2		Conf.3.1
BW _{channel}	MHz	1, 2	100: N	$_{RB,c} = 66$
OCNG patterns defined in A.2.1 (OP.1)		1, 2	C	P.1
SMTC configuration defined in A.4		1	SM	TC.2
		2	SM	TC.1
PDSCH/PDCCH subcarrier spacing	kHz	1, 2	1	.20
b1-ThresholdNR UE power class 3	dBm/SCS	1, 2	-:	L08
EPRE ratio of PSS to SSS		1, 2		
EPRE ratio of PBCH DMRS to SSS				
EPRE ratio of PBCH to PBCH DMRS				
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS				
EPRE ratio of PDSCH DMRS to SSS				0
EPRE ratio of PDSCH to PDSCH				
EPRE ratio of OCNG DMRS to SSS (Note				
1)				
EPRE ratio of OCNG to OCNG DMRS				
(Note 1)				
AoA setup defined in A.9		1, 2	Setup 2a	
$N_{_{OC}}^{}$ Note2	dBm/15kHz	1, 2	-111+TT	
$N_{oc}^{ m Note2}$	dBm/SCS	1, 2	-102+TT	
SS-RSRP Note 3	dBm/SCS	1, 2	-Infinity	-88+TT
$\mathbf{\hat{E}}_{\mathrm{s}}/\mathbf{I}_{\mathrm{ot}}$	dB	1, 2	-Infinity	14+TT
\hat{E}_s/N_{oc}	dB	1, 2	-Infinity	14+TT
Io ^{Note3}	dBm/95.04MH	1, 2	-Infinity	-58.84+TT
	Z			
Propagation Condition		1, 2	AV	VGN

Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 8.4.2.5.5-2: Test requirements for NR inter-RAT event triggered reporting for FR2 without SSB time index detection in non-DRX

Test case	Measurement reporting delay (ms)					
	Test 1: D1 ms Test 2: D2 ms					
UE power class 3	3200+TT	1600+TT				

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

In test 1 with per-UE gap, the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than D1 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than D2 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and test 2, the UE is not required to report SSB time index.

8.4.2.6 E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in DRX

Editor's notes: This test case is incomplete. The following aspects are either missing or TBD.

- The core requirements in TS 38.133 are between [.] or TBD;
- Connection Diagram is TBD;
- Test procedure and Message content are TBD;
- Test tolerance analysis is missing;
- Test applicability Table in TS38.522 need to be updated.

8.4.2.6.1 Test purpose

To verify the UE's ability to make a correct reporting of an event without SSB time index detection in DRX within E-UTRA – NR FR2 cell search requirements.

8.4.2.6.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR FR2 measurements.

8.4.2.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.6.

8.4.2.6.4 Test description

8.4.2.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.6.4.1-1.

Table 8.4.2.6.4.1-1: NR inter-RAT event triggered reporting tests without SSB index reading for FR2 in DRX

Configuration	Description					
8.4.2.6-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode					
8.4.2.6-2	LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode					
Note 1: The UE is only required to be tested in one of the supported test configurations.						

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.6.4.1-2.

Table 8.4.2.6.4.1-2: Initial conditions for E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in DRX

Parameter		Value	Comment			
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.			
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.			
Channel	As specified by the test configuration selected from Table 8.4.2.6.4.1-1.					
bandwidth						
Propagation	AWGN		As specified in Annex C.2.1			
conditions						
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.			
Diagram	DUT Part	TBD				
Exceptions to	N/A					
connection						
diagram						

- 1. The general test parameter settings are set up according to Table 8.4.2.6.4.1-3.
- 2. Message contents are defined in clause 8.4.2.6.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR FR2 neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.6.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.6.4.1-3: General test parameters for NR inter-RAT event triggered reporting for FR2 without SSB time index detection in DRX

Parameter	Unit	Test	Value			Comment		
		configuratio	Test	Test 2	Test	Test 4		
55.01		n	1 3					
RF Channel		1, 2	2				One LTE and 1 FR2 NR carrier	
Number					" 4 (0.0	115	frequencies are used.	
Active cell		1, 2, 3, 4, 5,		E-UTRA ce	ell 1 (PCe	ell)	E-UTRA cell 1 is on E-UTRA RF	
		6					channel number 1 as defined in clause A.6.1.2.	
Neighbour cell		1, 2, 3, 4, 5, 6		NR (cell 2		NR cell 2 is on NR RF channel number 1.	
Gap Pattern Id		1, 2, 3, 4, 5, 6		0		4	As specified in clause Table 8.1.2.1-1 of TS 36.133 [23].	
Measurement gap offset		1, 2, 3, 4, 5, 6	;	39		19	As specified in TS 36.331 [29].	
b1-ThresholdNR	dB	1, 2		Not	te 1		SS-RSRP threshold for SS-RSRP	
	m	,					measurement on cell 2 for event B1 [29].	
Hysteresis	dB	1, 2, 3, 4, 5,		(0		[-5].	
CP length		1, 2, 3, 4, 5,		Nor	mal			
TimeToTrigger	S	1, 2, 3, 4, 5,		(0			
Filter coefficient		1, 2, 3, 4, 5,		(0		L3 filtering is not used.	
DRX		1, 2, 3, 4, 5,	DRX. 9	DRX.10	DRX. 9	DRX.10	As specified in clause A.3.3.	
Time offset		6 1		3r	ns	l.	Asynchronous cells.	
between serving				Silio			The timing of Cell 2 is 3ms later than	
and neighbour							the timing of Cell 1.	
cells		2	3µs				Synchronous cells.	
T1	S	1, 2, 3, 4, 5,	5					
T2	S	1, 2, 3, 4, 5,	6 83 6 83		83			
Note 1: The value	Note 1: The value of b1-ThresholdNR is defined in Table 8.4.2.6.5-1							

8.4.2.6.4.2 Test procedure

Same test procedure as described in section 8.4.2.2.4.2 with following exception:

- TBD

8.4.2.6.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.6.4.3-1: Common Exception messages for E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in DRX

Default Message Contents						
Common contents of system information blocks exceptions	,					
Default RRC messages and information elements contents exceptions	FFS					

8.4.2.6.5 Test requirement

Tables 8.4.2.6.4.1-3 and 8.4.2.6.5-1 define the primary level settings including test tolerances for E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in DRX.

Table 8.4.2.6.5-1: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR2 without SSB time index detection in DRX

Parameter	Unit	Test	С	ell 2
		configuration	T1	T2
NR RF Channel Number		1, 2	1	
Duplex mode		1, 2	TDD	
TDD configuration		1, 2		Conf.3.1
BW _{channel}	MHz	1, 2	100: N	I _{RB,c} = 66
OCNG patterns defined in A.2.1 (OP.1)		1, 2	C	P.1
SMTC configuration defined in A.4		1	SMTC.2	
		2	SM	ITC.1
PDSCH/PDCCH subcarrier spacing	kHz	1, 2		L20
b1-ThresholdNR UE power class 3	dBm/SCS	1, 2		·96
EPRE ratio of PSS to SSS		1, 2		
EPRE ratio of PBCH DMRS to SSS				
EPRE ratio of PBCH to PBCH DMRS				
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS				
EPRE ratio of PDSCH DMRS to SSS				0
EPRE ratio of PDSCH to PDSCH				
EPRE ratio of OCNG DMRS to SSS (Note				
1)				
EPRE ratio of OCNG to OCNG DMRS				
(Note 1)				
AoA setup defined in A.9		1, 2		tup 1
N_{oc} Note2	dBm/15kHz	1, 2	-111+TT	
$oldsymbol{N}_{oc}$ Note2	dBm/SCS	1, 2	-102+TT	
SS-RSRP Note 3	dBm/SCS	1, 2	-Infinity	-88+TT
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 2	-Infinity	14+TT
\hat{E}_s/N_{oc}	dB	1, 2	-Infinity	14+TT
Io ^{Note3}	dBm/95.04MH z	1, 2	-Infinity	-58.84+TT
Propagation Condition		1, 2		VGN

- Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 8.4.2.6.5-2: Test requirements for NR inter-RAT event triggered reporting for FR2 without SSB time index detection in DRX

Test case	Measurement reporting delay (ms)							
	Test 1: D1 ms Test 2: D2 ms Test 3: D3 ms Test 4: D4 ms							
UE power class 3	4800 51200 4800 51200							

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

In test 1 with per-UE gap, the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than D1 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-UE gap, the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than D2 ms from the beginning of time period T2. The UE shall not send event triggered measurement

reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-FR gap, the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than D3 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event B1 triggered measurement report, with a measurement reporting delay less than D4 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In tests 1, 2, 3 and 4, the UE is not required to report SSB time index.

8.4.2.7 E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in non-DRX

Editor's notes: This test case is incomplete. The following aspects are either missing or TBD.

- The core requirements in TS 38.133 are between [.] or TBD;
- Connection Diagram is TBD;
- Test procedure and Message content are TBD;
- Test tolerance analysis is missing;
- Test applicability Table in TS38.522 need to be updated.

8.4.2.7.1 Test purpose

To verify the UE's ability to make a correct reporting of an event with SSB time index detection in non-DRX within E-UTRA – NR FR2 cell search requirements.

8.4.2.7.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR FR2 measurements.

8.4.2.7.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.7.

8.4.2.7.4 Test description

8.4.2.7.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.7.4.1-1.

Table 8.4.2.7.4.1-1: NR inter-RAT event triggered reporting tests with SSB index reading for FR2 in non-DRX

Configuration	Description					
8.4.2.7-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode					
8.4.2.7-2	LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode					
Note 1: The UE is only required to be tested in one of the supported test configurations.						

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.7.4.1-2.

Table 8.4.2.7.4.1-2: Initial conditions for E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in non-DRX

Parameter		Value	Comment					
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.					
Test frequencies	As specified	As specified in Annex E, Table E.6-1 and TS 38.508-1 [14] clause 4.3.1.						
Channel	As specified by the test configuration selected from Table 8.4.2.7.4.1-1.							
bandwidth								
Propagation	AWGN		As specified in Annex C.2.1					
conditions								
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.					
Diagram	DUT Part	TBD						
Exceptions to	N/A							
connection								
diagram								

- 1. The general test parameter settings are set up according to Table 8.4.2.7.4.1-3.
- 2. Message contents are defined in clause 8.4.2.7.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR FR2 neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.7.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.7.4.1-3: General test parameters for NR inter-RAT event triggered reporting for FR2 with SSB time index detection in non-DRX

Parameter	Unit	Test	Value		Comment			
		configurati	Test 1	Test 2				
		on						
RF Channel Numbers		1, 2	:	2	One LTE and one FR2 NR carrier			
					frequencies are used.			
Active cell		1, 2	E-UTRA co	ell 1 (PCell)	E-UTRA cell 1 is on E-UTRA RF channel			
					number 1 as defined in clause A.6.1.2.			
Neighbour cell		1, 2	NR (cell 2	NR cell 2 is on NR RF channel number 1.			
Gap Pattern Id		1, 2	0	4	As specified in clause Table 8.1.2.1-1 of TS 36.133 [23].			
Measurement gap		1, 2	39	19	As specified in TS 36.331 [29].			
offset								
b1-ThresholdNR	dBm	1, 2	No	te 1	SS-RSRP threshold for SS-RSRP			
					measurement on cell 2 for event B1 [29]			
Hysteresis	dB	1, 2		0				
CP length		1, 2	Normal					
TimeToTrigger	S	1, 2		0				
Filter coefficient		1, 2	0		L3 filtering is not used.			
DRX		1, 2	0	FF	DRX is not used.			
Time offset between		1	31	ns	Asynchronous cells.			
serving and neighbour					The timing of Cell 2 is 3ms later than the			
cells					timing of Cell 1.			
		2	3	μS	Synchronous cells.			
T1	S	1, 2	5					
T2	S	1, 2	5	3				
Note 1: The value of b								

8.4.2.7.4.2 Test procedure

Same test procedure as described in section 8.4.2.3.4.2 with following exception:

- TBD

8.4.2.7.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.7.4.3-1: Common Exception messages for E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in non-DRX

Default Message Contents						
Common contents of system information						
blocks exceptions						
Default RRC messages and information	FFS					
elements contents exceptions						

8.4.2.7.5 Test requirement

Tables 8.4.2.7.4.1-3 and 8.4.2.7.5-1 define the primary level settings including test tolerances for E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in non-DRX.

Table 8.4.2.7.5-1: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR2 with SSB time index detection in non-DRX

Parameter		Unit	Test	C	ell 2
			configuration	T1	T2
NR RF Channel Nur	nber		1, 2	1	
Duplex mode			1, 2	TDD	
TDD configuration			1, 2	TDD	Conf.3.1
BW _{channel}		MHz	1, 2	100: 1	$N_{RB,c} = 66$
OCNG patterns defin	ned in A.2.1 (OP.1)		1, 2	(DP.1
SMTC configuration	defined in A.4		1	SN	ITC.2
			2	SN	ITC.1
PDSCH/PDCCH sub	ocarrier spacing	kHz	1, 2		120
b1-ThresholdNR	UE power class 3	dBm/SCS	1, 2 1, 2		-96
EPRE ratio of PSS to	o SSS		1, 2		
EPRE ratio of PBCH	I DMRS to SSS				
EPRE ratio of PBCH	I to PBCH DMRS				
EPRE ratio of PDCC	CH DMRS to SSS				
EPRE ratio of PDCC	CH to PDCCH DMRS				
EPRE ratio of PDSC	CH DMRS to SSS				0
EPRE ratio of PDSC	CH to PDSCH				
EPRE ratio of OCNO	G DMRS to SSS (Note				
1)					
EPRE ratio of OCNO	G to OCNG DMRS				
(Note 1)					
AoA setup defined in	n A.9		1, 2 1, 2	Setup 1	
$N_{_{oc}}$ Note2		dBm/15kHz	1, 2	-111+TT	
$N_{_{OC}}^{}$ Note2		dBm/SCS	1, 2	-102+TT	
SS-RSRP Note 3		dBm/SCS	1, 2	-Infinity	-88+TT
$\hat{\mathbf{E}}_{s}/\mathbf{I}_{ot}$		dB	1, 2	-Infinity	14+TT
\hat{E}_s/N_{oc}		dB	1, 2	-Infinity	14+TT
IO ^{Note3}		dBm/95.04MH	1, 2	-Infinity	-58.84+TT
		Z			
Propagation Condition	on		1, 2	A	WGN
			- · · · ·		

- Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 8.4.2.7.5-2: Test requirements for NR inter-RAT event triggered reporting for FR2 with SSB time index detection in non-DRX

Test case	Measurement reporting delay (ms)					
	Test 1: D1 ms Test 2: D2 ms					
UE power class 3	4160	2080				

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than D1 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than D2 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and test 2, the UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

8.4.2.8 E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in DRX

Editor's notes: This test case is incomplete. The following aspects are either missing or TBD.

- The core requirements in TS 38.133 are between [.] or TBD;
- Connection Diagram is TBD;
- Test procedure and Message content are TBD;
- Test tolerance analysis is missing;
- Test applicability Table in TS38.522 need to be updated.

8.4.2.8.1 Test purpose

To verify the UE's ability to make a correct reporting of an event with SSB time index detection in DRX within E-UTRA – NR FR2 cell search requirements.

8.4.2.8.2 Test applicability

This test applies to all E-UTRA UE release 15 onwards and capable of NR FR2 measurements.

8.4.2.8.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.4.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.8.4.2.8.

8.4.2.8.4 Test description

8.4.2.8.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.4.2.8.4.1-1.

Table 8.4.2.8.4.1-1: NR inter-RAT event triggered reporting tests without SSB index reading for FR2 in DRX

Configuration	Description		
8.4.2.8-1	LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
8.4.2.8-2	LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode		
Note 1: The UE is only required to be tested in one of the supported test configurations.			

Configure the test requirement and the DUT according to the parameters in Table 8.4.2.8.4.1-2.

Table 8.4.2.8.4.1-2: Initial conditions for E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in DRX

Parameter		Value	Comment				
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.				
Test frequencies	As specified	As specified in Annex E, Table E.6-1 and TS 38.508-1 [14] clause 4.3.1.					
Channel	As specified by the test configuration selected from Table 8.4.2.8.4.1-1.						
bandwidth							
Propagation	AWGN		As specified in Annex C.2.1				
conditions							
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.				
Diagram	DUT Part	TBD					
Exceptions to	N/A						
connection							
diagram							

- 1. The general test parameter settings are set up according to Table 8.4.2.8.4.1-3.
- 2. Message contents are defined in clause 8.4.2.8.4.3.
- 3. There are two carriers and two cells specified in the test, where Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR FR2 neighbour cell on the NR carrier. Cell 1 is the cell used for connection setup with the power level set according to Table 8.4.2.8.5-1 for this test. Cell 1 is configured according to Annex C.1.1 and C.1.2.

Table 8.4.2.8.4.1-3: General test parameters for NR inter-RAT event triggered reporting for FR2 with SSB time index detection in DRX

Parameter	Unit	Test		Value			Comment
		configuratio	Test	Test 2	Test	Test 4	
		n	1		3		
RF Channel		1, 2		2	2	~	One LTE and 1 FR2 NR carrier
Number							frequencies are used.
Active cell		1, 2		E-UTRA ce	ell 1 (PCe	ell)	E-UTRA cell 1 is on E-UTRA RF channel
							number 1 as defined in clause A.6.1.2.
Neighbour cell		1, 2		NR (cell 2		NR cell 2 is on NR RF channel number 1.
Gap Pattern Id		1, 2		0		4	As specified in clause Table 8.1.2.1-1 of
							TS 36.133 [23].
Measurement		1, 2		39		19	As specified in TS 36.331 [29].
gap offset							
b1-ThresholdNR	dBm	1, 2		Not	te 1		SS-RSRP threshold for SS-RSRP
							measurement on cell 2 for event B1 [29].
Hysteresis	dB	1, 2		()		
CP length		1, 2		Nor	mal		
TimeToTrigger	S	1, 2		()		
Filter coefficient		1, 2)		L3 filtering is not used.
DRX			DRX.	DRX.10	DRX.	DRX.10	As specified in clause A.3.3.
			9		9		
Time offset		1		3r	ns		Asynchronous cells.
between serving							The timing of Cell 2 is 3ms later than the
and neighbour							timing of Cell 1.
cells		2	3µs				Synchronous cells.
T1	S	1, 2	5				
T2	S	1, 2	7	70	7	70	
Note 1: The value of b1-ThresholdNR is defined in Table A.8.4.2.8.5-1							

8.4.2.8.4.2 Test procedure

Same test procedure as described in section 8.4.2.4.4.2 with following exception:

- TBD

8.4.2.8.4.3 Message contents

Message contents are according to TS 36.508 [25] clause 4.6 with the following exceptions:

Table 8.4.2.8.4.3-1: Common Exception messages for E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in DRX

Default Message Contents						
Common contents of system information						
blocks exceptions						
Default RRC messages and information	FFS					
elements contents exceptions						

8.4.2.8.5 Test requirement

Tables 8.4.2.8.4.1-3 and 8.4.2.8.5-1 define the primary level settings including test tolerances for E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in DRX.

Table 8.4.2.8.5-1: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR2 with SSB time index detection

Parameter			Cell 2	
		configuration	T1	T2
NR RF Channel Number		1, 2	1	
Duplex mode		1, 2	TDD	
TDD configuration		1, 2		Conf.3.1
BW _{channel}	MHz	1, 2	100: N	I _{RB,c} = 66
OCNG patterns defined in A.2.1 (OP.1)		1, 2	C	P.1
SMTC configuration defined in A.4		1	SM	ITC.2
		2	SM	ITC.1
PDSCH/PDCCH subcarrier spacing	kHz	1, 2		L20
b1-ThresholdNR UE power class 3	dBm/SCS	1, 2		·96
EPRE ratio of PSS to SSS		1, 2		
EPRE ratio of PBCH DMRS to SSS				
EPRE ratio of PBCH to PBCH DMRS				
EPRE ratio of PDCCH DMRS to SSS				
EPRE ratio of PDCCH to PDCCH DMRS				
EPRE ratio of PDSCH DMRS to SSS				0
EPRE ratio of PDSCH to PDSCH				
EPRE ratio of OCNG DMRS to SSS (Note				
1)				
EPRE ratio of OCNG to OCNG DMRS				
(Note 1)				
AoA setup defined in A.9		1, 2	Setup 1	
N_{oc} Note2	dBm/15kHz	1, 2	-111+TT	
$oldsymbol{N}_{oc}$ Note2	dBm/SCS	1, 2	-102+TT	
SS-RSRP Note 3	dBm/SCS	1, 2	-Infinity	-88+TT
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$	dB	1, 2	-Infinity	14+TT
\hat{E}_s/N_{oc}	dB	1, 2	-Infinity	14+TT
Io ^{Note3}	dBm/95.04MH z	1, 2	-Infinity	-58.84+TT
Propagation Condition		1, 2		VGN

- Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 8.4.2.8.5-2: Test requirements for NR inter-RAT event triggered reporting for FR2 with SSB time index detection in DRX

Test case	Measurement reporting delay (ms)			
	Test 1: D1 ms Test 2: D2 ms Test 3: D3 ms Test 4: D4 ms			
UE power class 3	4800	51200	4800	51200

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than D1 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than D2 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than D3 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than D4 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In tests 1, 2, 3 and 4, the UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to $2xTTI_{DCCH}$ higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

8.5 Measurement performance requirements

8.5.1 SFTD measurement accuracy

8.5.1.0 Minimum conformance requirements

8.5.1.0.1 Intra-frequency absolute SS-RSRP measurement accuracy requirements

The SFN and frame timing difference (SFTD) is measured between PCell and NR cell for inter-RAT SFTD. The inter-RAT SFTD measurement can only be configured for E-UTRA - NR band combinations that are supported by the UE.

The accuracy requirements in Table 8.5.1.0.1-3 are applicable under the following conditions:

For PCell SFN and frame timing measurement:

- Cell specific reference signals are transmitted either from one, two or four antenna ports.
- Conditions defined in TS 36.101 clause 7.3 for reference sensitivity are fulfilled.
- No changes to the uplink transmission timing are applied during the measurement period.
- RSRP_{dBm} according to TS 36.133 Annex B.3.5 for a corresponding Band.
- Io range defined in Table 8.5.1.0.1-1.

Table 8.5.1.0.1-1: PCell lo range conditions for SFTD measurement accuracy

	lo ^{Note 1} ra	ınge	
Parameter	E-UTRA operating band groups Note 4, 5	Minimum Io	Maximum Io
		dBm/15kHz Note 2, 3	dBm/BW _{Channel}
	FDD_A, TDD_A	-121	-50
	FDD_C, TDD_C	-120	-50
	FDD_D	-119.5	-50
Condition	FDD_E, TDD_E	-119	-50
s	FDD_F	-118.5	-50
	FDD_G	-118	-50
	FDD_H	-117.5	-50
	FDD_N	-114.5	-50

- NOTE 1: When in dBm/15kHz, the minimum lo condition is expressed as the average lo per RE over all REs in that symbol. Io may be different in different symbols within a subframe.
- NOTE 2: The condition level is increased by Δ >0, when applicable, as described in clause B.4.2 and B.4.3.
- NOTE 3: The condition level is increased by MSD as defined in clause 7.3B in TS 38.101-3 [54], if applicable depending on E-UTRA NR band combination.
- NOTE 4: E-UTRA operating band groups are as defined in clause 3.5.
- NOTE 5: Only E-UTRA bands within EN-DC band combinations as specified in clause 5.5B in TS 38.101-3 [54] are applicable.

For NR PSCell, or NR cell SFN and frame timing measurement in FR1:

- Conditions defined in TS 38.101-1 clause 7.3 for reference sensitivity are fulfilled.
- Io range defined in Table 8.5.1.0.1-2.

Table 8.5.1.0.1-2: NR PSCell, or NR cell lo range conditions for SFTD measurement accuracy in FR1

	lo ^{No}	^{te 1} range		
	NR operating band groups Note 4,5	Minimun	n Io Note 2, 3	Maximum Io
Parameter		dBm/ SCS _{SSB}		
		SCS _{SSB} = 15 kHz	SCS _{SSB} = 30 kHz	dBm/BW _{Channel}
	NR_FDD_FR1_A, NR_TDD_FR1_A	-121	-118	-50
	NR_FDD_FR1_B	-120.5	-117.5	-50
Condition	NR_TDD_FR1_C	-120	-117	-50
Condition s	NR_FDD_FR1_D, NR_TDD_FR1_D	-119.5	-116.5	-50
)	NR_FDD_FR1_E, NR_TDD_FR1_E	-119	-116	-50
	NR_FDD_FR1_G	-118	-115	-50
	NR_FDD_FR1_H	-117.5	-114.5	-50

- NOTE 1: Io is assumed to have constant EPRE across the bandwidth.
- NOTE 2: The condition level is increased by $\Delta R_{\rm IB,c}$ as defined in clause 7.3B in TS 38.101-3 [54], depending on E-UTRA NR band combination.
- NOTE 3: The condition level is increased by MSD as defined in clause 7.3B in TS 38.101-3 [54], if applicable depending on E-UTRA NR band combination.
- NOTE 4: NR operating band groups are as defined in clause 3.5.
- NOTE 5: Only NR bands within EN-DC band combinations as specified in clause 5.5B in TS 38.101-3 [54] are applicable.

Table 8.5.1.0.1-3: SFTD measurement accuracy

	Conditions		
Accuracy	Ês/lot	Frequency range	
Ts Note 1	dB		
40	≥ -3 dB	FR1	

NOTE 1: Ts is the basic timing unit defined in TS 36.211 [16].

NOTE 2: The parameter £s/lot is the minimum £s/lot of the pair of cells to which the requirement applies.

8.5.1.1 E-UTRA – NR FR1 SFTD measurement accuracy

Editor's note: This test case is incomplete. The following aspects are either missing or TBD

- Message contents are not complete.
- Connection diagram is TBD.
- TT analysis is missing.

8.5.1.1.1 Test purpose

The purpose of this test is:

- To verify that the SFTD measurement accuracy is within the specified limits;
- To verify the requirements as specified in clause 9.1.27 in TS 36.133 [23] for inter-RAT FR1 SFTD measurements.

8.5.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards and support inter-RAT NR SFTD measurements.

8.5.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 8.5.1.0.

The normative reference for this requirement is TS 38.133 [6] clause A.8.5.1.1.

8.5.1.1.4 Test description

Two cells are configured in this test: E-UTRA Cell 1 is the E-UTRAN PCell and Cell 2 is the inter-RAT NR FR1 neighbour cell.

8.5.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 8.5.1.1.4.1-1.

Table 8.5.1.1.4.1-1: Supported test configurations for E-UTRA – NR FR1 SFTD measurement accuracy

Configuration	Description		
8.5.1.1-1	NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, LTE FDD		
8.5.1.1-2	NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode, LTE FDD		
8.5.1.1-3	NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, LTE FDD		
8.5.1.1-4	NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, LTE TDD		
8.5.1.1-5	NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode, LTE TDD		
8.5.1.1-6	NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, LTE TDD		
Note: The UE is or	Note: The UE is only required to be tested in one of the supported test configurations		

Configure the test equipment and the DUT according to the parameters in Table 8.5.1.1.4.1-2.

Table 8.5.1.1.4.1-2: Initial conditions for E-UTRA - NR FR1 SFTD measurement accuracy

Parameter		Value	Comment	
Test environment	NC		As specified in TS 36.508 [25] clause 4.1.	
Test frequencies	As specified	in Annex E, Table E.6-1 and TS 38.	508-1 [14] clause 4.3.1.	
Channel bandwidth	As specified	As specified by the test configuration selected from Table 8.4.2.1.4.1-1.		
Propagation conditions	AWGN		As specified in Annex C.2.1	
Connection	TE Part	TBD	As specified in TS 38.508-1 [14] Annex A.	
Diagram	DUT Part	TBD		
Exceptions to connection diagram	N/A			

- 1. The general test parameter settings are set up according to Table 8.5.1.1.4.1-3.
- 2. Message contents are defined in clause 8.5.1.1.4.3.
- 3. There are two carriers and two cells specified in the test, where E-UTRA Cell 1 is the E-UTRA PCell on the E-UTRA carrier and Cell 2 is the NR neighbour cell on the NR carrier. E-UTRA Cell 1 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

8.5.1.1.4.2 Test procedure

- 1. Ensure the UE is in State 3A-RF according to TS 36.508 [25] clause 7.2A.3.
- 2. Set the parameters according to Table 8.5.1.1.5-1 as appropriate.
- 3. The SS shall transmit an *RRCConnectionReconfiguration* message on Cell 1.
- 4. The UE shall transmit an RRCConnectionReconfigurationComplete message.
- 5. The UE shall transmit a *MeasurementReport* message triggered by SFTD measurement.

- 6. The SS shall check the reported values of SFN offset and frame boundary offset in the *MeasurementReport*. The SFN offset value and frame boundary offset value between E-UTRA Cell 1 and Cell 2 reported by the UE is compared to the expected SFN offset value and frame boundary offset, respectively. The number of failed iterations is increased by one, if
 - The reported SFN offset value is different with the expected SFN offset value, or
 - The difference between reported frame boundary offset value and expected frame boundary offset value is outside the limits given in Table 8.5.1.1.5-2, or
 - The UE fails to report the measurement value for Cell 2.

Otherwise the number of successful iterations is increased by one.

7. Repeat steps 1-6 until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8.5.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 8.5.1.1.4.3-1: Common Exception messages for E-UTRA – NR FR1 SFTD measurement accuracy

Default Message Contents		
Common contents of system information blocks	TBD	
exceptions		
Default RRC messages and information	TBD	
elements contents exceptions		

8.5.1.1.5 Test requirement

Table 8.5.1.1.5-1 and 8.5.1.1.5-2 defines the primary level settings including test tolerances for E-UTRA – NR FR1 SFTD measurement accuracy.

The SFN offset and frame boundary offset between E-UTRA PCell and the inter-RAT neighbour cell shall be set to one of the configurations in Table 8.5.1.1.5-3. The reported SFTD accuracy shall fulfil the accuracy requirements in Table 8.5.1.1.5-4.

Table 8.5.1.1.5-1: E-UTRA cell specific test parameters for E-UTRA - NR FR1 SFTD measurement accuracy

Parameter	Unit	Test 1
E-UTRA RF Channel Number		1
Duplex mode		FDD or TDD
TDD special subframe configuration ^{Note1}		6
TDD uplink-downlink configuration ^{Note1}		1
BW _{channel}		5 MHz: N _{RB,c} = 25
		10 MHz: N _{RB,c} = 50
		20 MHz: N _{RB,c} = 100
PDSCH parameters:		5 MHz: R.7 FDD
DL Reference Measurement Channel ^{Note2}		10 MHz: R.3 FDD
		20 MHz: R.6 FDD
		5 MHz: R.4 TDD
		10 MHz: R.0 TDD
		20 MHz: R.3 TDD
PCFICH/PDCCH/PHICH parameters:		5 MHz: R.11 FDD
DL Reference Measurement Channel ^{Note2}		10 MHz: R.6 FDD
		20 MHz: R.10 FDD
		5 MHz: R.11 TDD
		10 MHz: R.6 TDD
		20 MHz: R.10 TDD
OCNG Patterns ^{Note2}		5 MHz: OP.20 FDD
		10 MHz: OP.10 FDD
		20 MHz: OP.17 FDD
		5 MHz: OP.9 TDD
		10 MHz: OP.1 TDD
		20 MHz: OP.7 TDD
PBCH_RA	dB	0

PBCH_RB	dB			
PSS_RA	dB			
SSS_RA	dB			
PCFICH_RB	dB			
PHICH_RA	dB			
PHICH_RB	dB			
PDCCH_RA	dB			
PDCCH_RB	dB			
PDSCH_RA	dB			
PDSCH_RB	dB			
OCNG_RA ^{Note3}	dB			
OCNG_RB ^{Note3}	dB			
N _{oc} Note4	dBm/15 kHz	-104		
Ê _s /N _{oc}	dB	-3		
Ê _s /I _{ot}	dB	-3		
RSRP Note5	dBm/15 kHz	-107		
SCH_RP Note5	dBm/15 kHz	-107		
Io Note5	dBm/Ch BW	-74.45		
		+10log		
		(N _{RB,c} /50)		
Propagation Condition		AWGN		
Antenna Configuration 1x2				
Note 1: Special subframe and unlink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24]				

- Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].
- Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [23] respectively.
- Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.
- Note 5: Es/lot, RSRP, SCH_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Table 8.5.1.1.5-2: NR cell specific test parameters for E-UTRA – NR FR1 SFTD measurement accuracy

1-6		Parameter	Config	Unit	Test 1
Duplex mode	SSB GSCN		1		
Duplex mode			1,4		
Sample	Duplex mod	de		1	TDD
1,4				1	TDD
TDDConfiguration					
Section Sect	TDD Confic	nuration		-	
1,4 10: Name; = 52 10: Name; = 10: Name;	100 0011119	garation		1	
SWebarnel 2.5					
Description 1.4 1.5 1.4 1.4 1.4 1.4 1.5 1.4 1.4 1.4 1.4 1.5 1.4 1.4 1.4 1.5 1.4 1.4 1.5 1.4 1.4 1.5 1.4 1.4 1.5 1.4 1.4 1.5 1.4 1.4 1.5 1.4 1.4 1.5 1.4 1.4 1.5 1.5 1.	BW.			- MH2	
PDSCH Reference measurement channel 1.4 SR.1.1 FDD	D V V channel			- 1411 12	
PUSCH Reference measurement channel			1		
SR.2.1 TDD	PDSCH Re	ference measurement		-	
1,4 CR.1.1 FDD CR.1.1 TDD CR.2.1 TDD	channel			_	
RMSI CORESET Reference Channel					
Sabara S	D1401 00D	EGET Defended of the sect		_	
1,4 CCR.1.1 FDD CCR.2.1 TDD SSB.1 FR1 SSB.1 FR1 SSB.1 FR1 SSB.2 FR1 SSB.1 FR1 SSB.2 FR2 FR1 SSB.2 FR2 FR1 SSB.2 FR2 FR2 FR2 FR2 FR2 FR2 FR2 FR2 FR2 FR	RMSICOR	ESET Reference Channel		-	
RMC CORESET Reference Channel 2,5 CCR.1.1 TDD					
SSB configuration SSB configuration SSB configuration DL BWP configuration DL BWP configuration DL BWP configuration 1-6 SSB.1 FR1 SSB.2 FR1 SSB.2 FR1 SSB.2 FR1 SSB.2 FR1 SSB.2 FR1 SSB.2 FR1 DL BWP configuration 1-6 DL BWP1.1 DL BWP1.1 DL BWP configuration 1-6 DL BWP1.1 D					
1.4 SSB.1 FR1 SSB.2 FR2 FR1 SSB.2 FR1 SSB.2 FR1 SS	RMC COR	ESET Reference Channel			
SSB configuration					
SMTC configuration 1-6 SMTC.1 DL BWP configuration 1-6 DLBWP1.1 UL BWP configuration 1-6 DLBWP1.11 UL BWP configuration 1-6 ULBWP1.11 UCNG Patterns 1-6 ULBWP1.11 OCNG Patterns 1-6 UDBWP1.11 Including]	
SMTC configuration	SSB config	uration			SSB.1 FR1
DL BWP configuration			3,6		SSB.2 FR1
DL BWP configuration	SMTC conf	iguration	1~6		SMTC.1
UL BWP configuration			1~6		
OCNG Patterns	UL BWP co	onfiguration	1~6		ULBWP.1.1
EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH DMRS to SSS EPRE ratio of PDCH DMRS to SSS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of OCNG DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDCCH DMRS EPRE ratio of PDC		•	1~6		
EPRE ratio of PBCH DMRS to SSS EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH bMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSSNote 1 NR FDD FR1 A, NR FDD FR1 A, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR FDD FR1 B, NR TDD FR1			-		
EPRE ratio of PBCH to PBCH DMRS EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of OCNG DMRS to SSSNote 1 EPRE ratio of OCNG to OCNG DMRS EPRE ratio of OCNG to OCNG DMRS EPRE ratio of OCNG to OCNG DMRS Norte1 NR_FDD_FR1_A, NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_E, NR_TDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_B NR_TDD_FR1_A, NR_TDD_FR1_B NR_TDD_FR1_A, NR_TDD_FR1_B NR_TDD_FR1_A, NR_TDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A NR_TDD_FR1_A NR_TDD_FR1_A NR_TDD_FR1_A NR_TDD_FR1_A NR_TDD_FR1_A NR_TDD_FR1_A NR_TDD_FR1_B NR_FDD_FR1_B			†		
EPRE ratio of PDCCH DMRS to SSS EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSSNote 1 EPRE ratio of OCNG to OCNG DMRS Note1 NR_FDD_FR1_A, NR_TDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B, NR_TDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_C NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B			†		
EPRE ratio of PDCCH to PDCCH DMRS EPRE ratio of PDSCH DMRS to SSS EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSSNote 1 EPRE ratio of OCNG to OCNG DMRS Note1 NR_FDD_FR1_A, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_E, NR_TDD_FR1_E, NR_FDD_FR1_G NR_FDD_FR1_A, NR_FDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_B, NR_TDD_FR1_A, NR_TDD_FR1_B, NR_TDD_FR1_A, NR_FDD_FR1_A, NR_TDD_FR1_A, NR_TDD_FR1_A, NR_FDD_FR1_B, NR_FDD_FR1_B, NR_FDD_FR1_B, NR_FDD_FR1_B, NR_FDD_FR1_B, NR_TDD_FR1_B, NR_TDD			1		
DMRS EPRE ratio of PDSCH DMRS to SSS 1-6 dB 0 EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSSNote 1 1 0 EPRE ratio of OCNG to OCNG DMRS EPRE ratio of OCNG to OCNG DMRS 0 0 EPRE ratio of OCNG to OCNG DMRS NR_FDD_FR1_A, NR_TDD_FR1_A, NR_TDD_FR1_B NR_FDD_FR1_B 0 NN_FDD_FR1_B NR_FDD_FR1_B 0 0 NN_FDD_FR1_B NR_FDD_FR1_B 0 NN_FDD_FR1_B 0 0 NN_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_B 0	-		1		
EPRE ratio of PDSCH DMRS to SSS		OI POCCH (O POCCH			
EPRE ratio of PDSCH to PDSCH DMRS EPRE ratio of OCNG DMRS to SSSNore 1 EPRE ratio of OCNG to OCNG DMRS Note 1 NR_FDD_FR1_A, NR_TDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B, NR_FDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_G NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D, NR_FDD_FR1_D, NR_FDD_FR1_D, NR_FDD_FR1_D, NR_FDD_FR1_D NR_FDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A, NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_B -101 -101		of DDCCH DMDC to CCC	1~6	dB	0
DMRS			1-0	ub	0
EPRE ratio of OCNG DMRS to SSSNote EPRE ratio of OCNG to OCNG DMRS		01 PDSCH (0 PDSCH			
EPRE ratio of OCNG to OCNG DMRS Note 1 NR_FDD_FR1_A, NR_TDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D, NR_TDD_FR1_E, NR_TDD_FR1_G NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A, NR_FDD_FR1_A, NR_FDD_FR1_B NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D, NR_FDD_FR1_D, NR_FDD_FR1_D, NR_FDD_FR1_D, NR_TDD_FR1_D NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_B NR_TDD_FR1_B NR_TDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_TDD_FR1_A NR_TDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B		of OCNIC DMDC to CCCNote	-		
NR_FDD_FR1_A, NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_D NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_D NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B	EPRE fallo	OI OCNG DIMRS to 555			
NR_FDD_FR1_A, NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_D NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_D NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B	FPRF ratio	of OCNG to OCNG DMRS	1		
NR_TDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_D NR_FDD_FR1_B NR_FDD_FR1_B NR_TDD_FR1_D NR_FDD_FR1_E NR_FDD_FR1_E NR_TDD_FR1_B NR_FDD_FR1_E NR_TDD_FR1_B NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_F		of corte to corte builte			
NR_TDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_D NR_FDD_FR1_B NR_FDD_FR1_B NR_TDD_FR1_D NR_FDD_FR1_E NR_FDD_FR1_E NR_TDD_FR1_B NR_FDD_FR1_E NR_TDD_FR1_B NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_F		NR EDD ER1 A			
NR_FDD_FR1_B					
NR TDD FR1 C			†		
NR_FDD_FR1_D			1		
NR_TDD_FR1_D NR_FDD_FR1_E, NR_TDD_FR1_G NR_FDD_FR1_A, NR_TDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D, NR_TDD_FR1_D, NR_TDD_FR1_E, NR_TDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_B NR_TDD_FR1_E NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B			1		
NR_FDD_FR1_E, NR_FDD_FR1_G NR_FDD_FR1_H NR_FDD_FR1_A, NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D, NR_TDD_FR1_D, NR_TDD_FR1_D NR_FDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_E NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B 1,2,4,5 -104	N_{oc} Note2		1~6	dBm/15kHz	-104
NR TDD FR1 E			+		
NR FDD FR1 G					
NR FDD FR1 H			+		
NR_FDD_FR1_A, NR_TDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D, NR_TDD_FR1_D NR_TDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_G NR_FDD_FR1_G NR_FDD_FR1_A, NR_FDD_FR1_A, NR_TDD_FR1_A NR_FDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B			4		
NR_TDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D NR_TDD_FR1_E NR_TDD_FR1_E NR_TDD_FR1_G NR_FDD_FR1_H NR_FDD_FR1_A, NR_TDD_FR1_A NR_TDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B NR_FDD_FR1_B				In (222	
NR_FDD_FR1_A NR_FDD_FR1_B NR_TDD_FR1_C NR_FDD_FR1_D, NR_TDD_FR1_D NR_FDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_G NR_FDD_FR1_H NR_FDD_FR1_A, NR_TDD_FR1_A NR_FDD_FR1_B	$N_{ m oc}$ Note2			dBm/SSB SCS	
NR TDD FR1 C NR FDD FR1 D 1,2,4,5 NR TDD FR1 E -104 NR FDD FR1 E NR FDD FR1 G NR FDD FR1 H NR FDD FR1 A NR TDD FR1 A 3,6 NR FDD FR1 B -101			1		
NR_FDD_FR1_D, NR_TDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_G NR_FDD_FR1_H NR_FDD_FR1_A, NR_TDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_B			1		
NR_TDD_FR1_D NR_FDD_FR1_E, NR_TDD_FR1_E NR_FDD_FR1_G NR_FDD_FR1_H NR_FDD_FR1_A, NR_TDD_FR1_A NR_FDD_FR1_B NR_FDD_FR1_B			1		
NR_IDD_FRI_D NR_FDD_FRI_E, NR_TDD_FRI_E NR_FDD_FRI_G NR_FDD_FRI_H NR_FDD_FRI_A, NR_TDD_FRI_A NR_FDD_FRI_B			1245		-104
NR_TDD_FR1_E NR_FDD_FR1_G NR_FDD_FR1_H NR_FDD_FR1_A, 3,6 NR_TDD_FR1_A NR_FDD_FR1_B		NR_TDD_FR1_D	1,2,4,5		-104
NR_FDD_FR1_G NR_FDD_FR1_H NR_FDD_FR1_A, NR_TDD_FR1_A NR_FDD_FR1_B		NR_FDD_FR1_E,			
NR_FDD_FR1_H NR_FDD_FR1_A, 3,6 NR_TDD_FR1_A -101 NR_FDD_FR1_B -101		NR_TDD_FR1_E]		
NR_FDD_FR1_H NR_FDD_FR1_A, 3,6 NR_TDD_FR1_A -101 NR_FDD_FR1_B -101]		
NR_FDD_FR1_A, 3,6 NR_TDD_FR1_A NR_FDD_FR1_B -101			1		
NR_TDD_FR1_A NR_FDD_FR1_B			3.6	1	-101
NR_FDD_FR1_B					
			1		
		NR TDD FR1 C	1		

	NR_FDD_FR1_D,			
	NR_TDD_FR1_D			
	NR_FDD_FR1_E,			
	NR_TDD_FR1_E			
	NR_FDD_FR1_G			
-	NR_FDD_FR1_H			_
$\mathbf{\hat{E}}_{s}/\mathbf{I}_{ot}$		1~6	dB	-3
\hat{E}_{s}/N_{oc}		1~6	dB	-3
	NR_FDD_FR1_A,			
	NR_TDD_FR1_A			
	NR_FDD_FR1_B			
	NR_TDD_FR1_C			
	NR_FDD_FR1_D,	1,2,4,5		-107
	NR_TDD_FR1_D	1,2,4,0		10,
	NR_FDD_FR1_E,			
	NR_TDD_FR1_E			
	NR_FDD_FR1_G			
SS-RSRP Note3	NR_FDD_FR1_H		dBm/SCS	
Notes	NR_FDD_FR1_A,			
	NR_TDD_FR1_A			-104
	NR_FDD_FR1_B			
	NR_TDD_FR1_C			
	NR_FDD_FR1_D,	3,6		
	NR_TDD_FR1_D NR_FDD_FR1_E,			
	NR TDD FR1 E			
	NR FDD FR1 G	-		
	NR FDD FR1 H	-		
	NR FDD FR1 A,			
	NR TDD FR1 A			
	NR FDD FR1 B			
	NR TDD FR1 C			
	NR FDD FR1 D,		dBm/9.36 MHz	
	NR TDD FR1 D	1,2,4,5		-74.28
	NR FDD FR1 E,			
	NR_TDD_FR1_E			
	NR_FDD_FR1_G			
lo Note3	NR_FDD_FR1_H			
10	NR_FDD_FR1_A,			
	NR_TDD_FR1_A			
	NR_FDD_FR1_B			
	NR_TDD_FR1_C			
	NR_FDD_FR1_D,	3,6	dBm/38.16	-68.18
	NR_TDD_FR1_D	3,5	MHz	33.10
	NR_FDD_FR1_E,			
	NR_TDD_FR1_E			
	NR_FDD_FR1_G			
Duna a su ti c	NR_FDD_FR1_H	1.6		AVACAL
Propagation		1~6		AWGN
Antenna co	ringuration	1~6	1	1x2

Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.

Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for N_{oc} to be fulfilled.

Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.

Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.

Table 8.5.1.1.5-3: Timing offsets for E-UTRA – NR FR1 SFTD measurement accuracy

Configuration	SFN offset between PCell and PSCell	Frame boundary offset between PCell and PSCell (Ts)
1	100	-122000
2	300	-60540
3	500	1000
4	700	62540
5	900	124000

Table 8.5.1.1.5-4: SFTD measurement accuracy

Accuracy	Conditions		
	Ês/lot	Frequency range	
Ts Note 1	dB		
40	≥ -3 dB	FR1	

NOTE 1: Ts is the basic timing unit defined in TS 36.211 [24].

NOTE 2: The parameter Ês/lot is the minimum Ês/lot of the pair of cells to which the requirement applies.

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

Annex A (normative): RRM test configurations

A.1 Reference measurement channels

This section contains the Reference Measurement Channels (RMC) to be used for the RRM test scenarios in Sections 4 to 7 of this document.

A.1.1 PDSCH

A.1.1.1 FDD

Table A.1.1.1-1: PDSCH Reference Measurement Channels for SCS = 15 kHz for FDD

Parameter		Unit	Value		
Reference channel			SR.1.1 FDD		
Channel bandwidth		MHz	10		
Number of transmitter antennas			1		
Allocated resource blocks for PDSCH Note 1			24		
Allocated slots per Radio Frame			10		
Radio frame containing SSB		slots	Note 5		
Radio frame not containing SSB		slots	10		
MCS index			4		
Modulation			QPSK		
Target Coding Rate			1/3		
Number of control symbols			2		
PDSCH mapping type			Type A		
Information Bit Payload					
For slots with RMSI Note 2		Bits	1864		
Number of Code Blocks per slot			1		
Binary Channel Bits Per slot					
For slots with RMSI Note 2, 4		Bits	6048		
Note 1: Allocated outside the SMTC duration in time and in resource blocks which do not overlap with the resource blocks allocated for SS/PBCH block.					
Note 2:	PDSCH is scheduled on the slots with RMSI.				
Note 3:	If necessary, the information bit payload size can be adjusted to facilitate the test implementation. The payload sizes are defined in 3GPP TS 38.213 [8].				
Note 4: Derived based on the PDSCH DMRS assumption: dmrs-TypeA-Position=2, dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index: 1000, and Number of PDSCH DMRS CDM group(s) without data: 1.					
Note 5:	PDSCH is not scheduled in slots containing SSB according to the SSB configuration used in the test. SSB configurations are defined in section A.3.				

A.1.1.2 TDD

Table A.1.1.2-1: PDSCH Reference Measurement Channels for SCS = 15 kHz for TDD

	Parameter	Unit	Value
Reference	Reference channel		SR.1.1 TDD
Channel	bandwidth	MHz	10
Number	of transmitter antennas		1
Allocated	resource blocks for PDSCH Note 1		24
Allocated	l slots per Radio Frame		
Radio fr	ame containing SSB	slots	Note 5
Radio fr	rame not containing SSB	slots	4
MCS tab	le		64QAM
MCS ind	ex		4
Modulation	on		QPSK
Target Co	oding Rate		1/3
Number	of control symbols		2
PDSCH mapping type Type A			
	on Bit Payload		
For slots with RMSI Note 2 Bits			
Number of Code Blocks per slot			1
Binary Channel Bits Per slot			
For slots with RMSI Note 2, 4 Bits 6048			6048
Note 1:	Allocated outside the SMTC duration in time and in re	esource b	locks which do
	not overlap with the resource blocks allocated for SS	/PBCH bl	ock.
Note 2:	PDSCH is scheduled on the slots with RMSI.		
Note 3:	If necessary, the information bit payload size can be		
test implementation. The payload sizes are defined in 3GPP TS 38.213 [8].			
Note 4:	o		
dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index:			
	1000, and Number of PDSCH DMRS CDM group(s) without data: 1.		
Note 5:	Note 5: PDSCH is not scheduled in slots containing SSB according to the SSB		
configuration used in the test. SSB configurations are defined in section			
	A.3.10.		

Unit Value

Table A.1.1.2-2: PDSCH Reference Measurement Channels for SCS = 30 kHz for TDD

	Parameter		Value	
Reference channel			SR.2.1 TDD	
Channel	bandwidth	MHz	40	
	of transmitter antennas		1	
Allocated resource blocks for PDSCH Note 1			24	
Allocated	slots per Radio Frame			
Radio fr	ame containing SSB	slots	Note 5	
Radio fr	ame not containing SSB	slots	10	
MCS tabl	e		64QAM	
MCS inde	ex		4	
Modulatio	on		QPSK	
Target Co	oding Rate		1/3	
Number of	of control symbols		2	
PDSCH r	PDSCH mapping type Type A			
	on Bit Payload			
For slots with RMSI Note 2 Bits 1864				
Number of Code Blocks per slot 1				
Binary Channel Bits Per slot				
For slots with RMSI Note 2 Bits 6048				
Note 1:	Note 1: Allocated outside the SMTC duration in time and in resource blocks which do not overlap with the resource blocks allocated for SS/PBCH block.			
Note 2:	Note 2: PDSCH is scheduled on the slots with RMSI.			
Note 3:	If necessary, the information bit payload size can be ac			
test implementation. The payload sizes are defined in 3GPP TS 38.213 [8].				
Note 4:	Note 4: Derived based on the PDSCH DMRS assumption: dmrs-TypeA-Position=2,			
	dmrs-Type=1, dmrs-AdditonalPositions=2, maxLength=1, Antenna port index:			
1000, and Number of PDSCH DMRS CDM group(s) without data: 1.				
Note 5:				
	configuration used in the test. SSB configurations are of	aetined in	section A.3.10.	

Table A.1.1.2-3: PDSCH Reference Measurement Channels for SCS = 120 kHz for TDD

Parameter

		• • • • • • • • • • • • • • • • • • • •		
Reference channel			SR.3.1 TDD	
Channel bandwidth		MHz	100	
Number of transmitter antennas			1	
Allocated resource blocks for PDSCH Note 1			24	
Allocated slots per Radio Frame			TBD	
Radio fr	ame containing SSB	slots	Note 5	
Radio fr	ame not containing SSB	slots	48	
MCS tabl	le		64QAM	
MCS inde	ex		4	
Modulation	on		QPSK	
Target Co	oding Rate		1/3	
Number of	of control symbols		2	
PDSCH mapping type Type A				
Information	on Bit Payload			
For slots with RMSI Note 2 Bits 1864				
Number of Code Blocks per slot 1				
	nannel Bits Per slot			
For slots	with RMSI Note 2, 4	Bits	6048	
Note 1:	Allocated outside the SMTC duration in time and in resou	urce block	ks which do not	
	overlap with the resource blocks allocated for SS/PBCH	block.		
Note 2:	PDSCH is scheduled on the slots with RMSI.			
Note 3:	If necessary, the information bit payload size can be adju	isted to fa	acilitate the test	
implementation. The payload sizes are defined in 3GPP TS 38.213 [8].				
Note 4:				
	Type=1, dmrs-AdditonalPositions=2, maxLength=1, Ante		index: 1000,	
	and Number of PDSCH DMRS CDM group(s) without da			
Note 5:	PDSCH is not scheduled in slots containing SSB accordi			
	configuration used in the test. SSB configurations are de	fined in s	ection A.3.10.	

A.1.2 CORESET for RMSI scheduling

A.1.2.1 FDD

Table A.1.2.1-1: RMSI CORESET Reference Measurement Channels for SCS = 15 kHz for FDD

	Parameter	Unit	Value	
Referenc	e channel		CR.1.1 FDD	
Channel	bandwidth	MHz	10	
Subcarrie	er spacing for RMSI CORESET	kHz	15	
Allocated	resource blocks for RMSI CORESETNote 7		24	
Subcarrie	er spacing for SSB	kHz	15	
	RMSI CORESET multiplexing configuration		Pattern 1	
Offset be	tween SSB and RMSI CORESET Note 3, 7	RB	0 (Note 8)	
Configura Note 4	ation of PDCCH monitoring occasions for RMSI CORESET		Index 4	
	of transmitter antennas		1	
Duration	of RMSI CORESET ^{Note 7}	symb	2	
		ols		
DCI Form	DCI Format Note 1 Note 2			
	Aggregation level CCE 8			
	DMRS precoder granularity 6			
REG bun	4.0 0.20		6	
	from REG to CCE		Distributed	
Cell ID			Note 5	
Payload ((without CRC)	Bits	Note 6	
Note 1:	DCI formats are defined in TS 38.212 [31].			
Note 2:	DCI format shall depend upon the test configuration.			
Note 3:	Note 3: The offset is defined with respect to the subcarrier spacing of the CORESET from			
the smallest RB index of RMSI CORESET to the smallest RB index of the common			of the common	
	RB overlapping with the first RB of the SS/PBCH block.			
Note 4: The configuration of PDCCH monitoring occasions for RMSI CORESET is defined			SET is defined	
	in Table 13-11 in TS 38.213 [8].			
Note 5:	Cell ID shall depend upon the test configuration.			

Note 6: Payload size shall depend upon the test configuration.

The configuration of set of resource blocks and slot symbols of control resource set Note 7: for Type0-PDCCH search space corresponds to index 0 in Table 13-1 in TS 38.213

[8].
Other values can be used to align with GSCN as long as SSB does not overlap the Note 8: RMC

A.1.2.2 TDD

Table A.1.2.2-1: RMSI CORESET Reference Measurement Channels for SCS = 15 kHz for TDD

	Parameter	Unit	Value
Reference	e channel		CR.1.1 TDD
Channel bandwidth		MHz	10
Subcarrie	er spacing for RMSI CORESET	kHz	15
Allocated	resource blocks for RMSI CORESET Note 7		24
Index of transmitted SSB within an SS-Burst #0			
SSB and RMSI CORESET multiplexing configuration Pattern 1			
Offset be	tween SSB and RMSI CORESET Note 3, 7	RB	0 (Note 8)
Configura CORESE	ation of PDCCH monitoring occasions for RMSI ET ^{Note 4}		Index 4
Number	of transmitter antennas		1
Duration	of RMSI CORESET Note 7	symb ols	2
DCI Forn	nat Note 1		Note 2
Aggregat	ion level	CCE	8
DMRS precoder granularity 6			
REG bundle size 6			
Mapping from REG to CCE Distributed			
Cell ID Note 5			
Payload (without CRC) Bits Note 6			
Note 1: DCI formats are defined in TS 38.212 [31]. Note 2: DCI format shall depend upon the test configuration. Note 3: The offset is defined with respect to the subcarrier spacing of the CORESET from the smallest RB index of RMSI CORESET to the smallest RB index of the common RB overlapping with the first RB of the SS/PBCH block.			
Note 4: The configuration of PDCCH monitoring occasions for RMSI CORESET is defined in Table 13-11 in TS 38.213 [8].			
	Note 5: Cell ID shall depend upon the test configuration.		
1	Note 6: Payload size shall depend upon the test configuration.		
Note 7: The configuration of set of resource blocks and slot symbols of control resource set for Type0-PDCCH search space corresponds to index 0 in Table 13-1 in TS 38.213 [8].			le 13-1 in TS
Note 8:	Other values can be used to align with GSCN as long as the RMC	SSB doe	s not overlap

Table A.1.2.2-2: RMSI CORESET Reference Measurement Channels for SCS = 30 kHz for TDD

	Parameter	Unit	Value	
Reference	Reference channel		CR.2.1 TDD	
Channel bandwidth			40	
Subcarrie	er spacing for RMSI CORESET	kHz	30	
Allocated	resource blocks for RMSI CORESET Note 7		24	
Index of transmitted SSB within an SS-Burst #0				
	RMSI CORESET multiplexing configuration		Pattern 1	
Offset be	tween SSB and RMSI CORESET Note 3, 7	RB	0 (Note 8)	
Configura CORESE	ation of PDCCH monitoring occasions for RMSI ET ^{Note 4}		Index 4	
	of transmitter antennas		1	
Duration	of RMSI CORESET Note 7	symb ols	2	
DCI Forn	nat Note 1		Note 2	
Aggregat	ion level	CCE	8	
DMRS pr	DMRS precoder granularity 6			
REG bun	dle size		6	
Mapping	Mapping from REG to CCE Distribute			
Cell ID	Cell ID Note 5			
Payload	(without CRC)	Bits	Note 6	
Note 1: DCI formats are defined in TS 38.212 [31]. Note 2: DCI format shall depend upon the test configuration. Note 3: The offset is defined with respect to the subcarrier spacing of the CORESET from the smallest RB index of RMSI CORESET to the smallest RB index of the common RB overlapping with the first RB of the SS/PBCH block.				
Note 4: The configuration of PDCCH monitoring occasions for RMSI CORESET is defined in Table 13-11 in TS 38.213 [8].				
	Note 5: Cell ID shall depend upon the test configuration.			
1	Note 6: Payload size shall depend upon the test configuration.			
Note 7: The configuration of set of resource blocks and slot symbols of control resource set for Type0-PDCCH search space corresponds to index 0 in Table 13-1 in TS 38.213 [8].			dex 0 in Table	
Note 8:				

Note 8:

overlap the RMC

Table A.1.2.2-3: RMSI CORESET Reference Measurement Channels for SCS = 120 kHz for TDD

	Parameter	Unit	Value
Reference	ce channel		CR.3.1 TDD
Channel	bandwidth	MHz	100
Subcarri	120		
Allocated resource blocks for RMSI CORESET Note 7 24			
Subcarrie	er spacing for SSB	kHz	120
Index of	transmitted SSB within an SS-Burst		#0
SSB and	RMSI CORESET multiplexing configuration		Pattern 1
Offset be	tween SSB and RMSI CORESET Note 3, 7	RB	0 (Note 8)
Configura CORESE	ation of PDCCH monitoring occasions for RMSI ET ^{Note 4}		Index 4
	of transmitter antennas		2
Duration	of RMSI CORESET Note 7	symb ols	2
DCI Forn	nat Note 1		Note 2
Aggregation level CCE 8			
DMRS p	recoder granularity		6
REG bur	ndle size		6
Mapping	from REG to CCE		Distributed
Cell ID			Note 5
Payload	(without CRC)	Bits	Note 6
Note 1: DCI formats are defined in TS 38.212 [31]. Note 2: DCI format shall depend upon the test configuration. Note 3: The offset is defined with respect to the subcarrier spacing of the CORESET from the smallest RB index of RMSI CORESET to the smallest RB index of the common RB overlapping with the first RB of the SS/PBCH block.			
Note 4: The configuration of PDCCH monitoring occasions for RMSI CORESET is defined in Table 13-11 in TS 38.213 [8]. Note 5: Cell ID shall depend upon the test configuration.			
Note 6: Payload size shall depend upon the test configuration. Note 7: The configuration of set of resource blocks and slot symbols of control resource set for Type0-PDCCH search space corresponds to index 0 in Table 13-1 in TS 38.213 [8].			
Note 8: Other values can be used to align with GSCN as long as SSB does not			

Other values can be used to align with GSCN as long as SSB does not

A.1.3 CORESET for RMC scheduling

A.1.3.1 FDD

Table A.1.3.1-1: Control Channel RMC for SCS = 15 kHz for FDD

Parameter	Unit	Value
Reference channel		CCR.1.1 FDD
Channel bandwidth	MHz	10
Subcarrier spacing for RMSI CORESET	kHz	15
Allocated resource blocks for CORESET		24
Number of transmitter antenna		1
Duration of CORESET	symb	2
	ols	
REG bundle size		6
DMRS precoder granularity		Same as REG bundle size
CCE to REG mapping Interleave		Interleaved
Interleave n_shift 0		0
Interleave size		2
Beamforming Pre-Coder		N/A
Aggregation level CCE		8
DCI formats Note		Note 1
Payload size (without CRC) bits Note 2		Note 2
Note 1: DCI format shall depend upon the test configuration. Note 2: Payload size shall depend upon the test configuration. Note 3: Allocated in the same resource blocks where the associate	₂d RMC is	scheduled

A.1.3.2 TDD

Table A.1.3.2-1: Control Channel RMC for SCS = 15 kHz for TDD

Parameter	Unit	Value
Reference channel		CCR.1.1 TDD
Channel bandwidth	MHz	10
Subcarrier spacing for RMSI CORESET	kHz	15
Allocated resource blocks for CORESET ³		24
Number of transmitter antenna		1
Duration of CORESET	symb	2
	ols	
REG bundle size		6
		Same as
DMRS precoder granularity		REG bundle
		size
CCE to REG mapping Interleave		Interleaved
Interleave n_shift 0		0
Interleave size		2
Beamforming Pre-Coder		N/A
Aggregation level	CCE	8
DCI formats		Note 1
Payload size (without CRC) bits Note		Note 2
Note 1: DCI format shall depend upon the test configuration.		
Note 2: Payload size shall depend upon the test configuration.		
Note 3: Allocated in the same resource blocks where the associated RMC is scheduled.		s scheduled.

Table A.1.3.2-2: Control Channel RMC for SCS = 30 kHz for TDD

Parameter	Unit	Value
Reference channel		CCR.2.1 TDD
Channel bandwidth	MHz	40
Subcarrier spacing for RMSI CORESET	kHz	30
Allocated resource blocks for CORESET ³		24
Number of transmitter antenna		1
Duration of CORESET	symb	2
	ols	
REG bundle size		6
		Same as
DMRS precoder granularity		REG bundle
		size
CCE to REG mapping Interleav		Interleaved
Interleave n_shift 0		0
Interleave size		2
Beamforming Pre-Coder		N/A
Aggregation level	CCE	8
DCI formats		Note 1
Payload size (without CRC) bits Note 2		
Note 1: DCI format shall depend upon the test configuration.		
Note 2: Payload size shall depend upon the test configuration.		
Note 3: Allocated in the same resource blocks where the associated RMC is scheduled.		

Table A.1.3.2-3: Control Channel RMC for SCS = 120 kHz for TDD

Parameter	Unit	Value
Reference channel		[CCR.3.1]
		TDD
Channel bandwidth	MHz	100
Subcarrier spacing for RMSI CORESET	kHz	120
Allocated resource blocks for CORESET		24
Number of transmitter antenna		1
Duration of CORESET	symb	2
	ols	
REG bundle size		6
		Same as
DMRS precoder granularity		REG bundle
		size
CCE to REG mapping		Interleaved
Interleave n_shift		0
Interleave size		2
Beamforming Pre-Coder		N/A
Aggregation level	CCE	8
DCI formats		Note 1
Payload size (without CRC)	bits	Note 2
Note 1: DCI format shall depend upon the test configuration.		
Note 2: Payload size shall depend upon the test configuration		

A.1.4 CSI-RS

A.1.4.1 FDD

Table A.1.4.1-1: CSI-RS Reference Measurement Channels for SCS = 15 kHz for FDD

	CSI-RS.1.1 FDD	CSI-RS.1.2 FDD	CSI-RS.1.3 FDD	CSI-RS.1.4 FDD
Resource Type	periodic	periodic	aperiodic	aperiodic
Resource Set Config				
nzp-CSI-ResourceSetId	0	0	0	0
repetition	N/A	off	off	on

aperiodicTriggeringOffset	N/A	N/A	6	6
trs-Info	N/A	N/A	N/A	N/A
Resource Config				
		10 for resource #0	20 for resource #0	30 for resource #0
				31 for resource #1
		10 for resource #0	20 for resource #0	32 for resource #2
nan CCI DC Decoursed	0 for resource #0			33 for resource #3
nzp-CSI-RS-ResourceId	0 for resource #0			34 for resource #4
		11 for recovered #1	21 for recovered #1	35 for resource #5
		11 for resource #1	21 for resource #1	36 for resource #6
				37 for resource #7
powerControlOffset	0	0	0	0
powerControlOffsetSS	db0	db0	db0	db0
scramblingID	0	0	0	0
Period (slots)	slot5	slot10	N/A	N/A
Offset	1	1	N/A	N/A
and the factor of the COLEGO	TOLOU	TCI.State.0	N/A	N/A
qcl-InfoPeriodicCSI-RS	TCI.State.0	TCI.State.1		
frequencyDomainAllocation	000001	000001	000001	000001
nrofPorts	2	1	1	1
		0.5	C for your 1/0	0 for resource #0
				1 for resource #1
		6 for resource #0	6 for resource #0	2 for resource #2
firstOFDMC mballnTimeDemain	5 for resource #0			3 for resource #3
firstOFDMSymbolInTimeDomain	5 for resource #0			4 for resource #4
		10 for resource #1	10 for resource #1	5 for resource #5
		10 for resource #1	10 for resource #1	6 for resource #6
				7 for resource #7
cdm-Type	FD-CDM2	noCDM	noCDM	noCDM
density	1	3	3	3
startingRB	0	0	0	0
nrofRBs	276	276	276	276

A.1.4.2 TDD

Table A.1.4.2-1: CSI-RS Reference Measurement Channels for SCS = 15 kHz for TDD

	CSI-RS.1.1 TDD	CSI-RS.1.2 TDD	CSI-RS.1.3 TDD	CSI-RS.1.4 TDD
Resource Type	periodic	periodic	aperiodic	aperiodic
Resource Set Config				
nzp-CSI-ResourceSetId	0	0	0	0
repetition	N/A	off	off	on
aperiodicTriggeringOffset	N/A	N/A	6	6
trs-Info	N/A	N/A	N/A	N/A
Resource Config				
				30 for resource #0
		10 for resource #0	20 for resource #0	31 for resource #1
		10 for resource #0	20 for resource #0	32 for resource #2
nzp-CSI-RS-Resourceld	0 for resource #0			33 for resource #3
lizp-c3i-k3-kesourceiu	0 ioi lesouice #0			34 for resource #4
		11 for resource #1	21 for resource #1	35 for resource #5
				36 for resource #6
				37 for resource #7
powerControlOffset	0	0	0	0
powerControlOffsetSS	db0	db0	db0	db0
scramblingID	0	0	0	0
Period (slots)	slot5	slot10	N/A	N/A
Offset	1	1	N/A	N/A
gol InfoDoriodioCCL DC	TCI.State.0	TCI.State.0	N/A	N/A
qcl-InfoPeriodicCSI-RS	TCI.State.0	TCI.State.1		
frequencyDomainAllocation	000001	000001	000001	000001
nrofPorts	2	1	1	1

		C for recourse #0	6 for resource #0	0 for resource #0
				1 for resource #1
		6 for resource #0	0 101 Tesource #0	2 for resource #2
firstOFDMSymbolInTimeDomain	5 for resource #0			3 for resource #3
IIIStOPDMSymboliffilledomaili	5 for resource #0	10 for resource #1	10 for resource #1	4 for resource #4
				5 for resource #5
				6 for resource #6
				7 for resource #7
cdm-Type	FD-CDM2	noCDM	noCDM	noCDM
density	1	3	3	3
startingRB	0	0	0	0
nrofRBs	276	276	276	276

Table A.1.4.2-2: CSI-RS Reference Measurement Channels for SCS = 30 kHz for TDD

	CSI-RS.2.1 TDD	CSI-RS.2.2 TDD	CSI-RS.2.3 TDD	CSI-RS.2.4 TDD
Resource Type	periodic	periodic	aperiodic	aperiodic
Resource Set Config				
zp-CSI-ResourceSetId	0	0	0	0
epetition	N/A	off	off	on
periodicTriggeringOffset	N/A	N/A	6	6
s-Info	N/A	N/A	N/A	N/A
Resource Config				
				30 for resource #0
		10 for more 110	20 for reasons 110	31 for resource #1
		10 for resource #0	20 for resource #0	32 for resource #2
OCL DC D	0 for we consider #10			33 for resource #3
zp-CSI-RS-ResourceId	0 for resource #0			34 for resource #4
		11 5-11 11-1-11	01 for recovery 1/1	35 for resource #5
		11 for resource #1	21 for resource #1	36 for resource #6
				37 for resource #7
owerControlOffset	0	0	0	0
owerControlOffsetSS	db0	db0	db0	db0
cramblingID	0	0	0	0
eriod (slots)	slot10	slot20	N/A	N/A
ffset	2	2	N/A	N/A
- Lief-Devie die OCL DC	TCI State 0	TCI.State.0	N/A	N/A
cl-InfoPeriodicCSI-RS	TCI.State.0	TCI.State.1		
equencyDomainAllocation	000001	000001	000001	000001
rofPorts	2	1	1	1
				0 for resource #0
		C for 1000011100 40	6 for resource #0	1 for resource #1
		6 for resource #0		2 for resource #2
rotOFDMC; make all a Time a De marcin	F for recourse #0			3 for resource #3
stOFDMSymbolInTimeDomain	5 for resource #0			4 for resource #4
		10 for recovered #1	10 for recourse #1	5 for resource #5
		10 for resource #1	10 for resource #1	6 for resource #6
				7 for resource #7
dm-Type	FD-CDM2	noCDM	noCDM	noCDM
ensity	1	3	3	3
tartingRB	0	0	0	0
rofRBs	276	276	276	276

Table A.1.4.2-3: CSI-RS Reference Measurement Channels for SCS = 120 kHz for TDD

	CSI-RS.3.1 TDD	CSI-RS.3.2 TDD	CSI-RS.3.3 TDD	CSI-RS.3.4 TDD
Resource Type	periodic	periodic	aperiodic	aperiodic
Resource Set Config				
zp-CSI-ResourceSetId	0	0	0	0
epetition	N/A	off	off	on
periodicTriggeringOffset	N/A	N/A	6	6
s-Info	N/A	N/A	N/A	N/A
Resource Config				
				30 for resource #0
		10 for resource #0	20 for resource #0	31 for resource #1
		10 for resource #0	20 for resource #0	32 for resource #2
zp-CSI-RS-Resourceld	0 for resource #0			33 for resource #3
zp-c3i-k3-kesouiceiu	0 for resource #0			34 for resource #4
		11 for resource #1	21 for resource #1	35 for resource #5
		11 for resource #1		36 for resource #6
				37 for resource #7
owerControlOffset	0	0	0	0
owerControlOffsetSS	db0	db0	db0	db0
cramblingID	0	0	0	0
eriod (slots)	slot40	slot80	N/A	N/A
offset	8	8	N/A	N/A
cl-InfoPeriodicCSI-RS	TCI.State.0	TCI.State.0	N/A	N/A
		TCI.State.1		
equencyDomainAllocation	000001	000001	000001	000001
rofPorts	2	1	1	1
			6 for resource #0	0 for resource #0
		6 for resource #0		1 for resource #1
		0 for resource #0		2 for resource #2
rstOFDMSymbolInTimeDomain	5 for resource #0			3 for resource #3
IStOPDINGymboliiTillieDomaili	5 for resource #0			4 for resource #4
		10 for resource #1	10 for resource #1	5 for resource #5
		10 for resource #1	10 for resource #1	6 for resource #6
				7 for resource #7
dm-Type	FD-CDM2	noCDM	noCDM	noCDM
ensity	1	3	3	3
tartingRB	0	0	0	0
rofRBs	276	276	276	276

A.1.4A CSI-RS for tracking

A.1.4A.1 FR1

A.1.4A.1.1 FDD

Table A.1.4A.1.1-1: CSI-RS for tracking FDD

Parameter	Unit	Value			
Reference channel		TRS.1.1 FDD	TRS.1.2 FDD		
Bandwidth		BW of Active BWP1	BW of Active BWP ¹		
SCS	kHz	15	30		
First subcarrier index in the PRB used for CSI-RS		k ₀ =0 for CSI-RS resource 1,2,3,4	k ₀ =0 for CSI-RS resource 1,2,3,4		
First OFDM symbol in the PRB used for CSI-RS		$I_0 = 6$ for CSI-RS resource 1 and 3 $I_0 = 10$ for CSI-RS resource 2 and 4	I_0 = 6 for CSI-RS resource 1 and 3 I_0 = 10 for CSI-RS resource 2 and 4		
Number of CSI-RS ports (X)		1 for CSI-RS resource 1,2,3,4	1 for CSI-RS resource 1,2,3,4		
CDM Type		'No CDM' for CSI-RS resource 1,2,3,4	'No CDM' for CSI-RS resource 1,2,3,4		
Density (ρ)		3 for CSI-RS resource 1,2,3,4	3 for CSI-RS resource 1,2,3,4		
CSI-RS periodicity	slots	20 for CSI-RS resource 1,2,3,4	40 for CSI-RS resource 1,2,3,4		
CSI-RS offset	slots	10 for CSI-RS resource 1 and 2 11 for CSI-RS resource 3 and 4	20 for CSI-RS resource 1 and 2 21 for CSI-RS resource 3 and 4		
EPRE ratio to SSS	dB	-3	-3		
Note 1: BW of TRS is configured same as the BW size of UE active BWP in the RRM test cases					

A.1.4A.1.2 TDD

Table A.1.4A.1.2-1: CSI-RS for TDD

Parameter	Unit	Value		
Reference channel		TRS.1.1 TDD	TRS.1.2 TDD	
Bandwidth		BW of Active BWP ¹	BW of Active BWP ¹	
SCS	kHz	15	30	
First subcarrier index in the PRB used for CSI-RS		k ₀ =0 for CSI-RS resource 1,2,3,4	k ₀ =0 for CSI-RS resource 1,2,3,4	
First OFDM symbol in the PRB used for CSI-RS		I_0 = 6 for CSI-RS resource 1 and 3 I_0 = 10 for CSI-RS resource 2 and 4	I_0 = 6 for CSI-RS resource 1 and 3 I_0 = 10 for CSI-RS resource 2 and 4	
Number of CSI-RS ports (X)		1 for CSI-RS resource 1,2,3,4	1 for CSI-RS resource 1,2,3,4	
CDM Type		'No CDM' for CSI-RS resource 1,2,3,4	'No CDM' for CSI-RS resource 1,2,3,4	
Density (ρ)		3 for CSI-RS resource 1,2,3,4	3 for CSI-RS resource 1,2,3,4	
CSI-RS periodicity	slots	20 for CSI-RS resource 1,2,3,4	40 for CSI-RS resource 1,2,3,4	
CSI-RS offset	slots	10 for CSI-RS resource 1 and 2 11 for CSI-RS resource 3 and 4	20 for CSI-RS resource 1 and 2 21 for CSI-RS resource 3 and 4	
EPRE ratio to SSS	dB	-3	-3	
Note 1: BW of TRS is configured same as the BW size of UE active BWP in the RRM test cases				

A.1.4A.2 FR2

A.1.4A.2.1 TDD

Table A.1.4A.2.1-1: CSI-RS for tracking for TDD FR2

Parameter	Unit	Value			
Reference channel		TRS.2.1 TDD	TRS.2.2 TDD		
Bandwidth		BW of Active BWP ¹	BW of Active BWP ¹		
SCS	kHz	120	120		
First subcarrier index in the PRB used for CSI-RS		k ₀ =0 for CSI-RS resource 1,2,3,4	k ₀ =0 for CSI-RS resource 1,2,3,4		
First OFDM symbol in the PRB used for CSI-RS		I_0 = 1 for CSI-RS resource 1 and 3 I_0 = 5 for CSI-RS resource 2 and 4	I_0 = 2 for CSI-RS resource 1 and 3 I_0 = 6 for CSI-RS resource 2 and 4		
Number of CSI-RS ports (X)		1 for CSI-RS resource 1,2,3,4	1 for CSI-RS resource 1,2,3,4		
CDM Type		'No CDM' for CSI-RS resource 1,2,3,4	'No CDM' for CSI-RS resource 1,2,3,4		
Density (ρ)		3 for CSI-RS resource 1,2,3,4	3 for CSI-RS resource 1,2,3,4		
CSI-RS periodicity	slots	80 for CSI-RS resource 1,2,3,4	80 for CSI-RS resource 1,2,3,4		
CSI-RS offset	slots	40 for CSI-RS resource 1 and 2 41 for CSI-RS resource 3 and 4	40 for CSI-RS resource 1 and 2 41 for CSI-RS resource 3 and 4		
EPRE ratio to SSS	dB	-3	-3		
TCI state		TCI.State.0	TCI.State.1		
Note 1: BW of TRS is configured same as the BW size of UE active BWP in the RRM test cases					

A.1.5 TDD UL/DL configuration

Table A.1.5-1: TDD UL/DL configuration for SCS=15kHz

Parameter	Unit		Value	
Reference channel		TDDConf.1.1		
referenceSubcarrierSpacing	kHz	15		
TDD UL/DL pattern 1 Note 2		'DSUU'		
		S='10DL:2GP:2UL'		
dl-UL-TransmissionPeriodicity	ms	4		
nrofDownlinkSlots		1		
nrofDownlinkSymbols		10		
nrofUplinkSlot		2		
nrofUplinkSymbols		2		
TDD UL/DL pattern 2 Note 2		'D'		
dl-UL-TransmissionPeriodicity	ms	1		
nrofDownlinkSlots		1		
nrofDownlinkSymbols		0		
nrofUplinkSlot		0		
nrofUplinkSymbols		0		
Note 1: As specified in TS 38.213 [8] and TS 38.331 [13].				
Note 2: For information				

Table A.1.5-2: TDD UL/DL configuration for SCS=30kHz

Unit		Value
	TDDConf.2.1	
kHz	30	
	'3D1S4U'	
	S='6DL:4GP:4UL'	
ms	4	
	3	
	6	
	4	
	4	
	'DD'	
ms	1	
	2	
	0	
	0	
	0	
	kHz ms ms	TDDConf.2.1 kHz 30 '3D1S4U' S='6DL:4GP:4UL' ms 4 3 6 4 4 'DD' ms 1 2 0 0

Note 1: As specified in TS 38.213 [8] and TS 38.331 [13].

Note 2: For information

Table A.1.5-3: TDD UL/DL configuration for SCS=120kHz

Parameter	Unit		Value
Reference channel		TDDConf.3.1	
referenceSubcarrierSpacing	kHz	120	
TDD UL/DL pattern 1 Note 2		'DDDSU'	
		S='10DL:2GP:2UL'	
dl-UL-TransmissionPeriodicity	ms	0.625	
nrofDownlinkSlots		3	
nrofDownlinkSymbols		10	
nrofUplinkSlot		1	
nrofUplinkSymbols		2	
TDD UL/DL pattern 2 Note 2		Not configured	
dl-UL-TransmissionPeriodicity	ms	Not configured	
nrofDownlinkSlots		Not configured	
nrofDownlinkSymbols		Not configured	
nrofUplinkSlot		Not configured	
nrofUplinkSymbols		Not configured	

Note 1: As specified in TS 38.213 [8] and TS 38.331 [13].

Note 2: For information

A.1.6 PUSCH

This rule applies to NR cell(s), which the UE is connected to. The UE is in RRC_CONNECTED mode.

When signalling or data payloads are expected to be sent on the PUSCH, the UE may be provided in advance with PUSCH resources by the SS. For sake of simplicity, the PUSCH scheduling may also occur continuously over many consecutive subframes. These options shall not be used if:

1) stated otherwise in the test description, or

2) the transmission of PUSCH and UL scheduling information affects the test purpose (e.g. DRX, PUCCH reception etc.)

Reference OCGN configuration A.2

A.2.1 Generic OFDMA channel noise generator (OCGN)

The OCGN pattern is used in a test for modelling the allocation of unused resourced in the channel bandwidth to virtual UEs (UEs that are not under test). The OCNG pattern simulates both PDCCH and PDSCH transmissions to the virtual UEs.

Table A.2.1-1: OP.1: Generic OCNG pattern for all unused REs

OCNG Parameters	Control Region	Data Region			
Resource allocation	Unused REs (Note 1)	Unused REs (Note 2)			
Channel	PDCCH	PDSCH			
Contents	Virtual UE IDs	Uncorrelated pseudo random QPSK modulated			
		data			
Antenna transmission	Same as used in PDCCH RMC	Same as used in PDSCH RMC			
scheme					
Subcarrier spacing	Same as used in PDCCH RMC	Same as used in PDSCH RMC			
Aggregation level	Same as used in PDCCH RMC	N/A			
Code rate	Same as used in PDCCH RMC	Same as used in PDSCH RMC			
Transmit Power	Same as used in PDCCH RMC	Same as used in PDSCH RMC			
CP length	Same as used in PDCCH RMC	Same as used in PDSCH RMC			
Note 1: REs not used in the active CORESETs where PDCCH is scheduled for the UE under test.					
Note 2: REs not allocated to any physical channels, CORESET, SSB or any other reference signal within the channel					

bandwidth of the cell.

A.3 Reference SSB configuration

A.3.1 SSB configuration for FR1

Table A.3.1-1: SSB allocation for FR1

SMTC Parameters	Unit		Value						
SSB Pattern		SSB.1 FR1	SSB.2 FR1	SSB.	3 FR1	SSB	.4 FR1	SSB.5 FR1	SSB.6 FR1
Channel bandwidth	MHz	10	40	1	.0	4	40	10	40
SSB SCS	kHz	15	30	1	.5	;	30	15	30
SSB periodicity (T _{SSB})	ms	20	20	2	.0	2	20	20	20
Number of SSBs per SS-burst		1	1		2		2	1	1
SS/PBCH block index		0	0	0	1	0	1	0	0
Indices of symbols containing SSB		2-5	4-7	2-5	8-11	2-5	8-11	2-5	4-7 or 2-5 Note
Indices of slots containing SSB		0	0		-		-	0	0
Indices of SFN containing SSB		SFN	SFN mod $(max(T_{SSB},10ms)/10ms) = 0$ SFN mod $(max(T_{SSB},10ms)/10ms) = 1$						
RB numbers		(RB₃,	(RB₃,	0-	19	0	-19		(RB _J , RB _{J+1} ,.
containing SSB within channel BW		RB _{J+1} ,, RB _{J+19}) ^{Note 1}	RB _{J+1} ,, RB _{J+19}) ^{Note 1}					, RB _{J+19}) ^{Note}	1

RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the Note 1: allowed synchronization raster defined in TS 38.104 [28].

Symbols 4-7 are chosen if the SSB pattern Case B should be used for the current band as indicated by Table Note 2: 5.4.3.3-1 of TS 38.104 [28]; Otherwise, symbols 2-5 are chosen.

A.3.2 SSB configuration for FR2

Table A.3.2-1: SSB allocation for FR2

SMTC Parameters	Unit						Value	е					
SSB Pattern			B.1 R2	SSE	3.2 FR2	SSB.3 FR2	SSB.4 FR2		B.5 R2		B.6 ₹2	SSB.7 FR2	SSB.8 FR2
Channel bandwidth	MH z	10	00		100	100	100	10	00	10	00	100	100
SSB SCS	kHz	1:	20		240	120	240	12	20	24	40	120	240
SSB periodicity (T _{SSB})	ms	2	20		20	20	20	2	.0	2	.0	20	20
Number of SSBs per SS-burst		:	2		2	1	1	2	2	:	2	1	1
SS/PBCH block index		0	1	0	1	0	0	2	3	2	3	1	1
Indices of symbols containing SSB		4-7	8- 11	8- 11	12-13, 0-1	4-7	8-11	2-5	6-9	2-5	6-9	8-11	12-13, 0-1
Indices of slots containing SSB			0		0	0	0	:	1	:	1	0	0
Indices of SFN containing SSB			SFN mod (max(T_{SSB} ,10ms)/10ms) = 0										
RB numbers containing SSB within channel BW			(RB _J , RB _{J+1} ,, RB _{J+19}) ^{Note 1}										

Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [28].

A.4 Reference SMTC configuration

Table A.4-1: SMTC configurations

SSB Parameters	Unit	Value						
SMTC Pattern		SMTC.1	SMTC.2	SMTC.3	SMTC.4	SMTC.5		
SMTC periodicity	ms	20	20	160	20	20		
SMTC offset	ms	0	0	0	10	10		
SMTC duration	ms	1	5	1	1	5		

A.5 Reference DRX configurations

The reference DRX configurations for the NR serving cell are captured in Table A.5-1. The reference DRX configurations for the E-UTRA serving cell for NSA and inter-RAT test cases are captured in Table A.5-2.

Table A.5-1: DRX configurations for NR serving cell

Parameter	Unit				Value							
DRX Configuration		DRX.1	DRX.2	DRX.3	DRX.6	DRX.7	DRX.8	DRX.11				
drx-onDurationTimer	ms	1	1	6	1	6	6	6				
drx-InactivityTimer	ms	1	1	1	1	1	1	1				
drx-RetransmissionTimerDL	slot	1	1	1	1	1	1	1				
drx-RetransmissionTimerUL	slot	1	1	1	1	1	1	1				
drx-LongCycleStartOffset	ms	40	640	40	320	640	320	20				
shortDRX	-	disabled	disabled	disabled	disabled	disabled	disabled	disabled				
TimeAlignmentTimer	ms	500	500	Infinity	500	Infinity	Infinity	Infinity				
Note 1: The DRX cycle and time	e alignmer	nt timer parar	neters are s									

Table A.5-2: DRX configurations for E-UTRA serving cell

Parameter	Unit	Value						
DRX Configuration		DRX.4	DRX.5	DRX.9	DRX.10			
drx-onDurationTimer	ms	psf2	psf6	psf2	psf6			
drx-InactivityTimer	ms	psf2	psf1920	psf100	psf1920			
drx-RetransmissionTimerDL	slot	psf16	psf16	psf16	psf16			
drx-LongCycleStartOffset	ms	sf160, 0	sf320. 0	sf40, 0	sf640. 0			
shortDRX	-	disabled	disabled	disabled	disabled			
TimeAlignmentTimer	ms	Infinity	Infinity	500	500			
Note 1: The DRX cycle and time alignment timer parameters are specified in								
clause 6 3 2 in TS 3	26 221 [20	clause 6.3.2 in TS 36.331 [20]						

A.6 EN-DC test setup

The purpose of this Annex is to specify the EN-DC configuration for the test cases in Chapters 4 and 5 of this test specification.

A.6.1 E-UTRA serving cell parameters

This section defines the cell power levels and other specific cell parameters of the E-UTRA serving cell for EN-DC.

A.6.1.1 E-UTRA serving cell parameters for EN-DC tests with NR FR1

Table A.6.1.1-1 defines the E-UTRA serving cell parameters for EN-DC tests with NR FR1 cell(s), defined in Chapter 4 of this test specification. Unless otherwise stated within the test, all measurements in Clauses 4 and 5 are performed only on the NR carrier. The E-UTRA PCell shall configured to not interfere with NR operation and the E-UTRA PCell signal power shall not be critical to the test purpose.

Table A.6.1.1-1: E-UTRAN cell specific test parameters for EN-DC tests with NR FR1

Parameter	Unit	E-UTRAN Cell1
E-UTRA RF Channel Number		1
Duplex mode		FDD or TDD
TDD special subframe configuration ^N	lote1	6
TDD uplink-downlink configuration ^{Note}	e1	1
BW _{channel} Note 6		5MHz: N _{RB,c} = 25
Chamer		10MHz: N _{RB,c} = 50
		20MHz: N _{RB,c} = 100
PDSCH parameters:		5MHz: R.7 FDD
DL Reference Measurement Channe	Note2,	10MHz: R.3 FDD
Note 6		20MHz: R.6 FDD
		5MHz: R.4 TDD
		10MHz: R.0 TDD
		20MHz: R.3 TDD
PCFICH/PDCCH/PHICH parameters	:	5MHz: R.11 FDD
DL Reference Measurement Channe		10MHz: R.6 FDD
Note 6		20MHz: R.10 FDD
		5MHz: R.11 TDD
		10MHz: R.6 TDD
		20MHz: R.10 TDD
OCNG Patterns ^{Note 2}		5MHz: OP.20 FDD
		10MHz: OP.10 FDD
		20MHz: OP.17 FDD
		5MHz: OP.9 TDD
		10MHz: OP.1 TDD
		20MHz: OP.7 TDD
PBCH_RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB	
PHICH_RB	dB	0
PDCCH_RA	dB	
PDCCH_RB	dB	
PDSCH_RA	dB	
PDSCH_RB	dB	
OCNG_RA ^{Note 3}	dB	
OCNG_RB ^{Note 3}	dB	
N _{oc} Note 4	dBm/15 kHz	-104
Ê _s /N _{oc}	dB	17
\hat{E}_{s}/I_{ot}	dB	17
RSRP Note 5	dBm/15 kHz	-87
SCH_RP Note 5	dBm/15 kHz	-87
IO Note 5	dBm/Ch BW	-59.13 + 10log(N _{RB,c} /50)
Propagation Condition		AWGN
Antenna Configuration		1x2
	nk-downlink configurations	s are specified in table 4.2-1 in TS 36.211 [24].

- Note 2: DL RMCs and OCNG patterns are specified in sections A.1, A.2 and D.1 of TS 36.521-3 [26].
- Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.
- Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.
- Note 5: Es/lot, RSRP, SCH_RP and lo levels have been derived from other parameters for information purposes. They are not settable parameters themselves.
- Note 6: For E-UTRA anchor configuration, pick 5 MHz as default channel bandwidth setting in the tests as it is supported by all E-UTRA bands. If none of the UE supported EN-DC band combos support 5MHz E-UTRA carrier, pick 20 MHz channel BW or 10 MHz channel BW, in that order,

Table A.6.1.1-2: CQI-ReportConfig-DEFAULT: Additional E-UTRA Anchor Configuration

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-2 CQI-ReportConfig-DEFAULT							
Information Element Value/remark Comment Condition							
CQI-ReportConfig-DEFAULT ::= SEQUENCE {							
cqi-ReportModeAperiodic	NOT PRESENT						
cqi-ReportPeriodic	NOT PRESENT						
}							

Table A.6.1.1-3: Physical Config Dedicated-DEFAULT: Additional E-UTRA Anchor Configuration

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT							
Information Element	Value/remark	Comment	Condition				
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {							
soundingRS-UL-ConfigDedicated	Not present		RBC				
}							

Table A.6.1.1-4:MAC-MainConfig-RBC: Additional E-UTRA Anchor Configuration

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.5-1 MAC-MainConfig-RBC							
Information Element Value/remark Comment Condition							
timeAlignmentTimerDedicated	Infinity						

A.6.1.2 E-UTRA serving cell parameters for EN-DC tests with NR FR2

Table A.6.1.2-1 defines the E-UTRA serving cell parameters for EN-DC tests with NR FR2 cell(s), defined in Chapter 5 of this test specification. Unless otherwise stated within the test, all measurements in Clauses 6 and 7 are performed only on the NR carrier. The E-UTRA PCell shall configured to not interfere with NR operation and the E-UTRA PCell signal power shall not be critical to the test purpose.

Table A.6.1.2-1: E-UTRAN cell specific test parameters for EN-DC tests with NR FR2

Parameter	Unit	E-UTRAN Cell1
E-UTRA RF Channel Number		1
Duplex mode		FDD or TDD
TDD special subframe configuration ^{Note1}		6
TDD uplink-downlink configuration ^{Note1}		1
BW _{channel} Note 5	MHz	5MHz: N _{RB,c} = 25
DVV channel	IVITZ	10MHz: N _{RB,c} = 50
		20MHz: N _{RB,c} = 30
PDSCH parameters:		5MHz: R.7 FDD
DL Reference Measurement Channel ^{Note2,}		10MHz: R.3 FDD
Note 5		20MHz: R.6 FDD
		5MHz: R.4 TDD
		10MHz: R.0 TDD
		20MHz: R.3 TDD
PCFICH/PDCCH/PHICH parameters:		5MHz: R.11 FDD
DL Reference Measurement Channel ^{Note2,}		10MHz: R.6 FDD
Note 5		20MHz: R.10 FDD
		5MHz: R.11 TDD
		10MHz: R.6 TDD
		20MHz: R.10 TDD
OCNG Patterns ^{Note2, Note 5}		5MHz: OP.20 FDD
		10MHz: OP.10 FDD
		20MHz: OP.17 FDD
		5MHz: OP.9 TDD
		10MHz: OP.1 TDD
		20MHz: OP.7 TDD
PBCH_RA	dB	
PBCH_RB	dB	
PSS_RA	dB	
SSS_RA	dB	
PCFICH_RB	dB	
PHICH_RA	dB dB	
PHICH_RB PDCCH RA	dB	0
PDCCH_RA	dB	
PDSCH RA	dB	
PDSCH RB	dB	
OCNG RA ^{Note3}	dB	
OCNG RB ^{Note3}	dB	
		s are specified in table 4.2-1 in TS 36.211 [24].
		ons A 1, A.2 and D.1 of TS 36.521-3 [26].
Note 3: OCNG shall be used such that all	cells are fully alloc	cated and a constant total transmitted power
spectral density is achieved for all		,
		UTRA link to the DUT in the EN-DC operation.
The Test System shall provide a st	table and noise-fre	ee E-UTRA signal without need of precise
		ntrol. Further details of the E-UTRA signal
		ific test parameters, since the E-UTRA link is not
		o influence the NR FR2 requirement.
		s default channel bandwidth setting in the tests
		e UE supported EN-DC band combos support
5MHz E-UTRA carrier, pick 20 MH	z channel BW or :	10 MHz channel BW, in that order,

Table A.6.1.2-2: CQI-ReportConfig-DEFAULT: Additional E-UTRA Anchor Configuration

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-2 CQI-ReportConfig-DEFAULT								
Information Element	Value/remark	Comment	Condition					
CQI-ReportConfig-DEFAULT ::= SEQUENCE {								
cqi-ReportModeAperiodic	NOT PRESENT							
cqi-ReportPeriodic	NOT PRESENT							
}								

Table A.6.1.2-3: Physical Config Dedicated - DEFAULT: Additional E-UTRA Anchor Configuration

Derivation Path: TS 36.508 [7] clause 4.8.2, Table 4.8.2.1.6-1 PhysicalConfigDedicated-DEFAULT							
Information Element Value/remark Comment Condi							
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {							
soundingRS-UL-ConfigDedicated	Not present		RBC				
}							

Table A.6.1.2-4:MAC-MainConfig-RBC: Additional E-UTRA Anchor Configuration

Derivation Path: TS 36.508 [7] clause 4.8.2.1.5, Table 4.8.2.1.5-1 MAC-MainConfig-RBC						
Information Element Value/remark Comment Cond						
timeAlignmentTimerDedicated	Infinity					

A.6A NR FR1-FR2 test setup

Some test cases in clause 7 have NR cells in both FR1 and FR2. Unless otherwise stated within the test, the NR FR1 Cell signal is required only to provide a link to the UE under test. The Test Equipment shall provide a stable and noise-free NR FR1 signal without need of precise propagation modelling, path loss and polarization control. Further details of the NR FR1 signal configuration are not defined as part of the cell specific test parameters, since the NR FR1 link is not under performance verification and is not expected to influence the test purpose.

A.7 Reference PRACH configurations

This section provides the typical PRACH configurations used for all RRM test cases defined in this test specification. Parameters not listed in this section can be derived from the configuration of each test.

A.7.1 PRACH configurations for FR1

Table A.7.1-1 defines the PRACH configurations for FR1. Each of the PRACH configurations defined in Table A.7.1-1 have different applicabilities:

- PRACH.1 FR1 for SSB-based contention based random access in FR1.
- PRACH.2 FR1 for SSB-based non-contention based random access in FR1.
- PRACH.3 FR1 for CSI-RS based non-contention based random access in FR1.

Table A.7.1-1 Parameters for PRACH Configurations for FR1

Field		Val	ue		Comment
PRACH Configuration	PRACH.1 FR1	PRACH.2 FR1	PRACH.3 FR1	PRACH.4 FR1	
prach-ConfigurationIndex	102	102	102	8	10ms PRACH periodicity and other detailed configuration defined in table 6.3.3.2-2 in TS 38.211 [7].
msg1-SubcarrierSpacing	Same as UL carrier SCS	Same as UL carrier SCS	Same as UL carrier SCS	Same as UL carrier SCS	
totalNumberOfRA- Preambles	48	48	48	48	Total number of preambles used for contention based and contention free random access
numberOfRA- PreamblesGroupA	48	48	48	48	No group B.
prach-RootSequenceIndex	0	0	0	0	Logic sequence index = 0, resulting in root sequence = 1.
ssb-perRACH- OccasionAndCB- PreamblesPerSSB	oneFourth, n48	-	-	-	OneFourth: 1 SSB associated with 4 RACH occasions n48: 48 contention based preambles per SSB
ssb-perRACH-Occasion	-	oneFourth	oneFourth	oneFourth	OneFourth: 1 SSB associated with 4 RACH occasions
msg1-FDM	One	One	One	One	One PRACH transmission occasions FDMed in one time instance.
rsrp-ThresholdSSB	RSRP 51	RSRP 51	N/A	RSRP 51	The actual value of the threshold is
rsrp-ThresholdCSI-RS	N/A	N/A	RSRP_51	N/A	-105dBm, as defined in TS 38.331 [13].
ra- ContentionResolutionTimer	sf48	-	-	-	48 sub-frames
powerRampingStep	dB2	dB2	dB2	dB2	
preambleReceivedTargetP ower	dBm-120	dBm-120	dBm-120	dBm-120	
preambleTransMax	n6	n6	n6	n200	Max number of RA preamble transmission performed before declaring a failure is 6
ra-ResponseWindow	sl10	sl10	sl10	sl1	10 slots
zeroCorrelationZoneConfig	11	11	11	11	N-CS configuration, N _{CS} = 23
Backoff Parameter Index	2	2	2	2	20ms, as defined in table 7.2-1 in TS 38.321 [12].
ssb-ResourceList	-	present	N/A	N/A	Associated with SSB index 0
ra-PreambleIndex	-	50	N/A	N/A	Associated with SSB index 0. UE doesn't use ssb-ResourceList and BFR-SSB-Resource IEs at the same time. UE doesn't use this field if is transmitting CFRA to convey BFR.
BFR-SSB-Resource	-	present	N/A	N/A	Associated with SSB index 0
ra-PreambleIndex	-	50	N/A	N/A	Associated with SSB index 0. UE doesn't use ssb-ResourceList and BFR-SSB-Resource IEs at the same time. UE uses this field only if is transmitting CFRA to convey BFR
csirs-ResourceList	N/A	N/A	present	presnt	Associated with CSI-RS configured
ra-PreambleIndex	N/A	N/A	50	50	Associated with CSI-RS configured
ra-OccasionList	-	-	1	1	RA occasions allowed corresponding to CSI-RS
ra-ssb-OccasionMaskIndex	-	1	N/A	N/A	PRACH occasion index 1 is

A.7.2 PRACH configurations for FR2

Table A.7.2-1 defines the PRACH configurations for FR2. Each of the PRACH configurations defined in Table A.7.2-1 have different applicabilities:

- PRACH.1 FR2 for SSB-based contention based random access in FR2.
- PRACH.2 FR2 for SSB-based non-contention based random access in FR2.
- PRACH.3 FR2 for CSI-RS based non-contention based random access in FR2.

Table A.7.2-1 Parameters for PRACH Configurations for FR2

Field		Val	ue		Comment
PRACH Configuration	PRACH.1	PRACH.2	PRACH.3	PRACH.4	
ğ	FR2	FR2	FR2	FR2	
prach-ConfigurationIndex	190	190	190	190	Preamble format C2, 10ms PRACH
-					periodicity and other detailed configuration
					defined in table 6.3.3.2-4 in TS 38.211 [7].
msg1-SubcarrierSpacing	Same as UL	Same as UL	Same as UL	Same as UL	
	carrier SCS	carrier SCS	carrier SCS	carrier SCS	
totalNumberOfRA-	48	48	48	48	Total number of preambles used for
Preambles					contention based and contention free
	40	40	10	40	random access
numberOfRA-	48	48	48	48	No group B.
PreamblesGroupA	0				
prach-RootSequenceIndex	0	0	0	0	Logic sequence index = 0, resulting in root sequence = 1.
ssb-perRACH-	oneFourth,	N/A	N/A	N/A	OneFourth: 1 SSB associated with 4 RACH
OccasionAndCB-	n48				occasions
PreamblesPerSSB					n48: 48 contention based preambles per
					SSB
ssb-perRACH-Occasion	N/A	oneFourth	oneFourth	oneFourth	OneFourth: 1 SSB associated with 4 RACH
		_			occasions
msg1-FDM	One	One	One	One	One PRACH transmission occasions
Thurst Idea	DCDD F1	DCDD 51	N1/A	DCDD F1	FDMed in one time instance.
rsrp-ThresholdSSB	RSRP_51 N/A	RSRP_51 N/A	N/A RSRP 51	RSRP_51 N/A	The actual value of the threshold is -105dBm, as defined in TS 38.331 [13].
rsrp-ThresholdCSI-RS	sf48	N/A N/A	N/A	N/A N/A	48 sub-frames
ra- ContentionResolutionTimer	\$148	IN/A	IN/A	IN/A	48 Sub-Italiles
powerRampingStep	dB2	dB2	dB2	dB2	
preambleReceivedTargetP	dBm-120	dBm-120	dBm-120	dBm-120	
ower	ubili-120	dbiii-120	ubiii-120	ubiii-120	
preambleTransMax	n6	n6	n6	n200	Max number of RA preamble transmission
p					performed before declaring a failure
ra-ResponseWindow	sl10	sl10	sl10	sl40	
zeroCorrelationZoneConfig	11	11	11	11	N-CS configuration, N _{cs} = 23
Backoff Parameter Index	2	2	2	2	20ms, as defined in table 7.2-1 in TS
					38.321 [12].
ssb-ResourceList	-	present	N/A	N/A	Associated with SSB index 0
ra-PreambleIndex	-	50	N/A	N/A	Associated with SSB index 0
csirs-ResourceList	N/A	present	present	present	Associated with CSI-RS configured
ra-PreambleIndex	N/A	50	50	50	Associated with CSI-RS configured
ra-OccasionList	-	-	1	1	RA occasions allowed corresponding to CSI-RS
ra-ssb-OccasionMaskIndex	-	1	N/A	N/A	PRACH occasion index 1 is allowed
Note: For further information	see Clause 6.3.2	o in TS 38 331 [1			

A.8 Reference BWP configurations

This section provides the typical BWP configurations used for RRM test cases defined in this test specification. For downlink BWP, both initial BWP and dedicated BWP configurations are specified in section A.8.1 and for uplink BWP,

dedicated BWP configurations are specified in section A.8.2. Parameters not listed in this section can be derived from the configuration of each test.

A.8.1 Downlink BWP configurations

Table A.8.1-1 defines the different downlink initial BWP configurations. Table A.8.1-2 defines the different downlink dedicated BWP configurations.

Table A.8.1-1: Downlink BWP patterns for initial BWP configuration

BWP Parameters	Unit	Values				
DL BWP		DLBWP.0.1	DLBWP.0.2			
Starting PRB index		0	RB _a Note 1			
Bandwidth		Same as RF channel defined in each test	same as RMSI CORSET(CORESET #0) defined in each test			
Note 1: RBa is the lowest PRB index to guarantee the BWP including SSB PRB index						
(RBJ, RBJ+1,	, RBJ-	J+19) which is defined in Section A.3.				

Table A.8.1-2: Downlink BWP patterns for dedicated BWP configuration

BWP Parameters	Unit	t Values						
DL BWP		DLBWP.1.1	D	DLBWP.1.2		DLBWP.1.3		L.3
Starting PRB index		0	RB _b Not	e 1		RB _a Note	9 2	
SCS	kHz		15	30	120	15	30	120
Bandwidth	RB	Same as RF channel defined for the serving cell in each test	25	51	32	25	51	32
Note 1: RB _b is the lowest PRB index to guarantee the BWP not fully overlapped with SSB PRB index (RBJ, RBJ+1,, RBJ+19) which is defined in Section A.3. Note 2: RB _a is the lowest PRB index to guarantee the BWP including SSB PRB index (RBJ, RBJ+1,, RBJ+19) which is defined in Section A.3.								

A.8.2 Uplink BWP configurations

Table A.8.2-1 defines the uplink initial BWP configurations. Table A.8.2-2 defines the uplink dedicated BWP configurations.

Table A.8.2-1: Uplink BWP patterns for initial BWP configurations

BW	P Parameters	Values				
UL BWP		ULBWP.0.1	ULBWP.0.2			
Staring Pf	RB index	0	RB _a Note 1			
Bandwidth	1	Same as RF channel	same as RMSI			
		defined in each test	CORESET(CORSET			
			#0) defined in each test			
Note 1:		s the lowest PRB index to guarantee the BWP including SSB PRB				
	index (RBJ, RBJ+1,	, RBJ+19) which is defined in Section A.3.				

Table A.8.2-2: Uplink BWP patterns for dedicated BWP configurations

BWP Parameters	arameters Unit			Values	i			
UL BWP		ULBWP.1.1	UI	BWP.	1.2	ULBWP.1.3		1.3
Staring PRB index		0	RB _b N	ote 1		RB _a ^N	ote 1	
SCS	kHz		15	30	120	15	30	120
Bandwidth	RB	Same as RF channel defined for the serving cell in each test	25	51	32	25	51	32
index (RBJ, RBJ Note 2: RBa is the lowes	RB _b is the lowest PRB index to guarantee the BWP not fully overlapped with SSB PRB index (RBJ, RBJ+1,, RBJ+19) which is defined in Section A.3. RB _a is the lowest PRB index to guarantee the BWP including SSB PRB index (RBJ, RBJ+1,, RBJ+19) which is defined in Section A.3.							

A.9 Angle of Arrival (AoA) for FR2 RRM test cases

This clause specifies the AoA setups for FR2 RRM test cases in section 5 and 7. The applicable AoA setup is defined in each test case in section 5 and 7.

A.9.1 Setup 1: Single AoA in Rx beam peak direction

There is only one active probe in the test. The DL signals, and noise if applicable, transmitted from the probe, are aligned to the UE Rx beam peak direction (as defined in TS 38.101-2 [3]).

A.9.2 Setup 2: Single AoA in non Rx beam peak direction

A.9.2.1 Setup 2a: Single AoA in non Rx beam peak direction without change in direction

There is only one active probe in the test. The DL signals, and noise if applicable, transmitted from the probe, align to a direction (AoA) which is from the set of directions corresponding to the EIS spherical coverage percentile of the DUT as defined in clause 7.3.4 of TS 38.101-2 [3] for each UE power class. The direction (AoA) of the signals shall not be changed between test iterations.

A.9.2.2 Setup 2b: Single AoA in non Rx beam peak direction with change in direction

There is only one active probe in the test. The DL signals, and noise if applicable, transmitted from the probe, align to a direction (AoA) which is from the set of directions corresponding to the EIS spherical coverage percentile of the DUT as defined in clause 7.3.4 of TS 38.101-2 [3] for each UE power class. For UE power class 3, the direction (AoA) of the signals shall be changed for each test iteration (for UE power classes other than 3, this is FFS).

A.9.3 Setup 3: 2 AoAs

There are 2 active probes in the test. The DL signals, and noise if applicable, transmitted from the two active probes, align to directions (AoAs) which are from the set of directions corresponding to the EIS spherical coverage percentile of the DUT as defined in clause 7.3.4 of TS 38.101-2 [3] for each UE power class. The relative angular offset between the directions (AoAs) of the 2 active probes, shall be changed for each test iteration. The applicable set of relative angular offsets between the 2 active probes is given in Table A.9.3-1 for each UE power class.

Table A.9.3-1: Set of relative angular offsets between active probes for each power class

UE Power class	Relative angular offset between active probes			
1	FFS			
2	FFS			
3	30°, 60°, 90°, 120° and 150°			
4	FFS			

A.9.4 Setup 4: 2 AoAs, 1 AoA in Rx beam peak direction, 1 in non Rx beam peak

A.9.4.1 Setup 4a: 2 AoAs, 1 AoA in Rx beam peak direction, 1 in non Rx beam peak without change in direction

There are 2 active probes in the test. The DL signals, and noise if applicable, are transmitted from the two active probes. One probe is aligned to the UE Rx beam peak direction as defined in TS 38.101-2 [3]. The second is aligned to a direction (AoA) which is from the set of directions corresponding to the EIS spherical coverage percentile of the DUT as defined in clause 7.3.4 of TS 38.101-2 [3] for each UE power class. The direction (AoA) of the non Rx beam peak signal shall not be changed between test iterations.

A.9.4.2 Setup 4b: 2 AoAs, 1 AoA in Rx beam peak direction, 1 in non Rx beam peak with change in direction

There are 2 active probes in the test. The DL signals, and noise if applicable, are transmitted from the two active probes. One probe is aligned to the UE Rx beam peak direction as defined in TS 38.101-2 [3]. The second is aligned to a direction (AoA) which is from the set of directions corresponding to the EIS spherical coverage percentile of the DUT as defined in clause 7.3.4 of TS 38.101-2 [3] for each UE power class.

For UE power class 3, the relative angular offset between the directions (AoAs) of the 2 active probes shall be changed for each test iteration, within the probe alignment described above. The applicable set of relative angular offsets between the 2 active probes is given in Table A.9.3-1 for each UE power class.

A.10 TCI State Configuration

A.10.1 Introduction

This section provides the configurations for TCI states towards either SSB or CSI-RS. The TCI states defined in this section are configured in each test when applicable to indicate that certain DL signals are quasi-collocated with the referenceSignal configured in the TCI states.

A.10.2 TCI states

Table A.10.2-1: TCI States

Para	meter	TCI.State.0	TCI.State.1	TCI.State.2	TCI.State.3	
tci-S	StateId	ld0	ld1	ld2	Id3	
qcl-	Type1	typeC	typeC	typeA	typeA	
qcl-Ty	∕pe2 ^{Note1}	typeD	typeD	typeD	typeD	
referen	ceSignal	SSB0	SSB1	Resource #4 in TRS	Resource #4 in TRS	
				resource set 1 Note3	resource set 2 Note3	
Note 1:		of typeD only where app				
Note 2:	referenceSi	gnal configurations tow	ards which the TCI state	es are configured are de	efined in a test-specific	
	manner.					
Note 3:	, and a second of the second o					
	specified in each test case. When a single TRS resource set is configured in a test case, it is considered					
	as resource set 1.					

Annex B (normative):

Conditions for RRM requirements applicability for operating bands

B.1 Conditions for NR RRC_IDLE state mobility

B.1.1 Introduction

In Annex B.1, the following conditions are specified:

- UE conditions which shall apply for UE intra-frequency idle state mobility test cases in clauses 6.1 and 7.1,
- UE conditions which shall apply for UE inter-frequency idle state mobility test cases in clauses 6.1 and 7.1.

B.1.2 Conditions for measurements on NR intra-frequency cells for cell re-selection

This section defines the following conditions for NR intra-frequency measurements performed based on SSBs for cell re-selection: SSB_RP and SSB £s/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.1.2-1 for FR1 NR cells.

The conditions are defined in Table B.1.2-2 for FR2 NR cells.

Table B.1.2-1: Conditions for intra-frequency cell re-selection in FR1

Parameter		Minimum	SSB Ês/lot	
	NR operating band groups Note1	dBm /	SCS _{SSB}	dП
		SCS _{SSB} = 15 kHz	SCS _{SSB} = 30 kHz	dB
	NR_FDD_FR1_A, NR_TDD_FR1_A	-124	-121	
	NR_FDD_FR1_B	-123.5	-120.5	
Condition	NR_TDD_FR1_C	-123	-120	
	NR_FDD_FR1_D, NR_TDD_FR1_D	-122.5	-119.5	≥ -4
S	NR_FDD_FR1_E, NR_TDD_FR1_E	-122	-119	
	NR_FDD_FR1_G	-121	-118	
	NR_FDD_FR1_H	-120.5	-117.5	
NOTE 1: NF	R operating band groups are defined in Section	on 3.5.2.		

Table B.1.2-2: Conditions for intra-frequency cell re-selection in FR2

		Minimum	SSB Ês/lot			
Parameter	NR operating band groups Note1	dBm /	dBm / SCS _{SSB}			
		SCS _{SSB} = 120 kHz	SCS _{SSB} = 240 kHz	dB		
	NR_TDD_FR2_A	TBD	TBD			
	NR_TDD_FR2_B	TBD	TBD			
Condition	NR_TDD_FR2_F	TBD	TBD	TBD		
s	NR_TDD_FR2_G	TBD	TBD			
	NR_TDD_FR2_T	TBD	TBD			
	NR_TDD_FR2_Y	TBD	TBD			
NOTE 1: NR	operating band groups are defined in Sect	on 3.5.3.				

B.1.3 Conditions for measurements on NR inter-frequency cells for cell re-selection

This section defines the following conditions for NR inter-frequency measurements performed based on SSBs for cell re-selection: SSB_RP and SSB $\hat{E}s/Iot$, applicable for a corresponding operating band.

The conditions defined in Table B.1.2-1 for FR1 NR intra-frequency cell re-selection shall also apply for FR1 NR inter-frequency cells in this section.

The conditions defined in Table B.1.2-2 for FR2 NR intra-frequency cell re-selection shall also apply for FR2 NR inter-frequency cells in this section.

B.2 Conditions for NR RRC_CONNECTED state

B.2.1 Introduction

In Annex B.2, the following conditions are specified:

- UE conditions which shall apply for UE intra-frequency measurement procedures and measurement performance tests in clauses 4.6, 4.7, 5.6, 5.7, 6.6, 6.7, 7.6 and 7.7,
 - UE conditions which shall apply for UE inter-frequency measurements procedures and requirements in Section 9,
- UE conditions which shall apply for UE intra-frequency measurements performance requirements in Section 10,
- UE conditions which shall apply for UE inter-frequency measurements performance requirements in Section 10.

B.2.2 Conditions for NR intra-frequency measurements

This section defines the following conditions for NR intra-frequency measurements and corresponding procedures performed based on SSBs: SSB_RP and SSB £s/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.2-1 for FR1 NR cells.

The conditions are defined in Table B.2.2-2 for FR2 NR cells.

Table B.2.2-1: Conditions for intra-frequency measurements in FR1

Parameter		Minimum	SSB Ês/lot					
	NR operating band groups Note1	dBm /	SCS _{SSB}	dB				
		SCS _{SSB} = 15 kHz	SCS _{SSB} = 30 kHz	uБ				
	NR_FDD_FR1_A, NR_TDD_FR1_A	-127	-124					
	NR_FDD_FR1_B	-126.5	-123.5					
Condition	NR_TDD_FR1_C	-126	-123					
S	NR_FDD_FR1_D, NR_TDD_FR1_D	-125.5	-122.5	≥ -6				
3	NR_FDD_FR1_E, NR_TDD_FR1_E	-125	-122					
	NR_FDD_FR1_G	-124	-121					
	NR_FDD_FR1_H	-123.5	-120.5					
NOTE 1: NR	NOTE 1: NR operating band groups are defined in Section 3.5.2.							

Table B.2.2-2: Conditions for intra-frequency measurements in FR2

		Minimum	SSB Ês/lot			
Parameter	NR operating band groups Note1	dBm /	dB			
		SCS _{SSB} = 120 kHz	SCS _{SSB} = 240 kHz	uБ		
	NR_TDD_FR2_A	TBD	TBD			
	NR_TDD_FR2_B	TBD	TBD			
Condition s	NR_TDD_FR2_F	TBD	TBD	TBD		
	NR_TDD_FR2_G	TBD	TBD			
	NR_TDD_FR2_T	TBD	TBD			
	NR_TDD_FR2_Y	TBD	TBD			
NOTE 1: NR operating band groups are defined in Section 3.5.3.						

B.2.3 Conditions for NR inter-frequency measurements

This section defines the following conditions for NR inter-frequency measurements and corresponding procedures performed based on SSBs: SSB_RP and SSB \hat{E} s/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.3-1 for FR1 NR cells.

The conditions are defined in Table B.2.3-2 for FR2 NR cells.

Table B.2.3-1: Conditions for inter-frequency measurements in FR1

		Minimum	SSB Ês/lot				
Parameter	NR operating band groups Note1	dBm /	dB				
		SCS _{SSB} = 15 kHz	SCS _{SSB} = 30 kHz	uБ			
	NR_FDD_FR1_A, NR_TDD_FR1_A	-125	-122				
	NR_FDD_FR1_B	-124.5	-121.5				
Condition	NR_TDD_FR1_C	-124	-121				
s	NR_FDD_FR1_D, NR_TDD_FR1_D	-124.5	-120.5	≥ -4			
	NR_FDD_FR1_E, NR_TDD_FR1_E	-123	-120				
	NR_FDD_FR1_G	-122	-119				
	NR_FDD_FR1_H	-121.5	-118.5				
NOTE 1: NR operating band groups are defined in Section 3.5.2.							

Table B.2.3-2: Conditions for inter-frequency measurements in FR2

		Minimum	SSB Ês/lot			
Parameter	NR operating band groups Note1	dBm /	dB			
		SCS _{SSB} = 120 kHz	$SCS_{SSB} = 240 \text{ kHz}$	uБ		
	NR_TDD_FR2_A	TBD	TBD			
Condition	NR_TDD_FR2_B	TBD	TBD			
	NR_TDD_FR2_F	TBD	TBD	TBD		
s	NR_TDD_FR2_G	TBD	TBD			
	NR_TDD_FR2_T	TBD	TBD			
	NR_TDD_FR2_Y	TBD	TBD			
NOTE 1: NR operating band groups are defined in Section 3.5.3.						

B.3 RRM requirement exceptions

B.3.1 Introduction

Annex B.3 covers exceptions for the side conditions based on receiver sensitivity for CA, DC, and SUL.

B.3.2 Receiver sensitivity relaxation for CA

B.3.2.1 Receiver sensitivity relaxation for UE supporting CA in FR1

For a UE supporting inter-band carrier aggregation configuration with uplink in NR band, if there is a relaxation of receiver sensitivity $\Delta R_{IB,c} > 0$ dB as defined in TS 38.101-1 [18, Section 7.3A.3], the relevant side conditions specifying received power levels (SSB_RP and Io) shall be increased by the amount $\Delta = \Delta R_{IB,c}$ defined for the corresponding downlink NR bands.

For a UE supporting CA configuration in FR1, the requirement in this section applies for both SC and CA operation.

B.3.2.2 Receiver sensitivity relaxation for UE configured with CA in FR1

B.3.2.2.1 Inter-band carrier aggregation

For a UE configured with inter-band carrier aggregation with active uplink in NR band, if there is a relaxation of receiver sensitivity $\Delta R_{IB,c} > 0$ dB as defined in TS 38.101-1, Section 7.3A.3 [2], the relevant side conditions specifying received power levels (SSB_RP and Io) shall be increased by the amount $\Delta = \Delta R_{IB,c}$ defined for the corresponding downlink NR bands.

If the relaxation Δ specified in this section applies, then the relaxation specified in Section B.3.2.1 should not be applied.

B.3.2.2.2 Reference sensitivity exceptions due to UL harmonic interference for CA

In this section, requirements exceptions are described for the UE configured with a band in FR1 when it is impacted by UL harmonic interference from another band in FR1 of the same CA configuration.

A relevant side condition (SSB_RP and Io) in a requirement shall be increased by the amount Δ =L2-L1, where L1 is the reference sensitivity level specified in TS 38.101-1 [2], Section 7.3.2, and L2 is the reference sensitivity level based on the requirements in TS 38.101-1 [2], Section 7.3A.4, when the following conditions are fulfilled,

- corresponding downlink component carriers on different NR bands are configured with CA and active,
- the uplink is configured in the NR low operating band and is active,
- the uplink configuration is as specified in TS 38.101-1 [2], Section 7.3A.4, and

- the exception requirements specified in TS 38.101-1 [2], Section 7.3A.4 apply.

If the relaxation Δ specified in this section applies, then the relaxation specified in Section B.3.2.1 should not be applied.

B.3.2.2.3 Reference sensitivity exceptions due to intermodulation interference due to 2UL CA

In this section, requirements exceptions are described for the UE with an inter-band carrier aggregation with uplink assigned to two NR bands.

A relevant side condition (SSB_RP and Io) in a requirement shall be increased by the amount Δ =L2-L1, where L1 is the reference sensitivity level specified in TS 38.101-1 [2], Section 7.3.2, and L2 is the reference sensitivity level based on the requirements in TS 38.101-1 [2], Section 7.3A.5, when the following conditions are fulfilled,

- corresponding downlink component carriers on different bands are configured with CA and active,
- uplinks are assigned to two NR bands,
- the exception requirements specified in TS 38.101-1 [2], Section 7.3A.5 apply.

If the relaxation Δ specified in this section applies, then the relaxation specified in Section B.3.2.1 should not be applied.

B.3.2.3 Receiver sensitivity relaxation for UE supporting CA in FR2

Editor's note: TBD

B.3.2.4 Receiver sensitivity relaxation for UE configured with CA in FR2

B.3.2.4.1 Intra-band contiguous carrier aggregation

For a UE configured with intra-band contiguous carrier aggregation in NR band in FR2, if there is a relaxation of receiver sensitivity $\Delta R_{IB} > 0$ dB as defined in TS 38.101-2 [3], Section 7.3A.2.1 depending on the aggregated channel bandwidth, the relevant side conditions specifying received power levels (SSB_RP and Io) shall be increased by the amount $\Delta = \Delta R_{IB}$ defined for the corresponding downlink NR bands.

B.3.2.4.2 Intra-band non-contiguous carrier aggregation

For a UE configured with intra-band non-contiguous carrier aggregation in NR band in FR2, if there is a relaxation of receiver sensitivity $\Delta R_{IB} > 0$ dB as defined in TS 38.101-2 [3], Section 7.3A.2.1 depending on the aggregated channel bandwidth, the relevant side conditions specifying received power levels (SSB_RP and Io) shall be increased by the amount $\Delta = \Delta R_{IB}$ defined for the corresponding downlink NR bands.

B.3.3 Receiver sensitivity relaxation for DC

Editor's note: TBD

B.3.4 Receiver sensitivity relaxation for SUL

B.3.4.1 Receiver sensitivity relaxation for UE supporting SUL in FR1

For a UE supporting a SUL configuration in FR1, if there is a relaxation of receiver sensitivity $\Delta R_{IB,c}>0$ dB as defined in TS 38.101-1 [2], Section 7.3C.3, the relevant side conditions specifying received power levels (SSB_RP and Io) shall be increased by the amount $\Delta=\Delta R_{IB,c}$ defined for the corresponding downlink NR bands.

For a UE supporting a SUL configuration in FR1, the requirement in this section applies for both SC and SUL operation.

B.3.4.2 Receiver sensitivity relaxation for UE configured with SUL in FR1

B.3.4.2.1 Reference sensitivity exceptions due to UL harmonic interference for SUL

In this section, requirements exceptions are described for the UE with a band in FR1 when it is impacted by UL harmonic interference from another band in FR1 of the same SUL configuration.

A relevant side condition (SSB_RP and Io) in a requirement shall be increased by the amount Δ =L2-L1, where L1 is the reference sensitivity level specified in TS 38.101-1 [2], Section 7.3.2, and L2 is the reference sensitivity level based on the requirements in TS 38.101-1 [2], Section 7.3C.2, when the following conditions are fulfilled,

- a downlink component carrier is configured in NR band and is active,
- the uplink is configured in the NR low operating band and is active,
- the uplink configuration is as specified in TS 38.101-1 [2], Section 7.3C.2, and
- the exception requirements specified in TS 38.101-1 [2], Section 7.3C.2 apply.

If the relaxation Δ specified in this section applies, then the relaxation specified in Section B.3.4.1 should not be applied.

Annex C (normative): Downlink physical channels and propagation conditions

C.1 Downlink physical channels

The following clauses describe the downlink physical channels that are needed for setting a connection and channels that are needed during a connection.

C.1.1 General

TBD

C.1.2 Default downlink signal levels

The downlink power settings in Table C.1.2-1 is used unless otherwise specified in a test case. The downlink power settings in Table C.1.2-1 are also used for the initial registration for NR SA test cases in clauses 6 and 7. For EN-DC test cases in clauses 4 and 5, the E-UTRA power settings used for initial registration are defined in Annex A.6.

If the UE has more than one Rx antenna, the downlink signal is applied to each one. All UE Rx antennas shall be connected.

Table C.1.2-1: Default Downlink power levels for NR

scs	Parameter	Unit	Value											
(kHz)	Channel bandwidth	MHz	5	10	15	20	25	30	40	50	60	80	90	100
15	Number of RBs		25	50	75	100	128	160	215	270	N/A	N/A	N/A	N/A
15	Channel BW power	dBm	-60	-57	-55	-54	-53	-52	-51	-50	N/A	N/A	N/A	N/A
30	Number of RBs		10	24	36	50	64	75	100	128	162	216	243	270
30	Channel BW power	dBm	-61	-57	-55	-54	-53	-52	-51	-50	-49	-48	-47	-47
60	Number of RBs		N/A	10	18	24	30	36	50	64	75	100	120	135
00	Channel BW power	dBm	N/A	-58	-56	-54	-53	-52	-51	-50	-49	-48	-47	-47
	RS EPRE	dBm/ 15kH z	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85

Note 1: The channel bandwidth powers are informative, based on -85dBm/15kHz SS/PBCH SSS EPRE, then scaled according to the number of RBs and rounded to the nearest integer dBm value. Full RE allocation with no boost or deboost is assumed.

Note 2: The power level is specified at each UE Rx antenna.

Note 3: DL level is applied for any of the Subcarrier Spacing configuration () with the same power spectrum density of -85dBm/15kHz.

The default signal level uncertainty is +/-3dB at each test port, for any level specified. If the uncertainty value is critical for the Test purpose, a tighter uncertainty is specified for the related test case in Annex F

C.1.3 Default connection setup

Table C.1.3-1 describes the downlink physical channels that are required for NR connection setup. For EN-DC test cases in clauses 4 and 5, the required E-UTRA downlink physical channels are defined in TS 36.521-3 [26] Annex C.2.

Phys	ical Channel	EPRE Ratio	Note
	PBCH	PBCH_RA = 0 dB	
		PBCH_RB = 0 dB	
	PSS	$PSS_RA = 0 dB$	
	SSS	SSS_RA = 0 dB	
	PDCCH	PDCCH_RA = 0 dB	
		PDCCH_RB = 0 dB	
		MPDCCH_RB = 0 dB	
	PDSCH	PDSCH_RA = 0 dB	
		PDSCH_RB = 0 dB	
	DMRS	TBD	
	CSI-RS	TBD	
Note 1:	No boosting is applied	ed	

Table C.1.3-1: Downlink physical channels required for NR connection set-up

C.2 Propagation conditions

The propagation conditions and channel models for various environments are specified. For each environment a propagation model is used to evaluate the propagation pathless due to the distance. Channel models are formed by combining delay profiles with a Doppler spectrum, with the addition of correlation properties in the case of a multi-antenna scenario.

C.2.1 No interference

The downlink connection between the SS and the UE is without AWGN, and has no fading or multipath effects.

C.2.2 Static propagation conditions

The downlink connection between the SS and the UE is an AWGN environment (unless otherwise stated) with no fading or multipath effects.

C.2.2.1 UE receiver with 2Rx antenna connectors

For 1 port transmission to UE receiver with 2Rx the channel matrix is defined in the frequency domain by

$$\mathbf{H} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$
.

For 2 port transmission to UE Receiver with 2Rx the channel matrix is defined in the frequency domain by

$$\mathbf{H} = \begin{bmatrix} 1 & j \\ 1 & -j \end{bmatrix}$$

For 4 port transmission to UE Receiver with 2Rx the channel matrix is defined in the frequency domain by

$$\mathbf{H} = \begin{pmatrix} 1 & j & j \\ 2 & 1 - j & -j \end{pmatrix}$$

C.2.2.2 UE receiver with 4Rx antenna connectors

For 1 port transmission to UE receiver with 4Rx the channel matrix is defined in the frequency domain by

$$\mathbf{H} = \begin{bmatrix} 1 \\ 0 \\ 1 \\ 0 \\ 1 \end{bmatrix}$$

For 2 port transmission to UE Receiver with 4Rx the channel matrix is defined in the frequency domain by

$$\mathbf{H} = \begin{bmatrix} 1 & j & 0 \\ 0 & -j & 0 \\ 0 & j & 0 \\ 0 & j & 0 \\ 0 & -j & 0 \end{bmatrix}.$$

For 4 port transmission to UE Receiver with 4Rx the channel matrix is defined in the frequency domain by

$$\mathbf{H} = \begin{bmatrix} 01 & 1 & j & j \\ 01 & 1 & -j & -j \\ 01 & -1 & j & -j \\ 01 & -1 & -j & j \end{bmatrix}.$$

C.2.3 Multi-path fading propagation conditions

TBD

Annex D (normative): Deviations from standard test configuration

This annex summarizes the list of test cases which deviate from the standard test configuration.

D.1 Test cases with different numerologies

TBD

D.2 EN-DC test cases with different EN-DC configurations

In clauses 4 and 5, EN-DC test cases may be defined for two component carriers (CCs) as well as for more than two CCs to verify the same RRM requirement.

D.2.1 Principle of testing

If multiple EN-DC test cases are defined for two CCs as well as for more than two CCs to verify the same type of RRM requirement, and this requirement is dependent on the number of CCs, then from the UE performance point of view the test coverage can be considered fulfilled by executing only the EN-DC test cases with the maximum number of CCs in EN-DC supported by the UE. Otherwise if the same type of RRM requirement is independent of the number of CCs then from the UE performance point of view the test coverage can be considered fulfilled by executing only the EN-DC test cases with two CCs in EN-DC supported by the UE.

Editor's Note: The maximum number of CCs that can be used in FR2 tests in EN-DC would depend on the test equipment capability.

D.3 Carrier aggregation test cases with different CA configurations

In clauses 6 and 7, carrier aggregation test cases may be defined for two CCs as well as for more than two CCs to verify the same RRM requirement.

D.3.1 Principle of testing

If multiple carrier aggregation test cases are defined for two CCs as well as for more than two CCs to verify the same RRM requirement, and the test requirement is dependent on the number of CCs, then from the UE performance point of view the test coverage can be considered fulfilled by executing only the CA test cases with the maximum number of CCs in CA supported by the UE. Otherwise if the same type of RRM requirement is independent of the number of CCs then from the UE performance point of view the test coverage can be considered fulfilled by executing only the CA test cases with at least two CCs in CA supported by the UE.

Editor's: The maximum number of CCs that can be used in FR2 tests in CA would depend on the test equipment capability.

D.4 Antenna connection for 4Rx capable UEs

All the tests in this test specification are defined for UEs supporting 2Rx. This section explains how to apply the 2Rx tests in clauses 4 and 6 to UEs supporting 4Rx antenna ports. No tests are currently specified in clauses 4 or A.6 which are applicable only to 4Rx antenna ports, so 4Rx capable UEs are always tested by reusing tests which were originally specified for 2Rx UEs. Please notice that 4Rx is in general not supported for the test cases in clauses 5 and 7.

D.4.1 Principle of testing

D.4.1.1 Single carrier tests

For 4Rx capable UEs supporting at least one 2Rx band, all single carrier tests specified in clauses 4 and 6, except 4.7 and 6.7 shall be tested with 2Rx on any band where 2Rx is supported, with the antenna connection defined in D.4.2.1. Single carrier tests specified clauses 4.7 and 6.7 are band dependent and shall be tested in all bands supported by the UE, using 2Rx and the antenna connection defined in D.4.2.1 for the bands where 2Rx is supported, and 4Rx and the antenna connection defined in D.4.2.2 for the bands where 2Rx is not supported.

For 4Rx capable UEs that do not support any 2Rx band, all single carrier tests in clauses 4 and 6 shall be tested with 4Rx using the antenna configuration defined in D.4.2.2.For radio link monitoring tests, the SNR levels are modified according to table A.D.4.1.1-1 and table D.4.1.1-2

Table D.4.1.1-1: Modified parameters for RLM out of sync testing with 4 RX antenna connection

Test case SNR during T3 (dB)					
	Test 1	Test 2	Test 3	Test 4	
4.5.1.1	-18	N/A	N/A	N/A	
4.5.1.3	-18	N/A	N/A	N/A	
4.5.1.5	-18	N/A	N/A	N/A	
4.5.1.7	-18	N/A	N/A	N/A	
5.5.1.1	-18	N/A	N/A	N/A	
5.5.1.3	-18	N/A	N/A	N/A	
5.5.1.5	-18	N/A	N/A	N/A	
5.5.1.7	-18	N/A	N/A	N/A	
6.5.1.1	-18	N/A	N/A	N/A	
6.5.1.3	-18	N/A	N/A	N/A	
6.5.1.5	-18	N/A	N/A	N/A	
6.5.1.7	-18	N/A	N/A	N/A	
7.5.1.1	-18	N/A	N/A	N/A	
7.5.1.3	-18	N/A	N/A	N/A	
7.5.1.5	-18	N/A	N/A	N/A	
7.5.1.7	-18	N/A	N/A	N/A	

Table D.4.1.1-2: Modified parameters for RLM in sync single carrier testing with 4 RX antenna connection

Test case	SNR dui	ing T3 (dB)	SNR durin	g T4 (dB)
	Test 1	Test 2	Test 1	Test 2
4.5.1.2	-18	N/A	-8	N/A
4.5.1.4	-18	N/A	-8	N/A
4.5.1.6	-18	N/A	-8	N/A
4.5.1.8	-18	N/A	-8	N/A
5.5.1.2	-18	N/A	-8	N/A
5.5.1.4	-18	N/A	-8	N/A
5.5.1.6	-18	N/A	-8	N/A
5.5.1.8	-18	N/A	-8	N/A
6.5.1.2	-18	N/A	-8	N/A
6.5.1.4	-18	N/A	-8	N/A
6.5.1.6	-18	N/A	-8	N/A
6.5.1.8	-18	N/A	-8	N/A
7.5.1.2	-18	N/A	-8	N/A
7.5.1.4	-18	N/A	-8	N/A
7.5.1.6	-18	N/A	-8	N/A
7.5.1.8	-18	N/A	-8	N/A

Table A.4.1.1-3: Modified parameters for Beam Failure Detection and Link Recovery testing with 4 RX antenna connection

Test case	SNR during T3 (dB)
	Test 1

4.5.5.1	-15
4.5.5.2	-15
4.5.5.3	-15
4.5.5.4	-15
5.5.5.1	-15
5.5.5.2	-15
5.5.5.3	-15
5.5.5.4	-15
6.5.5.1	-15
6.5.5.2	-15
6.5.5.3	-15
6.5.5.4	-15
7.5.5.1	-15
7.5.5.2	-15
7.5.5.3	-15
7.5.5.4	-15

D.4.1.2 Carrier aggregation tests

For carrier aggregation tests, the antenna connection is selected independently for each cell, the PCell and the SCell(s). If a cell (either PCell or any of the SCell(s)) is on a band where 2Rx is supported, antenna connection in Section D.4.2.1 shall be used for this cell. If the cell is on a band where 2Rx is not supported, antenna connection in section D.4.2.2 shall be used for this cell.

D.4.1.3 EN-DC tests

For all EN-DC tests, the antenna connection is selected independently for each cell. For the E-UTRA PCell, the antenna connection specified in D.4.2.3 shall be used if the PCell is on an E-UTRA band supporting 2Rx, and the antenna connection specified in D.4.2.4 shall be used if the PCell is on an E-UTRA band not supporting 2Rx.

For the NR PSCell and SCell(s), the principle of testing is the same as in D.4.1.2.

D.4.2 Antenna connection

D.4.2.1 Antenna connection for NR bands where 2Rx is supported

For NR bands where 2Rx is supported, the UE shall decide via manufacturer declaration and AP configuration which 2 of the 4 antenna ports shall be connected with the downlink signal from the SS. The remaining 2 antenna ports shall be connected to zero input. The parameters and test requirements remain unmodified.

D.4.2.2 Antenna connection for NR bands where only 4Rx is supported

For NR bands where only 4Rx is supported, all 4Rx antenna ports shall be connected to the downlink signal from the SS. The system simulator shall provide independent noise and fading (low correlation) for each antenna port. Except for the modifications to radio link monitoring tests specified in section TBD, the parameters and test requirements remain unmodified.

D.4.2.3 Antenna connection for E-UTRA bands where 2Rx is supported

For E-UTRA bands where 2Rx is supported, the UE shall decide via manufacturer declaration and AP configuration which 2 of the 4 antenna ports shall be connected with the downlink signal from the SS. The remaining 2 antenna ports shall be connected to zero input. The parameters and test requirements remain unmodified.

D.4.2.4 Antenna connection for NR bands where only 4Rx is supported

For E-UTRA bands where only 4Rx is supported, all 4Rx antenna ports shall be connected to the downlink signal from the SS. The system simulator shall provide independent noise and fading (low correlation) for each antenna port. Except

for the modifications to radio link monitoring tests specified in section TBD, the parameters and test requirements remain unmodified.

D.5 Test Cases with Different Channel Bandwidths

D.5.1 Test Cases with Different E-UTRA Channel Bandwidths

D.5.1.1 Introduction

Test cases involving E-UTRA cell(s) may be defined with different E-UTRA channel bandwidths to verify the same type of RRM requirement.

D.5.1.2 Principle of testing

If multiple test cases involving E-UTRA cell(s) are defined with different E-UTRA channel bandwidths to verify the same type of RRM requirement that is E-UTRA channel bandwidth independent, then the UE needs to be tested with only one channel bandwidth in each E-UTRA cell and with the same bandwidth in all the E-UTRA cells used in the test case.

D.6 Test Cases for Synchronous and Asynchronous DC Operations

D.6.1 EN-DC Test Cases for Synchronous and Asynchronous EN-DC Operations

D.6.1.1 Introduction

This clause defines a principle, which is applicable to test cases verifying RRM requirements for EN-DC operation in synchronous and asynchronous scenarios.

Test cases may be defined in both synchronous EN-DC and asynchronous EN-DC scenarios to verify the same type of RRM requirement.

D.6.1.2 Principle of Testing

If EN-DC test cases are defined in both synchronous and asynchronous EN-DC scenarios to verify the same type of RRM requirement then the UE capable of both synchronous and asynchronous EN-DC operations needs to be tested with one of the tests in either synchronous or asynchronous EN-DC scenarios.

Annex E (normative): Cell configuration mapping

The cells used in TS 38.533 do not correspond to the cells defined in TS 38.508-1 [14] section 4.4.2. This annex describes the mapping between the test cases in TS 38.533 and the cells defined in TS 38.508-1 [14]. The test case shall apply the RF parameters as defined in TS 38.533 according to the column heading.

NOTE: For example if the second cell in a test case is an inter-frequency cell then Cell3 from TS 38.508-1 [14] section 4.4.2 is used with the radio parameters as defined for Cell2 in TS 38.533.

E.1 Test frequency selection

The requirements defined in this test specification comprise EN-DC and NR SA test cases. The test cases are defined with a single NR cell or with multiple NR cells. The multi-cell test cases can be either intra-frequency, i.e. the NR cells defined by the test are overlapping in the frequency domain, or inter-frequency, i.e. the NR cells defined by the test have different centre frequencies, separated from each other by a frequency value bigger than the respective cell bandwidths. This clause describes the general rule on how to select the test frequencies for the NR RRM test cases in this test specification.

E.1.1 E-UTRA PCell for EN-DC test cases

Unless otherwise stated, the E-UTRA PCell for EN-DC test cases shall be configured using the test frequency "Mid" as defined in TS 36.508 [25] for the corresponding E-UTRA band.

In case that the "Mid" test frequency overlaps with any of the NR test frequencies required by the test case, the E-UTRA PCell shall be shifted to an additional frequency within the E-UTRA same band. If the E-UTRA band channel bandwidth is not sufficient to allocate a non-overlapping E-UTRA PCell, the auxiliary band as defined in TS 36.521-3 [26] clause 3 shall be used.

E.1.2 Test cases with one NR cell

Unless otherwise stated, for NR test cases with one NR cell, this cell shall be configured using the test frequency "Mid" as defined in TS 38.508-1 [14] for the corresponding band under test.

E.1.3 Test cases with more than one NR cell

E.1.3.1 Intra-frequency test cases

Unless otherwise stated, multi-cell intra-frequency test cases shall be tested using the test frequency "Mid" as defined in TS 38.508-1 [14] for the corresponding NR band under test.

E.1.3.2 Inter-frequency test cases

For NR SA multi-cell inter-frequency test cases in FR2, unless otherwise stated, the serving cell (and any other neighbour cell in the same frequency carrier) shall be configured using the test frequency "Mid" as defined in TS 38.508-1 [14] for the corresponding band under test. Any inter-frequency neighbour cell shall be configured using a non-overlapping test frequency adjacent to the serving cell frequency, as defined in TBD.

For EN-DC multi-cell inter-frequency test cases in FR2, unless otherwise stated, the PSCell (and any other neighbour cell in the same frequency carrier) shall be configured using the test frequency "Mid" as defined in TS 38.508-1 [14] for the corresponding band under test. Any inter-frequency neighbour cell shall be configured using a non-overlapping test frequency adjacent to the PSCell frequency, as defined in TBD.

E.1.4 Carrier aggregation test cases

E.1.4.1 Inter-band carrier aggregation

For inter-band carrier aggregation test cases, each of the component carriers and their respective neighbour cells shall be configured following the sample principles defined in E.1.2 and E.1.3.

E.1.4.2 Intra-band contiguous carrier aggregation

For intra-band contiguous carrier aggregation, the test frequency selection shall be done following the same principle as in E.1.3.2 for inter-frequency test cases.

E.1.4.3 Intra-band non-contiguous carrier aggregation

For intra-band non-contiguous carrier aggregation in FR1, unless otherwise specified, the test frequency selection shall be done following the maximum Wgap principle, i.e. selecting the test frequencies (of the test frequencies defined in TS 38.508-1 [14]) with the widest frequency separation within the band under test.

For intra-band non-contiguous carrier aggregation in FR2, the test frequency selection is TBD.

E.2 Cell configuration mapping for EN-DC FR1 test cases in Chapter 4

Table E.2-1 defines the cell configuration mapping for EN-DC FR1 test cases in chapter 4 of this test specification.

Table E.2-1: Cell configuration mapping for EN-DC FR1 RRM testing

TC	Description	38.533 LTE Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	CA Type
4.3.2.2.1	EN-DC FR1 contention based random access	LTE Cell 1	NR Cell 1			
4.3.2.2.2	EN-DC FR1 non-contention based random access	LTE Cell 1	NR Cell 1			
4.4.1.1	EN-DC FR1 UE transmit timing accuracy	LTE Cell 1	NR Cell 1			
4.4.3.1	EN-DC FR1 timing advance adjustment accuracy	LTE Cell 1	NR Cell 1			
4.5.1.1	EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
4.5.1.2	EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
4.5.1.3	EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
4.5.1.4	EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
4.5.1.5	EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
4.5.1.6	EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
4.5.1.7	EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
4.5.1.8	EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
4.5.2.1	EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC	LTE Cell 1	NR Cell 1			
4.5.2.2	EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC	LTE Cell 1	NR Cell 1			
4.5.2.3	EN-DC FR1 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
4.5.2.4	EN-DC FR1 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
4.5.2.5	EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		

TC	Description	38.533 LTE Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	СА Туре
4.5.2.6	EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
4.5.3.1	EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle	LTE Cell 1	NR Cell 6	NR Cell 3		
4.5.3.2	EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 320ms SCell measurement cycle	LTE Cell 1	NR Cell 6	NR Cell 3		
4.5.3.3	EN-DC FR1 SCell activation and deactivation of unknown SCell in non-DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
4.6.1.1	EN-DC FR1 event-triggered reporting without gap in non-DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
4.6.1.2	EN-DC FR1 event-triggered reporting without gap in DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
4.6.1.3	EN-DC FR1 event-triggered reporting with gap in non-DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
4.6.1.4	EN-DC FR1 event-triggered reporting with gap in DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
4.6.1.5	EN-DC FR1 event-triggered reporting without gap in non-DRX with SSB time index detection	LTE Cell 1	NR Cell 1	NR Cell 2		
4.6.1.6	EN-DC FR1 event-triggered reporting with gap in non-DRX with SSB time index detection	LTE Cell 1	NR Cell 1	NR Cell 2		
4.6.2.1	EN-DC FR1-FR1 event-triggered reporting in non-DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
4.6.2.2	EN-DC FR1-FR1 event-triggered reporting in DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
4.6.2.5	EN-DC FR1-FR1 event-triggered reporting in non-DRX with SSB time index detection	LTE Cell 1	NR Cell 6	NR Cell 3		
4.6.2.6	EN-DC FR1-FR1 event-triggered reporting in DRX with SSB time index detection	LTE Cell 1	NR Cell 6	NR Cell 3		
4.6.3.1	EN-DC FR1 SSB-based L1-RSRP measurement in non-DRX	LTE Cell 1	NR Cell 1			
4.6.3.2	EN-DC FR1 SSB-based L1-RSRP measurement in DRX	LTE Cell 1	NR Cell 1			
4.6.3.3	EN-DC FR1 CSI-RS-based L1-RSRP measurement in non-DRX	LTE Cell 1	NR Cell 1			
4.6.3.4	EN-DC FR1 CSI-RS-based L1-RSRP measurement in DRX	LTE Cell 1	NR Cell 1			
4.7.1.1.1	EN-DC FR1 SS-RSRP absolute measurement accuracy	LTE Cell 1TBD	NR Cell 489	NR Cell 1		
4.7.1.1.2	EN-DC FR1 SS-RSRP relative measurement accuracy	LTE Cell 1	NR Cell 489	NR Cell 1		
4.7.1.2.1	EN-DC FR1-FR1 SS-RSRP absolute measurement accuracy	TBD	TBD	TBD		
4.7.1.2.2	EN-DC FR1-FR1 SS-RSRP relative measurement accuracy	TBD	TBD	TBD		

E.3 Cell configuration mapping for EN-DC FR2 test cases in Chapter 5

Table E.3-1 defines the cell configuration mapping for EN-DC FR2 test cases in chapter 5 of this test specification.

Table E.3-1: Cell configuration mapping for EN-DC FR2 RRM testing

TC	Description	38.533 LTE Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	СА Туре
5.4.3.1	EN-DC FR2 timing advance adjustment accuracy	LTE Cell 1	NR Cell 6			
5.5.1.1	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.3	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.5	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS- based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.6	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.7	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.8	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.2.1	EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.2	EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.3	EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.4	EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.5	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.2.6	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.3.1	EN-DC FR2 SCell activation and deactivation intra-band in non-DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.5.1	EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.2	EN-DC FR2 SSB-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
5.5.5.3	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.4	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
5.6.1.1	EN-DC FR2 event-triggered reporting without gap in non-DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
5.6.1.2	EN-DC FR2 event-triggered reporting without gap in DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
5.6.1.3	EN-DC FR2 event-triggered reporting with gap in non-DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
5.6.1.4	EN-DC FR2 event-triggered reporting with gap in DRX	LTE Cell 1	NR Cell 1	NR Cell 2		
5.6.2.1	EN-DC FR2-FR2 event-triggered reporting in non-DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
5.6.2.2	EN-DC FR2-FR2 event-triggered reporting in DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
5.6.2.3	EN-DC FR2-FR2 event-triggered reporting in non-DRX with SSB time index detection	LTE Cell 1	NR Cell 6	NR Cell 3		
5.6.2.4	EN-DC FR2-FR2 event-triggered reporting in DRX with SSB time index detection	LTE Cell 1	NR Cell 6	NR Cell 3		
5.6.2.5		LTE Cell 1	NR Cell 6	NR Cell 3		

TC	Description	38.533 LTE Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	СА Туре
5.4.3.1	EN-DC FR2 timing advance adjustment accuracy	LTE Cell 1	NR Cell 6			
5.5.1.1	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.3	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.5	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.6	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.7	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.8	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.2.1	EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.2	EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.3	EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.4	EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.5	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.2.6	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.3.1	EN-DC FR2 SCell activation and deactivation intra-band in non-DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.5.1	EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.2	EN-DC FR2 SSB-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
5.5.5.3	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.4	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
	non-DRX					

TC	Description	38.533 LTE Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	СА Туре
5.4.3.1	EN-DC FR2 timing advance adjustment accuracy	LTE Cell 1	NR Cell 6			
5.5.1.1	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.3	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.5	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.6	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.7	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.8	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.2.1	EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.2	EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.3	EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.4	EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.5	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.2.6	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.3.1	EN-DC FR2 SCell activation and deactivation intra-band in non-DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.5.1	EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.2	EN-DC FR2 SSB-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
5.5.5.3	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.4	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
5.6.2.6	EN-DC FR1-FR2 event-triggered reporting in DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
5.6.2.7	EN-DC FR1-FR2 event-triggered reporting in non-DRX with SSB time index detection	LTE Cell 1	NR Cell 6	NR Cell 3		
5.6.2.8	EN-DC FR1-FR2 event-triggered reporting in DRX with SSB time index detection	LTE Cell 1	NR Cell 6	NR Cell 3		
5.6.3.1	EN-DC FR2 SSB-based L1-RSRP measurement in non-DRX	LTE Cell 1	NR Cell 1			
5.6.3.2	EN-DC FR2 SSB-based L1-RSRP measurement in DRX	LTE Cell 1	NR Cell 1			
5.6.3.3	EN-DC FR2 CSI-RS-based L1-RSRP measurement in non-DRX	LTE Cell 1	NR Cell 1			
5.6.3.4	EN-DC FR2 CSI-RS-based L1-RSRP measurement in DRX	LTE Cell 1	NR Cell 1			
5.7.1.1	EN-DC FR2 SS-RSRP measurement accuracy	TBD	TBD	TBD		
5.7.1.2	EN-DC FR2-FR2 SS-RSRP measurement	TBD	TBD	TBD		

тс	Description	38.533 LTE Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	CA Type
5.4.3.1	EN-DC FR2 timing advance adjustment accuracy	LTE Cell 1	NR Cell 6			
5.5.1.1	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.3	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode	LTE Cell 1	NR Cell 6			
5.5.1.5	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.6	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.7	EN-DC FR2 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.1.8	EN-DC FR2 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	LTE Cell 1	NR Cell 1			
5.5.2.1	EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.2	EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC	LTE Cell 1	NR Cell 1			
5.5.2.3	EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.4	EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.2.5	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.2.6	EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC	LTE Cell 6	NR Cell 1	LTE Cell 3		
5.5.3.1	EN-DC FR2 SCell activation and deactivation intra-band in non-DRX	LTE Cell 1	NR Cell 6	NR Cell 3		
5.5.5.1	EN-DC FR2 SSB-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.2	EN-DC FR2 SSB-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
5.5.5.3	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in non-DRX	LTE Cell 1	NR Cell 1			
5.5.5.4	EN-DC FR2 CSI-RS-based beam failure detection and link recovery in DRX	LTE Cell 1	NR Cell 1			
	accuracy					

E.4 Cell configuration mapping for SA FR1 test cases in Chapter 6

Table E.4-1 defines the cell configuration mapping for SA FR1 test cases in chapter 6 of this test specification.

Table E.4-1: Cell configuration mapping for SA FR1 RRM testing

TC	Description	38.533 NR Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	CA Type
6.1.1.1	NR SA FR1 cell re-selection	NR Cell 1	NR Cell 2			
6.1.1.2	NR SA FR1-FR1 cell re-selection	NR Cell 1	NR Cell 3			

TC	Description	38.533 NR Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	CA Type
6.3.1.1	NR SA FR1 handover with known target cell	NR Cell 1	NR Cell 2			
6.3.1.2	NR SA FR1 handover with unknown target cell	NR Cell 1	NR Cell 2			
6.3.1.3	NR SA FR1-FR1 Handover with unknown Target Cell	NR Cell 1	NR Cell 3			
6.3.2.1.1	NR SA FR1 RRC re-establishment	NR Cell 1	NR Cell 2			
6.3.2.1.2	NR SA FR1 - FR1 RRC re-establishment	NR Cell 1	NR Cell 3			
6.3.2.2.1	Contention based random access test in FR1 for NR standalone	NR Cell 1				
6.3.2.2.2	Non-Contention based random access test in FR1 for NR standalone	NR Cell 1				
6.3.2.3.1	NR SA FR1 RRC connection release with redirection	NR Cell 1	NR Cell 2			
6.4.3.1	NR SA FR1 timing advance adjustment accuracy	NR Cell 1				
6.5.1.1	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode	NR Cell 1				
6.5.1.2	NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in non-DRX mode	NR Cell 1				
6.5.1.3	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in DRX mode	NR Cell 1				
6.5.1.4	NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in DRX mode	NR Cell 1				
6.5.1.5	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode	NR Cell 1				
6.5.1.6	NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode	NR Cell 1				
6.5.1.7	NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode	NR Cell 1				
6.5.1.8	NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode	NR Cell 1				
6.5.4.1	NR SA FR1 UE UL carrier RRC reconfiguration delay	NR Cell 1	NR Cell 33			
6.5.5.3	NR SA FR1 CSI-RS-based beam failure detection and link recovery in non-DRX	NR Cell 1				
6.5.5.4	NR SA FR1 CSI-RS-based beam failure detection and link recovery in DRX	NR Cell 1				
6.6.1.1	SA event triggered reporting tests without gap under non-DRX	NR Cell 1	NR Cell 2			
6.6.1.2	SA event triggered reporting tests without gap under DRX	NR Cell 1	NR Cell 2			
6.6.1.3	SA event triggered reporting tests with per- UE gaps under non-DRX	NR Cell 1	NR Cell 2			
6.6.1.4	SA event triggered reporting tests with per- UE gaps under DRX	NR Cell 1	NR Cell 2			
6.6.1.5	SA event triggered reporting tests without gap under non-DRX with SSB index reading	NR Cell 1	NR Cell 2			
6.6.1.6	SA event triggered reporting tests with per- UE gaps under non-DRX with SSB index reading	NR Cell 1	NR Cell 2			
6.6.2.1	NR SA FR1-FR1 event-triggered reporting in non-DRX	NR Cell 6	NR Cell 3			
6.6.2.2	NR SA FR1-FR1 event-triggered reporting in DRX	NR Cell 6	NR Cell 3			
6.6.2.5	NR SA FR1-FR1 event-triggered reporting in non-DRX with SSB time index detection	NR Cell 6	NR Cell 3			
6.6.2.6	NR SA FR1-FR1 event-triggered reporting	NR Cell 6	NR Cell 3			

TC	Description	38.533 NR Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	CA Type
	in DRX with SSB time index detection					
6.6.4.1	NR SA FR1 SSB-based L1-RSRP measurement in non-DRX	NR Cell 1				
6.6.4.2	NR SA FR1 SSB-based L1-RSRP measurement in DRX	NR Cell 1				
6.6.4.3	NR SA FR1 CSI-RS-based L1-RSRP measurement in non-DRX	NR Cell 1				
6.6.4.4	NR SA FR1 CSI-RS-based L1-RSRP measurement in DRX	NR Cell 1				
6.7.1.3.1	NR SA FR1-FR2 SS-RSRP absolute measurement accuracy	NR Cell 1	NR Cell 2			
6.7.1.3.2	NR SA FR1-FR2 SS-RSRP relative measurement accuracy	NR Cell 1	NR Cell 2			
6.7.1.1.1	NR SA FR1 SS-RSRP absolute measurement accuracy	NR Cell 489	NR Cell 1			
6.7.1.1.2	NR SA FR1 SS-RSRP relative measurement accuracy	NR Cell 489	NR Cell 1			
6.7.1.2.1	NR SA FR1-FR1 SS-RSRP absolute measurement accuracy	TBD	TBD			
6.7.1.2.2	NR SA FR1-FR1 SS-RSRP relative measurement accuracy	TBD	TBD			

Table E.4-2 defines the cell configuration mapping for SA FR1 – E-UTRA Inter-RAT test cases (serving cell in NR) in chapter 6 of this test specification.

Table E.4-2: Cell configuration mapping for SA FR1 - E-UTRA Inter-RAT RRM testing

TC	Description	38.533 NR Cell1	38.533 LTE Cell2	38.533 LTE Cell3	38.533 LTE Cell4	СА Туре
6.1.2.1	NR SA FR1 – E-UTRA cell re-selection to higher priority E-UTRA	NR Cell 1	LTE Cell 1			
6.1.2.2	NR SA FR1 – E-UTRA cell re-selection to lower priority E-UTRA	NR Cell 1	LTE Cell 1			
6.3.1.4	NR SA FR1 – E-UTRA handover with known target cell	NR Cell 1	LTE Cell 1			
6.3.1.5	NR SA FR1 – E-UTRA handover with unknown target cell	NR Cell 1	LTE Cell 1			
6.3.2.3.2	NR SA FR1 – E-UTRA RRC connection release with redirection	NR Cell 1	LTE Cell 1			
6.6.3.1	NR SA FR1 – E-UTRAN event-triggered reporting in non-DRX	NR Cell 1	LTE Cell 1			
6.6.3.2	NR SA FR1 – E-UTRAN event-triggered reporting in DRX	NR Cell 1	LTE Cell 1			

E.5 Cell configuration mapping for SA FR2 test cases in Chapter 7

Table E.5-1 defines the cell configuration mapping for SA FR2 test cases in chapter 7 of this test specification.

Table E.5-1: Cell configuration mapping for SA FR2 RRM testing

TC	Description	38.533 NR Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	CA Type
7.1.1.1	NR SA FR2 cell re-selection	NR Cell 1	NR Cell 2			
7.1.1.2	NR SA FR2-FR2 cell re-selection	NR Cell 1	NR Cell 3			
7.3.2.1.1	NR SA FR2 RRC re-establishment	NR Cell 1				
7.3.2.1.2	NR SA FR2-FR2 re-establishment	NR Cell 1		İ		
	NR SA FR2 SSB-based beam failure	NID O. II 4		İ		
7.5.5.1	detection and link recovery in non-DRX	NR Cell 1				
	NR SA FR2 SSB-based beam failure					
7.5.5.2	detection and link recovery in DRX	NR Cell 1				
	NR SA FR2 CSI-RS-based beam failure					
7.5.5.3	detection and link recovery in non-DRX	NR Cell 1				
	NR SA FR2 CSI-RS-based beam failure					
7.5.5.4	detection and link recovery in DRX	NR Cell 1				
	NR SA FR2 event-triggered reporting without					
7.6.1.1	gap in non-DRX	NR Cell 1	NR Cell 2			
	NR SA FR2 event-triggered reporting without					
7.6.1.2		NR Cell 1	NR Cell 2			
	gap in DRX					
7.6.1.3	NR SA FR2 event-triggered reporting with	NR Cell 1	NR Cell 2			
	gap in non-DRX					
7.6.1.4	NR SA FR2 event-triggered reporting with	NR Cell 1	NR Cell 2			
	gap in DRX					
7.6.2.1	NR SA FR2-FR2 event-triggered reporting in	TBD	TBD			
	non-DRX		1			
7.6.2.2	NR SA FR2-FR2 event-triggered reporting in	TBD	TBD			
7.0.2.2	DRX	100	100			
7.6.2.3	NR SA FR2-FR2 event-triggered reporting in	TBD	TBD			
7.0.2.3	non-DRX with SSB time index detection	100	100			
7.6.2.4	NR SA FR2-FR2 event-triggered reporting	TBD	TBD			
7.0.2.4	in DRX with SSB time index detection	וטט	וטט			
7.6.2.5	NR SA FR1-FR2 event-triggered reporting in	TBD	TBD			
7.6.2.5	non-DRX	IBD	IBD			
7.0.0	NR SA FR1-FR2 event-triggered reporting in	TDD	TDD			
7.6.2.6	DRX	TBD	TBD			
	NR SA FR1-FR2 event-triggered reporting in					
7.6.2.7	non-DRX with SSB time index detection	TBD	TBD			
	NR SA FR1-FR2 event-triggered reporting in					
7.6.2.8	DRX with SSB time index detection	TBD	TBD			
7.6.3.1	NR SA FR2 SSB-based L1-RSRP					
7.0.0.1	measurement in non-DRX	NR Cell 1				
7.6.3.2	NR SA FR2 SSB-based L1-RSRP					
7.0.3.2	measurement in DRX	NR Cell 1				
7.6.3.3	NR SA FR2 CSI-RS-based L1-RSRP					
7.0.3.3		NR Cell 1				
7624	measurement in non-DRX					
7.6.3.4	NR SA FR2 CSI-RS-based L1-RSRP	NR Cell 1				
	measurement in DRX				1	
7.7.1.1	NR SA FR2 SS-RSRP measurement	TBD	TBD	TBD		
	accuracy				-	
7.7.1.2	NR SA FR2-FR1 SS-RSRP measurement	TBD	TBD	TBD		
	accuracy				ļ	
7.7.1.3.1	NR SA FR1-FR2 SS-RSRP absolute	NR Cell 1	NR Cell 10			
	measurement accuracy					
7.7.1.3.2	NR SA FR1-FR2 SS-RSRP relative	NR Cell 1	NR Cell 10			
	measurement accuracy	1.41. OCH 1	1.41. OCH 10			

E.6 Cell configuration mapping for E-UTRAN – SA test cases in Chapter 8

Table E.6-1 defines the cell configuration mapping for E-UTRAN - SA FR1 Inter-RAT test cases (serving cell in LTE) in chapter 8 of this test specification.

Table E.6-1: Cell configuration mapping for E-UTRA – SA FR1 Inter-RAT RRM testing

TC	Description	38.533 LTE Cell1	38.533 NR Cell2	38.533 NR Cell3	38.533 NR Cell4	CA Type
8.2.1.1	E-UTRA – NR FR1 cell re-selection to higher priority NR target cell	LTE Cell 1	NR Cell 1			
8.3.1.1	E-UTRA – NR FR1 handover with unknown target cell	LTE Cell 1	NR Cell 1			
8.4.1.1	E-UTRA – NR FR1 SFTD measurement delay in non-DRX	LTE Cell 1	NR Cell 1			
8.4.1.2	E-UTRA – NR FR1 SFTD measurement delay in DRX	LTE Cell 1	NR Cell 1			
8.4.2.1	E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in non-DRX	LTE Cell 1	NR Cell 1			
8.4.2.2	E-UTRA – NR FR1 event-triggered reporting without SSB time index detection in DRX	LTE Cell 1	NR Cell 1			
8.4.2.3	E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in non-DRX	LTE Cell 1	NR Cell 1			
8.4.2.4	E-UTRA – NR FR1 event-triggered reporting with SSB time index detection in DRX	LTE Cell 1	NR Cell 1			
8.5.1.1	E-UTRA – NR FR1 SFTD measurement accuracy	LTE Cell 1	NR Cell 1			

Table E.6-2 defines the cell configuration mapping for E-UTRAN - SA FR2 Inter-RAT test cases (serving cell in LTE) in chapter 8 of this test specification.

Table E.6-2: Cell configuration mapping for E-UTRA - SA FR2 Inter-RAT RRM testing

TC	Description	38.533 LTE	38.533 NR	38.533 NR	38.533 NR	CA Type
		Cell1	Cell2	Cell3	Cell4	
8.4.2.5	E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in non-DRX	LTE Cell 1	NR Cell 1			
8.4.2.6	E-UTRA – NR FR2 event-triggered reporting without SSB time index detection in DRX	LTE Cell 1	NR Cell 1			
8.4.2.7	E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in non-DRX	LTE Cell 1	NR Cell 1			
8.4.2.8	E-UTRA – NR FR2 event-triggered reporting with SSB time index detection in DRX	LTE Cell 1	NR Cell 1			

Annex F (normative): Measurement uncertainties and test tolerances

The requirements of this clause apply to all tests in the present document.

F.1 Measurement uncertainties and test tolerances for FR1

F.1.1 Acceptable uncertainty of test system (normative)

See TS 38.521-1 [17] annex F.1.

F.1.1.1Measurement of test environments

See TS 38.521-1 [17] Annex F1.1.

F.1.1.2Measurement of RRM requirements

This clause defines the maximum test system uncertainty for the RRM requirements. The maximum uncertainty values allowed for the typical RRM measurement uncertainty contributors is defined in Table F.1.1.2-1. Unless explicitly stated for a particular test case, these maximum uncertainty values should be used as starting point to perform the test tolerance analysis in TR 38.903 [22] for each of the test cases. Specific test cases might require a tigher measurement uncertainty value for some of the contributors. Exceptions to the general values in Table F.1.1.2-1 shall be handled case by case.

Table F.1.1.2-1: Maximum allowed measurement uncertainty values for the test system for FR1 (up to 6 GHz) and Cell BW BW ≤ 40 MHz

MU contributor	Unit	Value	Comment
AWGN absolute power, Noc	dB	±1.5	
Ratio of cell X signal / AWGN, Ês _x / N _{oc}	dB	±0.3	Same as in LTE
Fading profile uncertainty*	dB	±0.7 ^{Note 3}	Depends on fading profile, can be referenced from TS 38.101-4 [20]
AWGN and signal flatness*	dB	±2.0	Same as in LTE, can be referenced from TS 38.101-4 [20]
Uplink absolute power measurement	dB	±1.5	Same as in TS 38.101-1 [17]
Uplink relative power measurement	dB	±0.7	Same as in TS 38.101-1 [17]
Uplink signal transmit timing relative to downlink	Тс	±112	
Relative transmit timing accuracy during UE timing adjustment	Тс	±88	
Timing Advance Adjustment accuracy	Тс	±88	

Note 1: The values in this table are specified per cell. Multi-cell test cases need to combined these values in the TT analysis in TR 38.903

The maximum test system uncertainty for the EN-DC FR1 test cases in chapter 4 is defined in Table F.1.1.2-2.

The maximum test system uncertainty for the NR SA FR1 test cases in chapter 6 is defined in Table F.1.1.2-3.

Note 2:These values apply for cell BW ≤ 40 MHz. The maximum allowed measurement uncertainty for higher cell BW is FFS.

Note 3: Considering 2 Tx Antenna

Table F.1.1.2-2: Maximum test system uncertainty for RRM requirements for EN-DC FR1 test cases

Subclause	Maximum Test System Uncertainty ¹	Derivation of Test System Uncertainty
4.3.2.2.1	Noc ±1.5 dB Ês / Noc ±0.3 dB Uplink absolute power	\hat{E}_{S_1} / N_{oc} is the ratio of cell 1 signal / AWGN $T_c = 1/(480000 \times 4096)$ seconds, the basic timing unit defined in TS 38.211 [7]
	measurement ±1.5 dB Uplink relative power measurement ±0.7 dB	
	±112T _c Uplink signal transmit timing relative to downlink	
4.3.2.2.2 4.4.3.1 EN-DC FR1 timing advance adjustment accuracy	Same as 4.3.2.2.1 Noc ±1.5 dB	Same as 4.3.2.2.1 $\hat{E}s_1 / N_{oc}$ is the ratio of cell 1 signal / AWGN
	Ês₁ / N₀c ±0.3 dB ±88Tc Timing Advance Adjustment accuracy	$T_c = 1/(480000 \times 4096)$ seconds, the basic timing unit defined in TS 38.211 [7]
4.5.1.1 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	±0.9 dB	Overall system uncertainty for fading conditions comprises three quantities: 1. Signal-to-noise ratio uncertainty 2. Fading profile power uncertainty 3. Effect of AWGN flatness and signal flatness
		Items 1, 2 and 3 are assumed to be uncorrelated so can be root sum squared: AWGN flatness and signal flatness has x 0.25 effect on the required SNR, so use sensitivity factor of x 0.25 for the uncertainty contribution. Test System uncertainty = SQRT (Signal-to-noise ratio uncertainty^2 + Fading profile power uncertainty^2 + (0.25 x AWGN flatness and signal flatness)^2) Signal-to-noise ratio uncertainty ±0.3 dB Fading profile power uncertainty ±0.7 dB AWGN flatness and signal flatness ±2.0 dB
4.5.1.2 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode	±0.9 dB	Overall system uncertainty for fading conditions comprises three quantities: 1. Signal-to-noise ratio uncertainty 2. Fading profile power uncertainty 3. Effect of AWGN flatness and signal flatness
		Items 1, 2 and 3 are assumed to be uncorrelated so can be root sum squared: AWGN flatness and signal flatness has x 0.25 effect on the required SNR, so use sensitivity factor of x 0.25 for the uncertainty contribution. Test System uncertainty = SQRT (Signal-to-noise ratio uncertainty^2 + Fading profile power uncertainty^2 + (0.25 x AWGN flatness and signal flatness)^2) Signal-to-noise ratio uncertainty ±0.3 dB Fading profile power uncertainty ±0.7 dB AWGN flatness and signal flatness ±2.0 dB
4.5.1.3 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode	Same as 4.5.1.1	Same as 4.5.1.1

4.5.1.4 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode	Same as 4.5.1.2	Same as 4.5.1.2
4.5.1.5 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	Same as 4.5.1.1	Same as 4.5.1.1
4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode	Same as 4.5.1.2	Same as 4.5.1.2
4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	Same as 4.5.1.1	Same as 4.5.1.1
4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode	Same as 4.5.1.2	Same as 4.5.1.2
4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC	± 0.6dB (AWGN conditions)	Overall system uncertainty for AWGN condition comprises two quantities: 1. Signal-to-noise ratio uncertainty 2. Effect of AWGN flatness and signal flatness
		Items 1 and 2 are assumed to be uncorrelated so can be root sum squared: AWGN flatness and signal flatness has x 0.25 effect on the required SNR, so use sensitivity factor of x 0.25 for the uncertainty contribution. Test System uncertainty = SQRT (Signal-to-noise ratio uncertainty 2 + (0.25 x AWGN flatness and signal flatness) 2) Signal-to-noise ratio uncertainty ±0.3 dB AWGN flatness and signal flatness ±2.0 dB
4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC	Same as 4.5.2.1	Same as 4.5.2.1
4.5.3.1 EN-DC FR1 SCell activation	Noc1 ±1.5 dB	Note:
and deactivation of known SCell in	Ês1 / Noc1 ±0.3 dB	Noc1 is the AWGN on cell 1 frequency
non-DRX for 160ms SCell measurement cycle	Noc2 ±1.5 dB Ês2 / Noc2 ±0.3 dB	Ês1 / Noc1 is the ratio of cell 1 signal / AWGN Noc2 is the AWGN on cell 2 frequency Ês2 / Noc2 is the ratio of cell 2 signal / AWGN
4.5.3.2 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 320ms SCell measurement cycle	Same as 4.5.3.1	Same as 4.5.3.1
4.5.3.3 EN-DC FR1 SCell activation and deactivation of unknown SCell in non-DRX	Same as 4.5.3.1	Same as 4.5.3.1
4.6.1.1 EN-DC FR1 event-triggered reporting without gap in non-DRX	Noc ±1.5 dB Ês1 / Noc ±0.3 dB Ês2 / Noc ±0.3 dB	Note: Ês1 / Noc is the ratio of cell 1 signal / AWGN Ês2 / Noc is the ratio of cell 2 signal / AWGN
4.6.1.2 EN-DC FR1 event-triggered reporting without gap in DRX	Same as 4.6.1.1	Same as 4.6.1.1
4.6.1.3 EN-DC FR1 event-triggered reporting with gap in non-DRX	Same as 4.6.1.1	Same as 4.6.1.1
4.6.1.4 EN-DC FR1 event-triggered reporting with gap in DRX	Same as 4.6.1.1	Same as 4.6.1.1
4.6.2.1 EN-DC FR1-FR1 event- triggered reporting in non-DRX	Freq 2 Noc ±1.5 dB Freq 3 Noc ±1.5 dB	Note: Ês2 / Noc is the ratio of cell 2 signal / AWGN
4.6.2.2 EN-DC FR1-FR1 event-	Ês2 / Noc ±0.3 dB Ês3 / Noc ±0.3 dB Same as 4.6.2.1	Ês3 / Noc is the ratio of cell 3 signal / AWGN Same as 4.6.2.1

4.6.2.5 EN-DC FR1-FR1 event- triggered reporting in non-DRX with SSB time index detection	Same as 4.6.2.1	Same as 4.6.2.1
4.6.2.6 EN-DC FR1-FR1 event- triggered reporting in DRX with SSB time index detection	Same as 4.6.2.1	Same as 4.6.2.1
4.7.1.1.1 EN-DC FR1 SS-RSRP absolute measurement accuracy		Noc is the AWGN on NR freq1 £s2 / Noc is the cell 2 SNR £s3 / Noc is the cell 3 SNR meas PRB is the measurement PRB for SS- RSRP #RBJ to RBJ+19
4.7.1.1.2 EN-DC FR1 SS-RSRP relative measurement accuracy	Same as 4.7.1.1.1	Same as 4.7.1.1.1

Table F.1.1.2-3 Maximum test system uncertainty for RRM requirements for SA FR1 test cases

Subclause	Maximum Test System Uncertainty ¹	Derivation of Test System Uncertainty
6.1.1.1 NR SA FR1 cell re-selection	Noc ±1.5 dB	Note:
	Ês1 / Noc ±0.3 dB Ês2 / Noc ±0.3 dB	Ês1 / Noc is the ratio of cell 1 signal / AWGN Ês2 / Noc is the ratio of cell 2 signal / AWGN
6.1.1.2 NR SA FR1-FR1 cell re-	Noc1 ±1.5 dB	Note:
selection	Ês1 / Noc1 ±0.3 dB	Noc1 is the AWGN on cell 1 frequency
	Noc2 ±1.5 dB	Ês1 / Noc1 is the ratio of cell 1 signal / AWGN
	Ês2 / Noc2 ±0.3 dB	Noc2 is the AWGN on cell 2 frequency
	L32 / NOC2 ±0.5 dB	Ês2 / Noc2 is the ratio of cell 2 signal / AWGN
6.1.2.1 NR SA FR1 – E-UTRA cell re-	Noc1 ±1.5 dB	Note:
selection to higher priority E-UTRA	Ês1 / Noc1 ±0.3 dB	Noc1 is the AWGN on cell 1 (NR) frequency
Selection to higher phonty E-OTRA	Noc2 ±1.5 dB	Ês1 / Noc1 is the ratio of cell 1 signal / AWGN
	Ês2 / Noc2 ±0.3 dB	
	ES2 / NOC2 ±0.3 UB	Noc2 is the AWGN on cell 2 (E-UTRAN)
		frequency
0.4.0.0.1.0.0.4.0.0.4.0.4.0.4.0.4.0.4.0.	0.1.0.1	Ês2 / Noc2 is the ratio of cell 2 signal / AWGN
6.1.2.2 NR SA FR1 – E-UTRA cell reselection to lower priority E-UTRA	Same as 6.1.2.1	Same as 6.1.2.1
6.3.1.1 NR SA FR1 handover with	Noc ±1.5 dB	Note:
known target cell	Ês1 / Noc ±0.3 dB	Ês1 / Noc is the ratio of cell 1 signal / AWGN
_	Ês2 / Noc ±0.3 dB	Ês2 / Noc is the ratio of cell 2 signal / AWGN
6.3.1.2 NR SA FR1 handover with	Same as 6.3.1.1	Same as 6.3.1.1
unknown target cell		
6.3.1.3 NR SA FR1-FR1 Handover with	Noc1 ±1.5 dB	Note:
unknown Target Cell	Ês1 / Noc1 ±0.3 dB	Noc1 is the AWGN on cell 1 frequency
agov oc.	Noc2 ±1.5 dB	Ês1 / Noc1 is the ratio of cell 1 signal / AWGN
	Ês2 / Noc2 ±0.3 dB	Noc2 is the AWGN on cell 2 frequency
	2027 11002 2010 42	Ês2 / Noc2 is the ratio of cell 2 signal / AWGN
6.3.1.4 NR SA FR1 – E-UTRA	Same as 6.1.2.1	Same as 6.1.2.1
handover with known target cell	Same as 0.1.2.1	Carrie do 0.1.2.1
6.3.1.5 NR SA FR1 – E-UTRA	Same as 6.1.2.1	Same as 6.1.2.1
handover with unknown target cell	Same as 0.1.2.1	Sume as 0.1.2.1
6.3.2.1.1 NR SA FR1 RRC re-	Same as 6.1.1.1	Same as 6.1.1.1
establishment	Same as o.i.i.i	Same as o.i.i.i
6.3.2.1.2 NR SA FR1 - FR1 RRC re-	Same as 6.1.1.2	Same as 6.1.1.2
establishment	Same as 0.1.1.2	Same as 0.1.1.2
6.3.2.2.1	N _{oc} ±1.5 dB	$\hat{E}s_1$ / N_{oc} is the ratio of cell 1 signal / AWGN
0.3.2.2.1	Ês / N _{oc} ±0.3 dB	L31 / Noc is the fatto of cell I signal / AVVOIV
	L3 / N _{0C} ±0.3 dB	$T_c = 1/(480000 \times 4096)$ seconds, the basic
	Uplink absolute power	timing unit defined in TS 38.211 [7]
	measurement ±1.5 dB	tilling triit defined in 13 30.211 [7]
	lileasurement ±1.5 db	
	Uplink relative power	
	measurement ±0.7 dB	
	measurement ±0.7 ub	
	±112Tc Uplink signal transmit	
6.3.2.2.2	timing relative to downlink Same as 6.3.2.2.1	Same as 6.3.2.2.1
6.3.2.3.1 NR SA FR1 RRC connection	Same as 6.3.2.2.1	Same as 6.3.2.2.1 Same as 6.1.1.2
	Same as 0.1.1.2	Same as 0.1.1.2
release with redirection	Cama as 6.1.2.1	Samo as 6.1.2.1
6.3.2.3.2 NR SA FR1 – E-UTRA RRC	Same as 6.1.2.1	Same as 6.1.2.1
connection release with redirection	C 4.1.1.1	6 4411
6.4.1.1EN-DC FR1 UE transmit timing	Same as 4.4.1.1	Same as 4.4.1.1
accuracy	No. 11 E dD	Fo / N is the water of and district ANAIGN
6.4.3.1 NR SA FR1 timing advance	Noc ±1.5 dB	$\hat{E}s_1$ / N_{oc} is the ratio of cell 1 signal / AWGN
adjustment accuracy	Ê- /N	T 4//400000 4000)
	Ës ₁ / N _{oc} ±0.3 dB	$T_c = 1/(480000 \times 4096)$ seconds, the basic
	LOOT Timing Adding	timing unit defined in TS 38.211 [7]
	±88T _c Timing Advance	
	Adjustment accuracy	

6.5.1.1 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode	±0.9 dB	Overall system uncertainty for fading conditions comprises three quantities: 1. Signal-to-noise ratio uncertainty 2. Fading profile power uncertainty 3. Effect of AWGN flatness and signal
		flatness Items 1, 2 and 3 are assumed to be uncorrelated so can be root sum squared:
		AWGN flatness and signal flatness has x 0.25 effect on the required SNR, so use sensitivity factor of x 0.25 for the uncertainty contribution.
		Test System uncertainty = SQRT (Signal-to- noise ratio uncertainty^2 + Fading profile power uncertainty^2 + (0.25 x AWGN flatness and signal flatness)^2) Signal-to-noise ratio uncertainty ±0.3 dB Fading profile power uncertainty ±0.7 dB
		AWGN flatness and signal flatness ±2.0 dB
6.5.1.2 NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in non-DRX mode	±0.9 dB	Overall system uncertainty for fading conditions comprises three quantities: 1. Signal-to-noise ratio uncertainty 2. Fading profile power uncertainty 3. Effect of AWGN flatness and signal flatness
		Items 1, 2 and 3 are assumed to be uncorrelated so can be root sum squared: AWGN flatness and signal flatness has x 0.25 effect on the required SNR, so use sensitivity factor of x 0.25 for the uncertainty contribution. Test System uncertainty = SQRT (Signal-tonoise ratio uncertainty^2 + Fading profile power uncertainty^2 + (0.25 x AWGN flatness and signal flatness)^2)
		Signal-to-noise ratio uncertainty ±0.3 dB Fading profile power uncertainty ±0.7 dB AWGN flatness and signal flatness ±2.0 dB
6.5.1.3 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in DRX mode	Same as 6.5.1.1	Same as 6.5.1.1
6.5.1.4 NR SA FR1 radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in DRX mode	Same as 6.5.1.2	Same as 6.5.1.2
6.5.1.5 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode	Same as 6.5.1.1	Same as 6.5.1.1
6.5.1.6 NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in non-DRX mode	Same as 6.5.1.2	Same as 6.5.1.2
6.5.1.7 NR SA FR1 radio link monitoring out-of-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode	Same as 6.5.1.1	Same as 6.5.1.1
6.5.1.8 NR SA FR1 radio link monitoring in-sync test for PCell configured with CSI-RS-based RLM RS in DRX mode	Same as 6.5.1.2	Same as 6.5.1.2
6.6.1.1 SA event triggered reporting tests without gap under non-DRX	Same as 4.6.1.1	Same as 4.6.1.1
6.6.1.2 SA event triggered reporting tests without gap under DRX	Same as 4.6.1.1	Same as 4.6.1.1

	1	
6.6.1.3 SA event triggered reporting	Same as 4.6.1.1	Same as 4.6.1.1
tests with per-UE gaps under non-DRX		
6.6.1.4 SA event triggered reporting	Same as 4.6.1.1	Same as 4.6.1.1
tests with per-UE gaps under DRX		
6.6.1.5 SA event triggered reporting	Same as 4.6.1.1	Same as 4.6.1.1
tests without gap under non-DRX with		
SSB index reading		
6.6.1.6 SA event triggered reporting	Same as 4.6.1.1	Same as 4.6.1.1
tests with per-UE gaps under non-DRX		
with SSB index reading		
6.6.2.1 NR SA FR1-FR1 event-	Freq 1 Noc ±1.5 dB	Note:
triggered reporting in non-DRX	Freq 2 Noc ±1.5 dB	Ês1 / Noc is the ratio of cell 1 signal / AWGN
	Ês1 / Noc ±0.3 dB	Ês2 / Noc is the ratio of cell 2 signal / AWGN
	Ês2 / Noc ±0.3 dB	
6.6.2.2 NR SA FR1-FR1 event-	Same as 6.6.2.1	Same as 6.6.2.1
triggered reporting in DRX		
6.6.2.5 NR SA FR1-FR1 event-	Same as 6.6.2.1	Same as 6.6.2.1
triggered reporting in non-DRX with		
SSB time index detection		
6.6.2.6 NR SA FR1-FR1 event-	Same as 6.6.2.1	Same as 6.6.2.1
triggered reporting in DRX with SSB		
time index detection		
6.6.3.1 NR SA FR1 – E-UTRAN event-	Freq 1 Noc ±1.5 dB	Note:
triggered reporting in non-DRX	Freq 2 Noc ±1.5 dB	Ês1 / Noc is the ratio of cell 1 signal / AWGN
	Ês1 / Noc ±0.3 dB	Ês2 / Noc is the ratio of cell 2 signal / AWGN
	Ês2 / Noc ±0.3 dB	
	Fading ±0.5 dB	
6.6.3.2 NR SA FR1 – E-UTRAN event-	Same as 6.6.3.1	Same as 6.6.3.1
triggered reporting in DRX		
6.7.1.1.1 NR SA FR1 SS-RSRP	Average Noc ±1.5 dB	Noc is the AWGN on NR freq1
absolute measurement accuracy	Average Ês1 / Noc ±0.3 dB	Ês1 / Noc is the cell 1 SNR
	Average Ês2 / Noc ±0.3 dB	Ês2 / Noc is the cell 2 SNR
	mass DDD fot / Nos 10 0 dD	mana DDD is the management DDD for CC
	meas PRB Ês1 / Noc ±0.8 dB	meas PRB is the measurement PRB for SS-
6.7.1.1.0 EN DO ED1 CC DCC2	meas PRB Ês2 / Noc ±0.8 dB	RSRP #RBJ to RBJ+19
6.7.1.1.2 EN-DC FR1 SS-RSRP	Same as 6.7.1.1.1	Same as 6.7.1.1.1
relative measurement accuracy		

F.1.2 Interpretation of measurement results (normative)

See TS 38.521-1 [17] Annex F.2.

F.1.3 Test Tolerance and Derivation of Test Requirements (informative)

See TS 38.521-1 [17] Annex F.3.

F.1.3.1Measurement of test environments

See TS 38.521-1 [17] Annex F.3.1.

F.1.3.2Measurement of RRM requirements

Because the relationships between the test system uncertainties and the test tolerances are often complex, it is not always possible to give a simple derivation of the test requirement in this document. The analysis is recorded in 3GPP TR 38 903 [22].

The derivation of the test requirements for the EN-DC FR1 test cases in chapter 4 is defined in Table F.1.3.2-1.

The derivation of the test requirements for the NR SA FR1 test cases in chapter 6 is defined in Table F.1.3.2-2.

Table F.1.3.2-1: Derivation of test requirements for EN-DC FR1 RRM tests

Test	Minimum requirement in TS 38.133 [6]	Test tolerance (TT)	Test requirement in TS 38.533
4.3.2.2.1	Absolute uplink power: Normal conditions ±9dB	2.1dB	Absolute uplink power: Normal conditions ±11.1dB
	Relative uplink power step: Normal conditions ±2.5dB	0.7dB	Relative uplink power step: Normal conditions ±3.2dB
	Uplink timing: 15kHz SCS T _e ±12*64*T _c 30kHz SCS T _e ±8*64*T _c	112T _c 112T _c	Uplink timing: 15kHz SCS T _e ±880*T _c 30kHz SCS Te ±624*T _c
4.3.2.2.2	Same as 4.3.2.2.1	Same as 4.3.2.2.1	Same as 4.3.2.2.1
4.4.1.1 EN-DC FR1 UE transmit timing accuracy	Test 1 (no DRX): Uplink timing: $\pm 12*64~T_{c}~for~15~KHz~SSB~SCS,15~kHz~UL~SCS~\pm 10*64~T_{c}~for~15~KHz~SSB~SCS,30~kHz~UL~SCS~\pm 10*64~T_{c}~for~15~KHz~SSB~SCS,60~kHz~UL~SCS~\pm 8*64~T_{c}~for~30~KHz~SSB~SCS,15~kHz~UL~SCS~\pm 8*64~T_{c}~for~30~KHz~SSB~SCS,30~kHz~UL~SCS~\pm 10*64~T_{c}~for~30~KHz~SSB~SCS,30~kHz~UL~SCS~5*64~T_{c}~for~30~KHz~SSB~SCS,60~kHz~UL~SCS~5*10*10*10*10*10*10*10*10*10*10*10*10*10*$	±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c	Test 1 (10MHz Ch BW): Uplink timing: ±13.75*64*T _c Uplink timing: ±11.75*64*T _c Uplink timing: ±11.75*64*T _c Uplink timing: ±9.75*64*T _c Uplink timing: ±9.75*64*T _c Uplink timing: ±8.75*64*T _c
	Max step size T_q : 5.5*64* T_c Min adjust rate T_p : 5.5*64* T_c Max adjust rate: 5.5*64* T_c Ês / N_{oc} : +3.00dB N_{oc} = -98 dBm/15 kHz (Config 1,2,3)	+0.5*64T _c -3.6*64*T _c +1.1*64*T _c +0.3 dB +1.5 dB	Max step size T_q : $6.0*64*T_c$ Min adjust rate: $1.9*64*T_c$ Max adjust rate: $6.6*64*T_c$ $\hat{E}s$ / N_{oc} : $+3.30dB$ N_{oc} = -98 dBm/15 kHz (Config 1,2,3) $+1.5$ dB
	Test 2 (with DRX): $\pm 12^*64$ T _c for 15 KHz SSB SCS,15 kHz UL SCS $\pm 10^*64$ T _c for 15 KHz SSB SCS,30 kHz UL SCS $\pm 10^*64$ T _c for 15 KHz SSB SCS,60 kHz UL SCS $\pm 8^*64$ T _c for 30 KHz SSB SCS,15 kHz UL SCS $\pm 8^*64$ T _c for 30 KHz SSB SCS,30 kHz UL SCS $\pm 8^*64$ T _c for 30 KHz SSB SCS,60 kHz UL SCS $\pm 7^*64$ T _c for 30 KHz SSB SCS,60 kHz UL SCS	±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c ±1.75*64*T _c	Test 2 (with DRX): Uplink timing: ±13.75*64*T _c Uplink timing: ±11.75*64*T _c Uplink timing: ±11.75*64*T _c Uplink timing: ±9.75*64*T _c Uplink timing: ±9.75*64*T _c
	Ês / N _{oc} : +3.00dB	+0.3dB	Uplink timing: ±8.75*64*T _c Ês / N _{oc} : +3.30dB
4.4.3.1 EN-DC FR1 timing advance	N _{oc} = -98 dBm/15 kHz (Config 1, 2, 4, 5)	0	N _{oc} = -98 dBm/15 kHz (Config 1, 2, 4, 5)
adjustment accuracy	N_{oc} = -95 dBm/15 kHz (Config 3, 6)	0	N_{oc} = -95 dBm/15 kHz (Config 3, 6)
	$\hat{E}s_x / N_{oc} = 3 dB$	0	$\hat{E}s_x / N_{oc} = 3 dB$
	UE Timing Advance Adjustment Accuracy for 15kHz SCS = $\pm 256 T_c + TT$	+/- 88 Tc	UE TAAA for 15kHz SCS = ± 344 T _c
	UE Timing Advance Adjustment Accuracy for 30kHz SCS = $\pm 256 T_c + TT$	+/- 88 Tc	UE TAAA for 30kHz SCS = ±344
4.5.1.1 EN-DC FR1 radio link monitoring out-of- sync test for PSCell configured with SSB- based RLM RS in non- DRX mode	SNR during T1: 1dB T2: -7dB T3: -15dB	Offset during T1: +0.9dB T2: +0.9dB T3: -0.9dB	SNR during T1: 1.9dB T2: -6.1dB T3: -15.9dB
4.5.1.2 EN-DC FR1 radio link monitoring in-sync	SNR during T1: 1dB T2: -7dB T3: -15dB T4: -4.5dB T5: 1dB	Offset during T1: +0.9dB T2: +0.9dB T3: -0.9dB T4: -0.9dB T5: 0.9dB	SNR during T1: 1.9dB T2: -6.1dB T3: -15.9dB T4: -5.4dB T5: 1.9dB For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in section D.4.1.1

A.5.1.2 RN-DC FRI radio Ink monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in DRX mode				
Sync test for PSCell configured with SSB- based RLM RS in DRX mode 4.5.1.4 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode 4.5.1.5 EN-DC FR1 radio link monitoring out-of- sync test for PSCell configured with CSI-RS- based RLM RS in non- DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in non- DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of- sync test for PSCell configured with cSI-RS- based RLM RS in DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of- sync test for PSCell configured with cSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with cSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with cSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with cSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with cSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with cSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.1 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX same as 4.5.1.1 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5	4.5.1.3 EN-DC FR1 radio	Same as 4.5.1.1	Same as 4.5.1.1	Same as 4.5.1.1
Sync test for PSCell configured with SSB- based RLM RS in DRX mode 4.5.1.4 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode 4.5.1.5 EN-DC FRI radio [ink monitoring out-of-sync test for PSCell configured with CSI-RS- based RLM RS in non- DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in non- DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in non-DRX mode 4.5.1.7 EN-DC FRI radio [ink monitoring out-of-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring out-of-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.6 EN-DC FRI radio [ink monitoring in-sync test for PSCell configured with CSI-RS- Same as 4.5.1.1 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.1 Sam	link monitoring out-of-			
Configured with SSB-based RLM RS in DRX mode				
based RLM RS in DRX mode				
A.5.1.4 EN-DC FR1 radio Ink monitoring in-sync test for PSCell configured with SSB-based RLM RS Ink monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode				
link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode 4.5.1.5 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 Scell activation and deactivation and deactivation and deactivation and deactivation and deactivation of known SCell in non-DRX for Scell puring T1: Noc1: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz OdB Scell mon-DRX for Scell puring T2: Noc2: -117dB During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/	mode			
link monitoring in-sync test for PSCell configured with SSB-based RLM RS in DRX mode 4.5.1.5 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 Scell activation and deactivation and deactivation and deactivation and deactivation and deactivation of known SCell in non-DRX for Scell puring T1: Noc1: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz OdB Scell mon-DRX for Scell puring T2: Noc2: -117dB During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/	4.5.1.4 EN-DC FR1 radio	Same as 4.5.1.2	Same as 4.5.1.2	Same as 4.5.1.2
test for PSCeil configured with SSB-based RLM RS in DRX mode 4.5.1.5 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Scell During T1: Noc2: -104dBm/15kHz Noc2: -104d				
with SSB-based RLM RS in DRX mode 4.5.1.5 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 shased RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Solution and deactive and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Solution and deactive and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Solution and deactive and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Solution and deactive and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Solution End End End End End End End End End En				
In DRX mode				
A.S.1.5 EN-DC FRI radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode A.S.1.6 EN-DC FRI radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode A.S.1.7 EN-DC FRI radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode A.S.1.7 EN-DC FRI radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode A.S.1.8 EN-DC FRI radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode A.S.1.8 EN-DC FRI radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode A.S.1.8 EN-DC FRI radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode A.S.1.8 EN-DC FRI linterruptions at transitions between active and non-active during DRX in synchronous EN-DC A.S.2.2 EN-DC FRI interruptions at transitions between active and non-active during DRX in asynchronous EN-DC A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured with CSI-RS-based RLM RS in DRX mode A.S.3.1 EN-DC FRI Scell configured w				
link monitoring out-of- sync test for PSCell Configured with CSI-RS- based RLM RS in non- DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of- sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 therruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle measurement cycle Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 During T1: During T1: During T1: Noc1: 104dBm/15kHz During T2: During		Same as 4.5.1.1	Same as 4.5.1.1	Same as 4.5.1.1
sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.2 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured with CSI-RS-based RLM RS in DRX mode 4.5.3.1 EN-DC FR1 Scell configured RS in RS i		James de merara		Came as moral
configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: During T				
based RLM RS in non-DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 tradio link monitoring alternations at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and mon-active during DRX in Synchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation of known SCell in non-DRX for 160ms SCell mon-DRX for 160ms SCell mon-DRX for 160ms SCell measurement cycle During T2: Noc2: +17dB During T2: Duri				
DRX mode 4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation of known SCell in non-DRX for 160ms SCell mon-DRX for 160ms SCell measurement cycle measurement cycle Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.1 Same as 4.5.1.2 Same as 4.5.1.1 Same as 4.5.1.1 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.1 Same as 4.5				
4.5.1.6 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and magnetic plans and transitions between active and non-active during DRX in Synchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell mon-DRX for 160ms SCell measurement cycle During T2: During T3: During T2: D				
link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell mon-DRX for 160ms SCell mon-DRX for 1610ms SCell measurement cycle During T2:		Same as 4.5.1.2	Same as 4 5 1 2	Same as 4.5.1.2
test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCEll looking and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCEll looking and the properties of the properties o		Sum as 4.5.1.2	Game as 4.0.1.2	Same as 4.5.1.2
with CSI-RS-based RLM RS in non-DRX mode 4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 linterruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.2.3 EN-DC FR1 scell activation and deactivation and deactivation of known SCell in non-DRX for 160ms SCell mon-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz During T2: During T2: During T2: During T2: During T2: Noc1: -104dBm/15kHz During T2: During T2: During T2: During T2: During T2: Noc1: -104dBm/15kHz During T2: During T2: During T2: During T2: Noc1: -104dBm/15kHz During T2: During T2: During T2: During T2: Noc1: -104dBm/15kHz				
RS in non-DRX mode 4.5.1.7 EN-DC FR1 ratio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.3 EN-DC FR1 state line ruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell claring DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell large line ruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell large line ruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell large line ruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.2.1 EN-DC FR1 SCell large				
4.5.1.7 EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell onfigured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 sin DRX mode 4.5.2.1 EN-DC FR1 sin DRX mode 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation and deactivation of known SCell in non-DRX for 160ms SCell mon-DRX for 160ms SCell measurement cycle measurement cycle Same as 4.5.1.1 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 During T1: During T1: During T1: Odd B Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Es2 / Noc2: +17dB OdB Es2 / Noc2: +17dB OdB Es2 / Noc2: +17dB OdB Es2 / Noc2: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB N				
link monitoring our-of- sync test for PSCell configured with CSI-RS- based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Scell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.2.1 Same as 4.5.1.2 During T1: During T1: During T1: During T1: OdB Noc1: -104dBm/15kHz OdB Se2 / Noc2: -104dBm/15kHz OdB Se3 / Noc2: -117dB OdB Se5 / Noc2: -117dB During T2: During T3: During T2: During T3: Duri		Same as 4.5.1.1	Same as 4 5 1 1	Same as 4.5.1.1
sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 stransport of transport of transport of the pscend stransport of transport of		Jame as 4.J.I.I	Jame as 4.3.1.1	Carrie as 4.J.I.I
configured with CSI-RS-based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 solved RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.3.1 EN-DC FR1 Solved RLM Same as 4.5.2.1 Same a				
based RLM RS in DRX mode 4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.1 EN-DC FR1 Scame as 4.5.2.1 Same as 4.5.1.2 Sa				
Mode 4.5.1.8 EN-DC FR1 radio Ink monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 Interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 Interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCEII Interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCEII Interruptions EN-DC 4.5.3.1 EN-DC FR1 SCEII Interruptions EN-DC Inter				
4.5.1.8 EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle Mark as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 Same as 4.5.1.2 During TI: During TI: During TI: Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Es2 / Noc2: +17dB During T2: During T2: During T2: During T2: During T2: Noc1: -104dBm/15kHz During T2: During T2: During T2: During T2: During T2: During T2: During T2: Noc1: -104dBm/15kHz				
link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 Scell activation and deactivation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle SNRs as specified 0.6dB Formula: SNR + TT		Sama as 4 F 1 2	Comp oc 4 F 1 2	Samo as 4 F 1 2
test for PSCell configured with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle Test of the page 2.5 Port of the page 3.5 Port of		Same as 4.5.1.2	Same as 4.5.1.2	Same as 4.5.1.2
with CSI-RS-based RLM RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.3 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle with CSI-RS-based RLM RS in Do.6dB Formula: SNR + TT SAME as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 During T1: During T1: Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Es2 / Noc2: +17dB OdB Es2 / Noc2: +17dB During T2: During T2: During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz				
RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle RS in DRX mode 4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell lactivation and deactivation of known SCell in non-DRX for 160ms SCell in pon-DRX for 160ms SCell in non-DRX for 1				
4.5.2.1 EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle SNRs as specified 0.6dB Formula: SNR + TT SAME as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 During T1: During T1: OdB Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB OdB Es2 / Noc2: +17dB OdB During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz				
interruptions at transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz SCell in non-DRX for 160ms SCell During T2: Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz		CNDs as appointed	0 64D	Formula: CND + TT
transitions between active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle Transitions between as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 During T1: Noci: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB OdB Noc2: -104dBm/15kHz OdB OdB Es1 / Noc1: +17dB Es2 / Noc2: +17dB During T2: Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz OdB OdB During T2: Noc1: -104dBm/15kHz		SNRS as specified	0.608	Formula: SNR + 11
active and non-active during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz During T2: During T				
during DRX in synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz during DRX in Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 During T1: During T1: Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Es1 / Noc1: +17dB Noc2: +17dB Noc2: +17dB Noc2: +17dB Noc2: +17dB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz Noc1: -104dBm/15kHz				
synchronous EN-DC 4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 During T1: Ouring T1: Ouring T1: OdB Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Ês2 / Noc2: +17dB During T2: During T2: OdB Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz				
4.5.2.2 EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 Same as 4.5.2.1 During T1: During T1: Noring T1: Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz				
interruptions at transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz During T3: During T1: During T1: Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Ês1 / Noc1: +17dB Ês2 / Noc2: +17dB During T2: During T2: Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz				1501
transitions between active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz During T1: During T1: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Es1 / Noc1: +17dB Es2 / Noc2: +17dB During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz		Same as 4.5.2.1	Same as 4.5.2.1	Same as 4.5.2.1
active and non-active during DRX in asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T1: During T1: During T1: OdB Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB OdB Es1 / Noc1: +17dB OdB OdB Es2 / Noc2: +17dB During T2: Noc1: -104dBm/15kHz OdB During T2: Noc1: -104dBm/15kHz				
during DRX in asynchronous EN-DC asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T1: During T1: During T1: During T1: Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz During T1: Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB OdB Es1 / Noc1: +17dB OdB Es2 / Noc2: +17dB During T2: Noc1: -104dBm/15kHz During T2: During T2: Noc1: -104dBm/15kHz				
asynchronous EN-DC 4.5.3.1 EN-DC FR1 SCell During T1: During T1: During T1: During T1: During T1: During T1: Noc1: -104dBm/15kHz 0dB Noc1: -104dBm/15kHz Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz 0dB Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz 0dB Es1 / Noc1: +17dB Es1 / Noc1: +17dB 0dB Es2 / Noc2: +17dB 0dB Es2 / Noc2: +17dB During T2: During T2: During T2: Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz				
A.5.3.1 EN-DC FR1 SCell activation and deactivation of known Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz Noc2: -104dBm/15kHz OdB Noc2: -104dBm/15kHz Noc1: +17dB OdB Ês1 / Noc1: +17dB Es2 / Noc2: +17dB OdB Es2 / Noc2: +17dB OdB Es2 / Noc2: +17dB OdB				
activation and deactivation of known SCell in non-DRX for 160ms SCell measurement cycle During T2: Noc1: -104dBm/15kHz Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz OdB Noc2: -104dBm/15kHz OdB Sil / Noc1: +17dB Es2 / Noc2: +17dB OdB OdB During T2: During T2: During T2: Noc1: -104dBm/15kHz OdB Noc1: -104dBm/15kHz			<u> </u>	
deactivation of known SCell in non-DRX for 160ms SCell measurement cycle Noc2: -104dBm/15kHz Es1 / Noc1: +17dB 0dB 0dB 0dB Es2 / Noc2: +17dB Noc2: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz During T2: 0dB During T2: Noc1: -104dBm/15kHz				
SCell in non-DRX for 160ms SCell measurement cycle Ês1 / Noc1: +17dB 0dB Ês1 / Noc1: +17dB During T2: Noc1: -104dBm/15kHz During T2: During T2: Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz				
160ms SCell measurement cycle Ês2 / Noc2: +17dB 0dB Ês2 / Noc2: +17dB During T2: Noc1: -104dBm/15kHz During T2: During T2: Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz				
measurement cycle During T2: Noc1: -104dBm/15kHz During T2: During T2: During T2: Noc1: -104dBm/15kHz During T2: Noc1: -104dBm/15kHz				
During T2: During T2: During T2: During T2: Noc1: -104dBm/15kHz 0dB Noc1: -104dBm/15kHz		Es2 / Noc2: +17dB	OdB	Es2 / Noc2: +17dB
Noc1: -104dBm/15kHz	measurement cycle			
		1,200		
Ês1 / Noc1: +17dB OdB Ês1 / Noc1: +17dB		1 -		
Ês2 / Noc2: +17dB OdB Ês2 / Noc2: +17dB		Es2 / Noc2: +17dB	OdB	Es2 / Noc2: +17dB
During T3: During T3: During T3:				
Noc1: -104dBm/15kHz				
Noc2: -104dBm/15kHz 0dB Noc2: -104dBm/15kHz				
Ês1 / Noc1: +17dB OdB Ês1 / Noc1: +17dB		1.		1 -
Ês2 / Noc2: +17dB				
4.5.3.2 EN-DC FR1 SCell Same as 4.5.3.1 Same as 4.5.3.1 Same as 4.5.3.1		Same as 4.5.3.1	Same as 4.5.3.1	Same as 4.5.3.1
activation and				
deactivation of known				
	SCell in non-DRX for			
		T. Control of the Con	i e	1
SCell in non-DRX for 320ms SCell measurement cycle				

4.5.3.3 EN-DC FR1 SCell	Same as 4.5.3.1	Same as 4.5.3.1	Same as 4.5.3.1
activation and			
deactivation of unknown			
SCell in non-DRX			
4.6.1.1 EN-DC FR1	During T1:	During T1:	During T1:
event-triggered reporting	Noc: -98dBm/15kHz	0dB	Noc: -98dBm/15kHz
without gap in non-DRX	Ês1 / Noc: +4.00dB	0dB	Ês1 / Noc: +4.00dB
Without gap in hon-bitx		0dB	
	Ês2 / Noc: -infinity	ОИВ	Ês2 / Noc: -infinity
	During T2:	During T2:	During T2:
	Noc: -98dBm/15kHz	0dB	Noc: -98dBm/15kHz
	Ês1 / Noc: +4.00dB	0dB	Ês1 / Noc: +4.00dB
	Ês2 / Noc: +4.00dB	0dB	Ês2 / Noc: +4.00dB
4.6.1.2 EN-DC FR1	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
event-triggered reporting			
without gap in DRX			
4.6.1.3 EN-DC FR1	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
	Same as 4.0.1.1	Same as 4.0.1.1	Same as 4.0.1.1
event-triggered reporting			
with gap in non-DRX			
4.6.1.4 EN-DC FR1	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
event-triggered reporting			
with gap in DRX			
4.6.2.1 EN-DC FR1-FR1	During T1:	During T1:	During T1:
event-triggered reporting	Freq 2 Noc: -98dBm/15kHz	0dB	Freq 2 Noc: -98dBm/15kHz
in non-DRX	Freq 3 Noc: -98dBm/15kHz	0dB	Freq 3 Noc: -98dBm/15kHz
	Ês2 / Noc: +4.00dB	0dB	Ês2 / Noc: +4.00dB
	Ês3 / Noc: -infinity	0dB	Ês3 / Noc: -infinity
	During T2:	During T2:	During T2:
	Freq 2 Noc: -98dBm/15kHz	OdB	Freq 2 Noc: -98dBm/15kHz
		1	
	Freq 3 Noc: -98dBm/15kHz	0dB	Freq 3 Noc: -98dBm/15kHz
	Ês2 / Noc: +4.00dB	0dB	Ês2 / Noc: +4.00dB
	Ês3 / Noc: +7.00dB	0dB	Ês3 / Noc: +7.00dB
4.6.2.2 EN-DC FR1-FR1	Same as 4.6.2.1	Same as 4.6.2.1	Same as 4.6.2.1
	Same as 4.0.2.1	Same as 4.0.2.1	Same as 4.0.2.1
event-triggered reporting			
in DRX			
4.6.2.5 EN-DC FR1-FR1	Same as 4.6.2.1	Same as 4.6.2.1	Same as 4.6.2.1
event-triggered reporting			
in non-DRX with SSB			
time index detection			
4.6.2.6 EN-DC FR1-FR1	Same as 4.6.2.1	Same as 4.6.2.1	Same as 4.6.2.1
event-triggered reporting			
in DRX with SSB time			
index detection			
4.7.1.1.1 EN-DC FR1	TEST CONFIGURATION 1, 2, 4, 5		
SS-RSRP absolute			
measurement accuracy			
measurement accuracy	Toot 1:	Toot 1:	Toot 1:
	Test 1:	Test 1:	Test 1:
	N _{oc} : -106dBm/15kHz	-1.5dB	N _{oc} : -107.5dBm/15kHz
	ÊS ₂ / N _{oc} : +6.0dB	0dB	Ês ₂ / N _{oc} : +6.0dB
	Ês ₃ / N _{oc} : +1.0dB	+1.0dB	Ês ₃ / N _{oc} : +2.0dB
	Reported RSRP values: ±4.5dB	Via mapping	RSRP_45 to RSRP_57
	Test 2:	Test 2:	Test 2:
	N _{oc} : -88dBm/15kHz	0dB	N _{oc} : -88dBm/15kHz
	Ês ₂ / N _{oc} : +6.0dB	0dB	Ês ₂ / N _{oc} : +6.0dB
		1	
	Ês ₃ / N _{oc} : +1.0dB	+1.0dB	Ës ₃ / N _{oc} : +2.0dB
	Reported RSRP values: ±8dB	Via mapping	RSRP_61 to RSRP_80
	Test 3:	Test 3:	Test 3:
	N_{oc} : -116dBm/15kHz + Δ_{BG_offset}	0dB	N_{oc} : -116dBm/15kHz + Δ_{BG_offset}
	Ës ₂ / N _{oc} : +3.0dB	0dB	Ës ₂ / N _{oc} : +3.0dB
	Ês ₃ / N _{oc} : -1.0dB	+0.8dB	Ês ₃ / N _{oc} : -0.2dB
	Reported RSRP values: ±6dB	Via mapping	RSRP 34 to RSRP 47
	Nepotieu NONE values. 1000	via iliappiliy	
			RSRP_35 to RSRP_47
			RSRP_35 to RSRP_48
			RSRP 36 to RSRP 48
·	1		

			RSRP_36 to RSRP_49 RSRP_37 to RSRP_50 RSRP_38 to RSRP_50
TES	ST CONFIGURATION 3, 6		depending on operating band
Test Noc: Ês2 Ês3 Rep Test Noc:	t 1: -110dBm/30kHz / N _{oc} : +6.0dB / N _{oc} : +1.0dB <u>ported RSRP values:</u> ±4.5dB t 2: -91dBm/30kHz	Test 1: -0.8dB 0dB +1.0dB Via mapping Test 2: 0dB 0dB	Test 1: Noc: -110.8dBm/30kHz Ês ₂ / Noc: +6.0dB Ês ₃ / Noc: +2.0dB RSRP_42 to RSRP_54 Test 2: Noc: -91dBm/30kHz Ês ₂ / Noc: +6.0dB
Ês ₃	/ N _{oc} : +1.0dB	+1.0dB Via mapping	Ês ₃ / N _{oc} : +0.0dB Ês ₃ / N _{oc} : +2.0dB RSRP_58 to RSRP_77
Ês ₂	-113 dBm/30kHz + Δ_{BG_offset} / N_{oc} : +3.0dB	<u>Test 3:</u> 0dB 0dB +0.8dB	$\label{eq:local_control_control} \begin{split} & \underline{\text{Test 3:}} \\ & N_{\text{oc}} : \text{-}113 \text{dBm/}30 \text{kHz} + \Delta_{\text{BG_offset}} \\ & \hat{\mathbb{E}} s_2 \ / \ N_{\text{oc}} : \text{+}3.0 \text{dB} \\ & \hat{\mathbb{E}} s_3 \ / \ N_{\text{oc}} : \text{-}0.2 \text{dB} \end{split}$
Rep	oorted RSRP values: ±6dB	Via mapping	RSRP_37 to RSRP_50 RSRP_38 to RSRP_50 RSRP_38 to RSRP_51 RSRP_39 to RSRP_51 RSRP_39 to RSRP_52 RSRP_40 to RSRP_53 RSRP_41 to RSRP_53 depending on operating band

The derivation of the RSRP values takes into account the uncertainty in Cell 3 SS-RSRP from Noc and Ês₃ / Noc, the allowed UE reporting accuracy, and the UE mapping function.
The SS-RSRP values given above are for normal conditions. In all cases the RSRP values are 4.5dB wider at each end for extreme

conditions.

4.7.1.1.2 EN-DC FR1	Test 1:	Test 1:	Test 1:
SS-RSRP relative	N _{oc} :		
measurement accuracy	Test configuration 1, 2, 4, 5:-106dBm/15kHz	0 dB	N _{oc} : -106 dBm/15kHz
	Test configuration 3, 6:-110dBm/30kHz	0 dB	N _{oc} : -110 dBm/30kHz
	Ĉ- (N COJD	0 40	Ê- /N · · · C O-ID
	Ês ₂ / N _{oc} : +6.0dB	0 dB	Ês ₂ / N _{oc} : +6.0dB
	Es ₃ / N _{oc} : +1.0dB	+1.0dB	Es ₃ / N _{oc} : +2.0dB
	Reported relative SS-RSRP values:_±3dB	Via mapping	RSRP_x-9 to RSRP_x+1
	Test 2:	Test 2:	Test 2:
	N _{oc} : -88dBm/15kHz	0dB	N _{oc} : -88dBm/15kHz
	Es ₂ / N _{oc} : +6.0dB	0dB	Es ₂ / N _{oc} : +6.0dB
	Ês ₃ / N _{oc} : +1.0dB	+1.0dB	Ês₃ / N₀c: +2.0dB
	Reported relative SS-RSRP values:_±3dB	Via mapping	RSRP_x-9 to RSRP_x+1
	Test 3:	Test 3:	Test 3:
	N_{oc} : -116dBm/15kHz + Δ_{BG_offset}	0dB	N_{oc} : -116dBm/15kHz + Δ_{BG_offset}
	Es ₂ / N _{oc} : +3.0dB	0dB	Ës ₂ / N _{oc} : +3.0dB
	Ës₃ / N₀c: -1.0dB	+1.0dB	Es ₃ / N _{oc} : 0dB
	Reported relative SS-RSRP values:_±3dB	Via mapping	RSRP_x-8 to RSRP_x+2
I=1 1 1 1 1 00 1	DODD - I I I I I I I -		opp ê /ê /

The derivation of the SS-RSRP values takes into account the uncertainty in Cell 2 and Cell 3 RSRP from Noc, Ês₂ / Noc and Ês₃ / Noc, the allowed UE reporting accuracy, and the UE mapping function.

The RSRP values given above are for both normal and extreme conditions.

Table F.1.3.2-2: Derivation of test requirements for NR SA FR1 RRM tests

Test	Minimum requirement in TS 38.133 [6]	Test tolerance (TT)	Test requirement in TS 38.533
6.1.1.1 NR SA FR1 cell re-	During T1:	During T1:	During T1:
selection	Noc: -98dBm/15kHz	OdB	Noc: -98dBm/15kHz
Selection	Ês1 / Noc: +16dB	0dB	
			Ês1 / Noc: +16dB
	Ês2 / Noc: -infinity	0dB	Ês2 / Noc: -infinity
	During T2:	During T2:	During T2:
	Noc: -98dBm/15kHz	0dB	Noc: -98dBm/15kHz
	Ês1 / Noc: +13dB	0dB	Ês1 / Noc: +13dB
	Ês2 / Noc: +16dB	0.45dB	Ës2 / Noc: +16.45dB
	During T3:	During T3:	During T3:
	Noc: -98dBm/15kHz	0dB	Noc: -98dBm/15kHz
	Ês1 / Noc: +16dB	0.45dB	Ês1 / Noc: +16.45dB
	Ês2 / Noc: +13dB	0dB	Ês2 / Noc: +13dB
6.1.1.2 NR SA FR1-FR1 cell re-	During T1:	During T1:	During T1:
selection	Noc1: -98dBm/15kHz	OdB	Noc1: -98dBm/15kHz
Sciection	Noc2: -98dBm/15kHz	-2dB	Noc2: -100dBm/15kHz
	Ês1 / Noc1: +14dB	1.6dB	Ês1 / Noc1: +15.6dB
		0.4dB	
	Ês2 / Noc2: -4dB	0.406	Ës2 / Noc2: -3.6dB
	During T2:	During T2:	During T2:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: +14dB	1.6dB	Ês1 / Noc1: +15.6dB
	Ês2 / Noc2: -infinity	0dB	Ês2 / Noc2: -infinity
	During T3:	During T3:	During T3:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: +14dB	1.6dB	Ês1 / Noc1: +15.6dB
	Ês2 / Noc2: +12dB	1.6dB	1
C 1 2 1 ND CA ED1 E LITDA			Ës2 / Noc2: 13.6dB
6.1.2.1 NR SA FR1 – E-UTRA	During T1:	During T1:	During T1:
cell re-selection to higher priority	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
E-UTRA	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: +14dB	0dB	Ës1 / Noc1: +14dB
	Ês2 / Noc2: -infinity	0dB	Ës2 / Noc2: -infinity
	During T2:	During T2:	During T2:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: +14dB	1.6dB	Ês1 / Noc1: +15.6dB
	Ês2 / Noc2: +12dB	1.6dB	Ês2 / Noc2: 13.6dB
	During T3:	During T3:	During T3:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	-2dB	Noc2: -100dBm/15kHz
	Ês1 / Noc1: +14dB	1.6dB	Ês1 / Noc1: +15.6dB
	Ês2 / Noc2: -4dB	0.4dB	Ês2 / Noc2: -3.6dB
6.1.2.2 NR SA FR1 – E-UTRA	During T1:	During T1:	During T1:
cell re-selection to lower priority	Noc1: -98dBm/15kHz	-2dB	Noc1: -100dBm/15kHz
E-UTRA	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: -4dB	0.4dB	Ês1 / Noc1: -3.6dB
	Ês2 / Noc2: +14dB	1.6dB	Ês2 / Noc2: +15.6dB
	During T2:	During T2:	During T2:
	Noc1: -98dBm/15kHz	OdB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: +12dB	1.6dB	Ês1 / Noc1: +13.6dB
	Ês2 / Noc2: +14dB	0dB	Ês2 / Noc2: +14dB
6.3.1.1 NR SA FR1 handover with	TEST CONFIGURATION 1, 2		
known target cell	A3-Offset: 0dB	-1dB	A3-Offset: -1dB

During T1:				
Noci:-980Bm/15kHz		During T1:	During T1:	During T1:
Noc2 - 98dBm/15kHz 0dB				
ES1 / Noc1: 80B				1
Ea2 / Noc2: -Infinity				1 =
During T2:		Ës1 / Noc1: 8dB	OdB	Ës1 / Noc1: 8dB
During T2:		Ês2 / Noc2: -infinity	0dB	Ês2 / Noc2: -infinity
Noc1_98dBm/15kHz		L32 / NOC2IIIIIIIty	OGB	L32 / NOC2Illillity
Noc1_98dBm/15kHz				
Noc1_98dBm/15kHz		During T2:	During T2:	During T2:
Noo2; -98dBm/JSkHz Douring T3; Douring T3; Douring T3; Noo2; -98dBm/JSkHz Douring T3; Noo2; -98dBm/JSkHz Douring T3; Noo2; -98dBm/JSkHz Douring T3; Noo2; -98dBm/JSkHz Douring T3; Noo2; -98dBm/JSkHz Douring T3; Noo2; -98dBm/JSkHz Douring T3; Noo2; -98dBm/JSkHz Douring T3; Noo2; -98dBm/JSkHz Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Noo2; -98dBm/JSkHz Douring T3; Douring T3; Douring T3; Douring T4; Douring T4; Noo2; -98dBm/JSkHz Douring T4; Douring T4; Douring T4; Douring T4; Douring T4; Douring T4; Noo2; -98dBm/JSkHz Douring T4; Douring T4; Douring T4; Noo2; -98dBm/JSkHz Douring T4; Douring T4; Douring T4; Noo2; -98dBm/JSkHz Douring T4; Douring T4; Noo2; -98dBm/JSkHz Douring T4; Douring T4; Noo2; -98dBm/JSkHz Douring T4; Douring T4; Noo2; -98dBm/JSkHz Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Douring T3; Noo2; -98dBm/JSkHz Douring T3; Douring T3; Douring T3; Noo2; -98dBm/JSkHz Douring T3; Douring T3; Douring T3; Douring T4; Noo2; -98dBm/JSkHz Douring T5; Noo2; -98dBm/JSkHz Douring T4; Noo2; -98dBm/J				
Est Noc1 + 988				
Es2 / Noc2: +11dB				
Es2 / Noc2: +11dB		Ês1 / Noc1: +8dB	0.8dB	Ês1 / Noc1: +8.8dB
During T3:				l a
Noc1:-986Bm/15kHz		ESZ / NOCZ. TITUD	OUB	ESZ / NOCZ. +11ub
Noc1:-986Bm/15kHz				
Noc1:-986Bm/15kHz		During T3:	During T3:	During T3:
Noc2: -98dBm/15kHz				
Es1 / Noc1: +8dB				
E\$2 / Noc2: +11dB				
E\$2 / Noc2: +11dB		Ês1 / Noc1: +8dB	0dB	Ês1 / Noc1: +8dB
TEST CONFIGURATION 3				
A3-Offset: 0dB			UUD	ESZ / NUCZ. TITUD
During T1:		TEST CONFIGURATION 3		
During T1:		A3-Offset: 0dB	-1dB	A3-Offset: -1dB
Noc1: 98(Bm/15kHz OdB Noc2: 98(Bm/15kHz Est / Noc2: 98(Bm/15kHz OdB Noc2: 98(Bm/15kHz Est / Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Noc2: shiftinity OdB Noc2: shiftinity OdB Noc2: shiftinity OdB Noc2: shiftinity OdB Noc2: shiftinity OdB Noc2: shiftinity OdB Noc2: shiftinity OdB Noc2: shiftinity OdB Est / Noc2: shiftinity OdB Noc2: shiftinity Noc2: shiftinity OdB Noc2: shiftinity Noc2: shiftinity Noc2: shiftinity OdB Noc2: shiftinity				
Noc2: 98dBm/15kHz				
Noc2: 98dBm/15kHz		Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
\$\frac{\fr				
Es2 / Noc2: -infinity				1 -
During T2:		1 =		l a
During T2:		Es2 / Noc2: -infinity	0dB	Es2 / Noc2: -infinity
Noc1:-98dBm/15kHz		ĺ		1
Noc1:-98dBm/15kHz		During T2:	During TO:	During T2:
Noc2: -98dBm/15kHz				
Est / Noc1: +8dB		Noc1: -98dBm/15kHz	OdB	Noc1: -98dBm/15kHz
Est / Noc1: +8dB			OdB	
\$\frac{\text{\color}{\color} 2 \ \text{\color}{\color} 1.1 \text{\color}{\color} 3. \\ During T3: \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				1 =
During T3:		ES1 / Noc1: +8dB	loan	ES1 / Noc1: +8dB
During T3:		Ês2 / Noc2: +11dB	-1dB	Ês2 / Noc2: +10dB
Noc1: -98dBm/15kHz				
Noc1: -98dBm/15kHz		During T2:	During T2:	During T2:
Noc2; -98dBm/15kHz				
Es1 / Noc1: +8dB		Noc1: -98dBm/15kHz		
Es1 / Noc1: +8dB		Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
\$\frac{\capacter}{\capacter}\$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		1 -		
A3-Offset: 0dB				
A3-Offset: 0dB		Ës2 / Noc2: +11dB	-1dB	Ës2 / Noc2: +10dB
unknown target cell During T1: Noc1: -98dBm/15kHz During T1: OdB During T1: Noc1: -98dBm/15kHz During T1: Noc2: -98dBm/15kHz During T2: OdB During T2: Noc2: -98dBm/15kHz During T2: OdB During T2: Es1 / Noc2: -98dBm/15kHz During T2: OdB During T2: Noc1: -98dBm/15kHz During T2: OdB During T2: Noc1: -98dBm/15kHz During T2: Noc1: -98dBm/15kHz During T2: OdB During T2: Noc1: -98dBm/15kHz During T2: Noc2: -98dBm/15kHz During T1: OdB During T1: During T1: During T1: During T1: During T1: During T1: Noc1: -98dBm/15kHz During T1: OdB Noc1: -98dBm/15kHz Noc1: -98dBm/15kHz Noc1: -98dBm/15kHz Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz<	6 3 1 2 NR SA FR1 handover with		-1dB	
During T1: During T1: During T1: OdB Noc1: -98dBm/15kHz Noc1: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB OdB Es1 / Noc1: 8dB Es2 / Noc2: -infinity OdB OdB Es1 / Noc1: 8dB Es2 / Noc2: -infinity OdB		AS Offset. Odb	Tub	AS Oliset. 10B
Noc1: -98dBm/15kHz	unknown target cell			
Noc1: -98dBm/15kHz		During T1:	During T1:	During T1:
Noc2: -98dBm/15kHz				Noc1: -98dBm/15kHz
Es1 / Noc1: 8dB Es2 / Noc2: -infinity				
Es2 / Noc2: -infinity				
Es2 / Noc2: -infinity		Ês1 / Noc1: 8dB	l0dB	Ês1 / Noc1: 8dB
During T2:				
Noc1: -98dBm/15kHz		L32 / NOC2IIIIIIIty	OGB	L32 / NOC2IIIIIIIty
Noc1: -98dBm/15kHz				
Noc1: -98dBm/15kHz		During T2:	During T2:	During T2:
Noc2: -98dBm/15kHz		Noc198dBm/15kHz		Noc1: -98dBm/15kHz
Ê\$1 / Noc1: +8dB Ê\$2 / Noc2: +8dB 1.5dB Ê\$2 / Noc2: +9.5dB				
Es2 / Noc2: +8dB		la .		l a
Es2 / Noc2: +8dB		Es1 / Noc1: +8dB	0dB	Es1 / Noc1: +8dB
During T1:		Ês2 / Noc2: +8dB		Ês2 / Noc2: +9 5dB
Handover with unknown Target Cell Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB OdB Es1 / Noc1: 4dB Es2 / Noc2: -infinity OdB Es1 / Noc1: 4dB Es2 / Noc2: -infinity OdB Es2 / Noc2: -infinity OdB	6 2 1 2 ND CA ED1 ED1			
Cell Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: 4dB 0dB ÛdB Ês1 / Noc1: 4dB Ês2 / Noc2: -infinity DdB ÛdB Ês2 / Noc2: -infinity During T2: During T2: During T2: During T2: Noc1: -98dBm/15kHz 0dB Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: +4dB 0dB Ês1 / Noc1: +4dB Ês2 / Noc2: +5dB 1.7dB Ês2 / Noc2: +6.7dB 6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell Noc1: -100dBm/15kHz OdB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz Ês1 / Noc1: +12dB 1.55dB Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity				
Cell Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: 4dB 0dB ÛdB Ês1 / Noc1: 4dB Ês2 / Noc2: -infinity DdB ÛdB Ês2 / Noc2: -infinity During T2: During T2: During T2: During T2: Noc1: -98dBm/15kHz 0dB Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: +4dB 0dB Ês1 / Noc1: +4dB Ês2 / Noc2: +5dB 1.7dB Ês2 / Noc2: +6.7dB 6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell Noc1: -100dBm/15kHz OdB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz Ês1 / Noc1: +12dB 1.55dB Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity	Handover with unknown Target	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
ÊS1 / Noc1: 4dB 0dB 0dB ÊS1 / Noc1: 4dB ÊS2 / Noc2: -infinity 0dB ÊS2 / Noc2: -infinity During T2: During T2: During T2: Noc1: -98dBm/15kHz 0dB Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz ÊS1 / Noc1: +4dB 0dB ÊS1 / Noc1: +4dB ÊS2 / Noc2: +5dB 1.7dB ÊS2 / Noc2: +6.7dB 6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell During T1: During T1: During T1: Noc1: -100dBm/15kHz 0dB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz ÊS1 / Noc1: +12dB 1.55dB ÊS1 / Noc1: +13.55dB ÊS2 / Noc2: -infinity ÔdB ÊS2 / Noc2: -infinity				
Es2 / Noc2: -infinity		1 -		
During T2: Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz During T2: Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz DdB Noc2: -98dBm/15kHz DdB Noc2: -98dBm/15kHz DdB DdB DdB DdB DdB DdB DdB DdB DdB DdB				
During T2: Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz Ês1 / Noc1: +4dB Ês2 / Noc2: +5dB During T2: Noc1: -98dBm/15kHz OdB OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz OdB Noc2: +6.7dB 03.1.4 NR SA FR1 – E-UTRA handover with known target cell Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz Noc2: -98dBm/15kHz Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz		Es2 / Noc2: -infinity	OdB	Es2 / Noc2: -infinity
Noc1: -98dBm/15kHz				
Noc1: -98dBm/15kHz		During T2:	During T2	During T2:
Noc2: -98dBm/15kHz				
ÊS1 / Noc1: +4dB 0dB ÊS1 / Noc1: +4dB ÊS2 / Noc2: +5dB 1.7dB ÊS2 / Noc2: +6.7dB 6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell During T1: Noc1: -100dBm/15kHz OdB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz ÊS1 / Noc1: +12dB 1.55dB ÊS1 / Noc1: +13.55dB ÊS2 / Noc2: -infinity OdB ÊS2 / Noc2: -infinity				
ÊS1 / Noc1: +4dB 0dB ÊS1 / Noc1: +4dB ÊS2 / Noc2: +5dB 1.7dB ÊS2 / Noc2: +6.7dB 6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell During T1: Noc1: -100dBm/15kHz OdB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz Noc2: -98dBm/15kHz OdB Noc2: -98dBm/15kHz ÊS1 / Noc1: +12dB 1.55dB ÊS1 / Noc1: +13.55dB ÊS2 / Noc2: -infinity OdB ÊS2 / Noc2: -infinity		Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
Ês2 / Noc2: +5dB 1.7dB Ês2 / Noc2: +6.7dB 6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell During T1: Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz Noc2: -98dBm/15kHz		Ês1 / Noc1: +4dB	0dB	Ês1 / Noc1: +4dB
6.3.1.4 NR SA FR1 – E-UTRA handover with known target cell Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz OdB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz				1 -
handover with known target cell Noc1: -100dBm/15kHz 0dB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: +12dB 1.55dB Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity 0dB Ês2 / Noc2: -infinity		ESZ / NUCZ. TOUB	1./UD	E32 / NUC2. +0./UB
handover with known target cell Noc1: -100dBm/15kHz 0dB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: +12dB 1.55dB Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity 0dB Ês2 / Noc2: -infinity		<u></u>		<u></u>
handover with known target cell Noc1: -100dBm/15kHz 0dB Noc1: -100dBm/15kHz Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: +12dB 1.55dB Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity 0dB Ês2 / Noc2: -infinity	6.3.1.4 NR SA FR1 – E-UTRA		During T1:	
Noc2: -98dBm/15kHz 0dB Noc2: -98dBm/15kHz Ês1 / Noc1: +12dB 1.55dB Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity 0dB Ês2 / Noc2: -infinity	handover with known target cell	Noc1: -100dBm/15kHz	0dB	Noc1: -100dBm/15kHz
Ês1 / Noc1: +12dB 1.55dB Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity 0dB Ês2 / Noc2: -infinity				
Ês2 / Noc2: -infinity OdB Ês2 / Noc2: -infinity		Noc2: -08dBm/15kHz		
Ês2 / Noc2: -infinity OdB Ês2 / Noc2: -infinity		la .		l a
		Ês1 / Noc1: +12dB		Ês1 / Noc1: +13.55dB
During T2: During T2: During T2:		Ês1 / Noc1: +12dB	1.55dB	Ês1 / Noc1: +13.55dB
լեսнінд т.г. լեսнінд т.г. լեսнінд т.г.		Ês1 / Noc1: +12dB	1.55dB	Ês1 / Noc1: +13.55dB
		Ês1 / Noc1: +12dB Ês2 / Noc2: -infinity	1.55dB 0dB	Ês1 / Noc1: +13.55dB Ês2 / Noc2: -infinity

Noc1: -100dBm/15kHz	0dB	Noc1: -100dBm/15kHz
Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
Ês1 / Noc1: -4dB	-1.55dB	Ês1 / Noc1: -5.55dB
Ês2 / Noc2: +8dB	1.55dB	Ês2 / Noc2: +9.55dB
During T3:	During T3:	During T3:
Noc1: -100dBm/15kHz	0dB	Noc1: -100dBm/15kHz
Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
Ês1 / Noc1: -4dB	-1.55dB	Ês1 / Noc1: -5.55dB
Ês2 / Noc2: +8dB	1.55dB	Ês2 / Noc2: +9.55dB

	T		I
6.3.1.5 NR SA FR1 – E-UTRA	During T1:	During T1:	During T1:
handover with unknown target	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
cell	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
Cell		I	
	Ês1 / Noc1: 0dB	0dB	Ês1 / Noc1: 0dB
	Ës2 / Noc2: -infinity	0dB	Ês2 / Noc2: -infinity
	During T2:	During T2:	During T2:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: 0dB	0dB	Ês1 / Noc1: 0dB
	l a	0dB	
	Ës2 / Noc2: +7dB		Ês2 / Noc2: +7dB
6.3.2.1.1 NR SA FR1 RRC re-	During T1:	During T1:	During T1:
establishment	Noc: -98dBm/15kHz	0dB	Noc: -98dBm/15kHz
	Ês1 / Noc: +7dB	0dB	Ês1 / Noc: +7dB
	1	I	
	Ës2 / Noc: +4dB	0dB	Ês2 / Noc: +4dB
	During T2:	During T2:	During T2:
	Noc: -98dBm/15kHz	0dB	Noc: -98dBm/15kHz
	Ës1 / Noc: -infinity	0dB	Ês1 / Noc: -infinity
	Ês2 / Noc: +4dB	0dB	Ês2 / Noc: +4dB
	232 / 1400. · 44B	OGB	L32 / 1400. 140B
	- ·		
	During T3:	During T3:	During T3:
	Noc: -98dBm/15kHz	0dB	Noc: -98dBm/15kHz
	Ês1 / Noc: -infinity	0dB	Ês1 / Noc: -infinity
	1 a		
	Ës2 / Noc: +4dB	0dB	Ês2 / Noc: +4dB
6.3.2.1.2 NR SA FR1 - FR1 RRC	During T1:	During T1:	During T1:
re-establishment	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
ie-establisiinent			
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	Ês1 / Noc1: +4dB	0dB	Ês1 / Noc1: +4dB
	Ês2 / Noc2: -infinity	0dB	Ês2 / Noc2: -infinity
	L32 / 14062. Illillility	ОСВ	L32 / 14062. Illillity
	During T2:	During T2:	During T2:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	
	la .		Noc2: -98dBm/15kHz
	Ës1 / Noc1: -infinity	0dB	Ës1 / Noc1: -infinity
	Ês2 / Noc2: -infinity	0dB	Ês2 / Noc2: -infinity
		02	_== /
	During at TO	Di.a. a. TO.	Di.a a. TO.
	During T3:	During T3:	During T3:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
	1 =	0dB	
	Ês1 / Noc1: -infinity		Ês1 / Noc1: -infinity
	Ës2 / Noc2: +7dB	0dB	Ës2 / Noc2: +7dB
6.3.2.2.1	Absolute uplink power:		Absolute uplink power:
0.0.1.1.1	Normal conditions ±9dB	2.1dB	Normal conditions ±11.1dB
	Normal Conditions ±30B	2.106	Normal Conditions ±11.10B
	Relative uplink power step:		Relative uplink power step:
	Normal conditions ±2.5dB	0.7dB	Normal conditions ±3.2dB
		045	. 10
	Live in energy		Live in the control
	Uplink timing:		Uplink timing:
	15kHz SCS T _e ±12*64*T _c	112T _c	15kHz SCS T _e ±880*T _c
	30kHz SCS T _e ±8*64*T _c	112T _c	30kHz SCS T _e ±624*T _c
6.3.2.2.2			
	Same as 6.3.2.2.1	Same as 6.3.2.2.1	Same as 6.3.2.2.1
6.3.2.3.1 NR SA FR1 RRC	During T1:	During T1:	During T1:
connection release with	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
redirection	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
realiection		I	
	Ês1 / Noc1: +4dB	0dB	Ēs1 / Noc1: +4dB
	Ês2 / Noc2: -infinity	0dB	Ês2 / Noc2: -infinity
			7
	During T2:	During TO:	During T2:
	During T2:	During T2:	During T2:
	Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
	Noc2: -98dBm/15kHz	0dB	Noc2: -98dBm/15kHz
1			
		UMP	Fc1 / Noc1: ±4dD
	Ês1 / Noc1: +4dB	0dB	Ês1 / Noc1: +4dB
		0dB	Es1 / Noc1: +4dB Ês2 / Noc2: +4dB
6.3.2.3.2 NR SA FR1 – F-LITRA	Ês1 / Noc1: +4dB Ês2 / Noc2: +4dB	0dB	Ês2 / Noc2: +4dB
6.3.2.3.2 NR SA FR1 – E-UTRA	Ês1 / Noc1: +4dB Ês2 / Noc2: +4dB During T1:	0dB During T1:	Ês2 / Noc2: +4dB During T1:
RRC connection release with	Ês1 / Noc1: +4dB Ês2 / Noc2: +4dB During T1: Noc1: -98dBm/15kHz	OdB During T1: OdB	Ês2 / Noc2: +4dB During T1: Noc1: -98dBm/15kHz
	Ês1 / Noc1: +4dB Ês2 / Noc2: +4dB During T1:	0dB During T1:	Ês2 / Noc2: +4dB During T1:
RRC connection release with	Ês1 / Noc1: +4dB Ês2 / Noc2: +4dB During T1: Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz	OdB During T1: OdB OdB	Ês2 / Noc2: +4dB During T1: Noc1: -98dBm/15kHz Noc2: -98dBm/15kHz
RRC connection release with	Ês1 / Noc1: +4dB Ês2 / Noc2: +4dB During T1: Noc1: -98dBm/15kHz	OdB During T1: OdB	Ês2 / Noc2: +4dB During T1: Noc1: -98dBm/15kHz

During T2:	During T2:	During T2:
Noc1: -98dBm/15kHz	0dB	Noc1: -98dBm/15kHz
		Noc2: -98dBm/15kHz
		Ês1 / Noc1: +4dB
Ês2 / Noc2: +4dB	0dB	Ês2 / Noc2: +4dB

6.4.1.1 EN-DC FR1 UE transmit	Same as 4.4.1.1	Same as 4.4.1.1	Same as 4.4.1.1
timing accuracy			
6.4.3.1 NR SA FR1 timing	N_{oc} = -98 dBm/15 kHz (Config 1, 2, 4, 5)	0	N_{oc} = -98 dBm/15 kHz (Config 1,
advance adjustment accuracy		_	2)
	N _{oc} = -95 dBm/15 kHz (Config 3, 6)	0	$N_{oc} = -95 \text{ dBm/15 kHz (Config 3)}$
	£ (),		$\hat{E}s_x / N_{oc} = 3 dB$
	$\hat{E}s_x / N_{oc} = 3 dB$	0	LIE TAAA 6-:: 45141- COC
	LIE Timing Advance Adjustment	1/ 00 To	UE TAAA for 15kHz SCS = ±344
	UE Timing Advance Adjustment	+/- 88 Tc	T _c
	Accuracy for 15kHz SCS = \pm 256 T _c + TT		UE TAAA for 30kHz SCS = ±344
	UE Timing Advance Adjustment	+/- 88 Tc	T _c
	Accuracy for 30kHz SCS = ±256 T _c + TT	17-00 10	i c
6.5.1.1 NR SA FR1 radio link	SNR during	Offset during	SNR during
monitoring out-of-sync test for	T1: 1dB	T1: +0.9dB	T1: 1.9dB
PCell configured with SSB-based	T2: -7dB	T2: +0.9dB	T2: -6.1dB
RLM RS in non-DRX mode	T3: -15dB	T3: -0.9dB	T3: -15.9dB
	1.6. 2662		1.0. 20.002
6.5.1.2 NR SA FR1 radio link	SNR during	Offset during	SNR during
monitoring in-sync test for PCell	T1: 1dB	T1: +0.9dB	T1: 1.9dB
configured with SSB-based RLM	T2: -7dB	T2: +0.9dB	T2: -6.1dB
RS in non-DRX mode	T3: -15dB	T3: -0.9dB	T3: -15.9dB
	T4: -4.5dB	T4: -0.9dB	T4: -5.4dB
	T5: 1dB	T5: 0.9dB	T5: 1.9dB
			For testing of a UE which
			supports 4RX on all bands, the
			SNR during T3 and T4 is
			modified as specified in section
			D.4.1.1
6.5.1.3 NR SA FR1 radio link	Same as 6.5.1.1	Same as 6.5.1.1	Same as 6.5.1.1
monitoring out-of-sync test for			
PCell configured with SSB-based			
RLM RS in DRX mode			
6.5.1.4 NR SA FR1 radio link	Same as 6.5.1.2	Same as 6.5.1.2	Same as 6.5.1.2
monitoring in-sync test for PCell			
configured with SSB-based RLM			
RS in DRX mode			
6.5.1.5 NR SA FR1 radio link	Same as 6.5.1.1	Same as 6.5.1.1	Same as 6.5.1.1
monitoring out-of-sync test for			
PCell configured with CSI-RS-			
based RLM RS in non-DRX mode			
6.5.1.6 NR SA FR1 radio link	Same as 6.5.1.2	Same as 6.5.1.2	Same as 6.5.1.2
monitoring in-sync test for PCell			
configured with CSI-RS-based			
RLM RS in non-DRX mode			
6.5.1.7 NR SA FR1 radio link	Same as 6.5.1.1	Same as 6.5.1.1	Same as 6.5.1.1
monitoring out-of-sync test for			
PCell configured with CSI-RS-			
based RLM RS in DRX mode			
6.5.1.8 NR SA FR1 radio link	Same as 6.5.1.2	Same as 6.5.1.2	Same as 6.5.1.2
monitoring in-sync test for PCell			
configured with CSI-RS-based			
RLM RS in DRX mode	1011		
6.6.1.1 SA event triggered	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
reporting tests without gap under			
non-DRX	0	0	0
6.6.1.2 SA event triggered	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
reporting tests without gap under			
DRX	Comp. co. 4 C 1 1	Comp 4 0 1 1	Comp. 00 4 C 1 1
6.6.1.3 SA event triggered	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
reporting tests with per-UE gaps			
under non-DRX	10	0	10
6.6.1.4 SA event triggered	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
reporting tests with per-UE gaps			
under DRX		0	0
6.6.1.5 SA event triggered	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
reporting tests without gap under			
non-DRX with SSB index reading			

	1-	1-	1-
6.6.1.6 SA event triggered reporting tests with per-UE gaps under non-DRX with SSB index	Same as 4.6.1.1	Same as 4.6.1.1	Same as 4.6.1.1
reading			
6.6.2.1 NR SA FR1-FR1 event-	During T1:	During T1:	During T1:
triggered reporting in non-DRX	Freq 1 Noc: -98dBm/15kHz	0dB	Freq 1 Noc: -98dBm/15kHz
	Freq 2 Noc: -98dBm/15kHz	0dB	Freq 2 Noc: -98dBm/15kHz
	Ês1 / Noc: +4.00dB	0dB	Ês1 / Noc: +4.00dB
	Ês2 / Noc: -infinity	0dB	Ês2 / Noc: -infinity
	During T2:	During T2:	During T2:
	Freq 1 Noc: -98dBm/15kHz	0dB	Freq 1 Noc: -98dBm/15kHz
	Freq 2 Noc: -98dBm/15kHz	0dB	Freq 2 Noc: -98dBm/15kHz
	Ês1 / Noc: +4.00dB	0dB	Ês1 / Noc: +4.00dB
	Ês2 / Noc: +7.00dB	0dB	Ês2 / Noc: +7.00dB
6.6.2.2 NR SA FR1-FR1 event-	Same as 6.6.2.1	Same as 6.6.2.1	Same as 6.6.2.1
triggered reporting in DRX			
6.6.2.5 NR SA FR1-FR1 event-	Same as 6.6.2.1	Same as 6.6.2.1	Same as 6.6.2.1
triggered reporting in non-DRX with SSB time index detection			
6.6.2.6 NR SA FR1-FR1 event-	Same as 6.6.2.1	Same as 6.6.2.1	Same as 6.6.2.1
	Jame as 0.0.2.1	Jaine as 0.0.2.1	June as 0.0.2.1
triggered reporting in DRX with SSB time index detection			
6.6.3.1 NR SA FR1 – E-UTRAN	During T1:	During T1:	During T1:
event-triggered reporting in non-	Freq 1 Noc: -106dBm/15kHz	0dB	Freq 1 Noc: -106dBm/15kHz
DRX	Freq 2 Noc: -106dBm/15kHz	0dB	Freq 2 Noc: -106dBm/15kHz
	Ês1 / Noc: +18.00dB	+1.65dB	Ês1 / Noc: +19.65dB
	Ês2 / Noc: -infinity	0dB	Ês2 / Noc: -infinity
	During T2:	During T2:	During T2:
	Freq 1 Noc: -106dBm/15kHz	0dB	Freq 1 Noc: -106dBm/15kHz
	Freq 2 Noc: -106dBm/15kHz	0dB	Freq 2 Noc: -106dBm/15kHz
	Ês1 / Noc: -2dB	-1.65dB	Ês1 / Noc: -3.65dB
	Ës2 / Noc: +19.00dB	1.65dB	Ês2 / Noc: +20.65dB
6.6.3.2 NR SA FR1 – E-UTRAN	Same as 6.6.3.1	Same as 6.6.3.1	Same as 6.6.3.1
event-triggered reporting in DRX			
6.7.1.1.1 NR SA FR1 SS-RSRP	TEST CONFIGURATION 1, 2,		
absolute measurement accuracy			
discourate medical ement decaracy	Test 1:	Test 1:	Test 1:
	Noc: -106dBm/15kHz	-1.5dB	Noc: -107.5dBm/15kHz
	Ês1 / Noc: +6.0dB	0dB	Ês1 / Noc: +6.0dB
	Ës2 / Noc: +1.0dB	+1.0dB	Ês2 / Noc: +2.0dB
	Reported RSRP values: ±4.5dB	Via mapping	RSRP_45 to RSRP_57
	Test 2:	Test 2:	Test 2:
			1
	Noc: -88dBm/15kHz	0dB	Noc: -88dBm/15kHz
	Ês1 / Noc: +6.0dB	0dB	Ês1 / Noc: +6.0dB
	Ês2 / Noc: +1.0dB	+1.0dB	Ês2 / Noc: +2.0dB
	Reported RSRP values: ±8dB	Via mapping	RSRP_61 to RSRP_80
	Test 3:	Test 3:	Test 3:
	Noc: -116dBm/15kHz + ΔBG_offset	0dB	Noc: -116dBm/15kHz +
	Ês1 / Noc: +3.0dB	0dB	ΔBG offset
	Ês2 / Noc: -1.0dB	+0.8dB	Ês1 / Noc: +3.0dB
	LSZ / NUCI.UUD	10.00D	Ês2 / Noc: -0.2dB
	Departed DCDD values: 104D	Via mannina	L32 / INUCU.ZUD
	Reported RSRP values: ±6dB	Via mapping	DCDD 24 to DCDD 47
			RSRP_34 to RSRP_47
			RSRP_35 to RSRP_47
			RSRP_35 to RSRP_48
			RSRP_36 to RSRP_48
			RSRP 36 to RSRP 49
			RSRP_37 to RSRP_50
			RSRP_38 to RSRP_50
			depending on operating band
	TEST CONFIGURATION 3	Took 4:	Took 1.
	Test 1:	Test 1:	Test 1:
	Noc: -110dBm/30kHz	-0.8dB	Noc: -110.8dBm/30kHz
T. Control of the Con	Ês1 / Noc: +6.0dB	0dB	Ês1 / Noc: +6.0dB
	20171100. 10.0GB		

	Ês2 / Noc: +1.0dB	+1.0dB	Ês2 / Noc: +2.0dB
	Reported RSRP values: ±4.5dB	Via mapping	RSRP_42 to RSRP_54
	Test 2:	Test 2:	Test 2:
	Noc: -91dBm/30kHz	0dB	Noc: -91dBm/30kHz
	Ês1 / Noc: +6.0dB	0dB	Ês1 / Noc: +6.0dB
	Ês2 / Noc: +1.0dB	+1.0dB	Ês2 / Noc: +2.0dB
	Reported RSRP values: ±8dB	Via mapping	RSRP_58 to RSRP_77
	Test 3:	Test 3:	Test 3:
	Noc: -113dBm/30kHz + ΔBG offset	0dB	Noc: -113dBm/30kHz +
	Ês1 / Noc: +3.0dB	0dB	ΔBG_offset
	Ês2 / Noc: -1.0dB	+0.8dB	Ês1 / Noc: +3.0dB
			Ês2 / Noc: -0.2dB
	Reported RSRP values: ±6dB	Via mapping	
			RSRP_37 to RSRP_50
			RSRP_38 to RSRP_50
			RSRP_38 to RSRP_51
			RSRP_39 to RSRP_51
			RSRP_39 to RSRP_52
			RSRP_40 to RSRP_53
			RSRP_41 to RSRP_53
T		0.00.000.00	depending on operating band

The derivation of the RSRP values takes into account the uncertainty in Cell 2 SS-RSRP from N_{oc} and $\hat{E}s_2 / N_{oc}$, the allowed UE reporting accuracy, and the UE mapping function.

The SS-RSRP values given above are for normal conditions. In all cases the RSRP values are 4.5dB wider at each end for extreme conditions.

6.7.1.1.2 NR SA FR1 SS-RSRP	<u>Test 1:</u>	<u>Test 1:</u>	<u>Test 1:</u>
relative measurement accuracy	Noc:		
	Test configuration 1, 2:-106dBm/15kHz	<u>0 dB</u>	Noc: -106 dBm/15kHz
	Test configuration 3:-110dBm/30kHz	<u>0 dB</u>	Noc: -110 dBm/30kHz
	Ês1 / Noc: +6.0dB	0 dB	Ês1 / Noc: +6.0dB
	Ês2 / Noc: +1.0dB	+1.0dB	Ês2 / Noc: +2.0dB
	Reported rel. SS-RSRP values: ±3dB	Via mapping	RSRP x-9 to RSRP x+1
	- topontou ron de riteria vanador zeuz	- via mapping	
	Test 2:	Test 2:	Test 2:
	Noc: -88dBm/15kHz	<u>0dB</u>	Noc: -88dBm/15kHz
	<u>Ês1 / Noc: +6.0dB</u>	<u>0dB</u>	<u>Ês1 / Noc: +6.0dB</u>
	Ês2 / Noc: +1.0dB	+1.0dB	Ês2 / Noc: +2.0dB
	Reported rel. SS-RSRP values: ±3dB	Via mapping	RSRP x-9 to RSRP x+1
	Test 3:	Test 3:	<u>Test 3:</u>
	Noc: -116dBm/15kHz + ΔBG offset	<u>0dB</u>	Noc: -116dBm/15kHz +
	_		ΔBG_offset
	<u>Ês1 / Noc: +3.0dB</u>	<u>0dB</u>	<u>Ês1 / Noc: +3.0dB</u>
	<u>Ês2 / Noc: -1.0dB</u>	+1.0dB	<u>Ês2 / Noc: 0dB</u>
	Reported re. SS-RSRP values: ±3dB	Via mapping	RSRP_x-8 to RSRP_x+2
The decision of the OO DODD			

The derivation of the SS-RSRP values takes into account the uncertainty in Cell 1 and Cell 2 RSRP from N_{oc} , $\hat{E}s_1 / N_{oc}$ and $\hat{E}s_2 / N_{oc}$, the allowed UE reporting accuracy, and the UE mapping function.

The RSRP values given above are for both normal and extreme conditions.

Annex G (normative): Statistical testing

G.1 General

The test requirements are expressed as absolute requirements with a single value stating the requirement or expressed as a success rate. The statistical nature depends on the type of test requirement. Some have large statistical variations, while others are not statistical in nature at all. When testing a parameter with a statistical nature, a confidence level is set. This establishes the probability that a Device Under Test (DUT) passing the test actually meets the test requirement

and determines how many times a test have to be repeated and what the pass and fail criteria is. This Annex describes how to set the statistical significance.

G.2 Statistical testing of delay and UE measurement performance in RRM tests

G.2.1 General

The RRM tests are either of deterministic or of statistical nature. The pass fail limits in tests of statistical nature are expressed as a limit (e.g. delay limit) and a success ratio applicable for the limit. The success ratio is 90% uniform (the complement is the error ratio ER = 10%).

G.2.2 Design of the test

The test is defined by the following design principles (see TS 36.521-1 clause G.X, Theory):

- 1) The early decision concept is applied.
- 2) A second limit is introduced: bad DUT factor M>1

To decide the test pass:

Supplier risk is applied based on the bad DUT quality

To decide the test fails

Customer risk is applied based on the specified DUT quality

The test is defined by the following parameters:

- 1) Limit ER = 0.1 (success ratio = 90%)
- 2) Bad DUT factor M=1.5 (selectivity)
- 3) Confidence level CL = 95% (for specified DUT and bad DUT-quality)

G.2.3 Numerical definition of the pass fail limits

Editor's Note:

 Further investigate the technical details behind this statistical method to ensure that this is applicable for FR2 radiated test cases.

Table G.2.3-1: pass fail limits

ne	nsp	ns _f	ne	nsp	ns _f	ne	nsp	ns _f	ne	nsp	ns _f
0	33	NA	43	408	283	86	737	644	129	1056	1021
1	46	NA	44	416	291	87	745	653	130	1064	1030
2	58	NA	45	424	299	88	752	661	131	1071	1039
3	69	NA	46	432	307	89	760	670	132	1078	1048
4	79	NA	47	440	315	90	767	679	133	1086	1057
5	89	NA	48	447	324	91	775	687	134	1093	1066
6	99	NA	49	455	332	92	782	696	135	1100	1074
7	109	NA	50	463	340	93	790	705	136	1108	1083
8	118	NA	51	471	348	94	797	713	137	1115	1092
9	127	NA	52	478	356	95	804	722	138	1122	1101
10	136	39	53	486	365	96	812	731	139	1130	1110
11	145	45	54	494	373	97	819	739	140	1137	1119
12	154	51	55	502	381	98	827	748	141	1144	1128
13	163	58	56	509	389	99	834	757	142	1152	1137
14	172	64	57	517	398	100	842	766	143	1159	1147
15	180	71	58	525	406	101	849	774	144	1166	1155
16	189	78	59	532	414	102	857	783	145	1174	1164
17	197	85	60	540	423	103	864	792	146	1181	1173
18	206	92	61	548	431	104	871	801	147	NA	1182
19	214	99	62	555	440	105	879	809	148		
20	223	106	63	563	448	106	886	818	149		
21	231	113	64	571	456	107	894	827	150		
22	239	120	65	578	465	108	901	836	151		
23	248	128	66	586	473	109	909	844	152		
24	256	135	67	594	482	110	916	853	153		
25	264	142	68	601	490	111	923	862	154		
26	272	150	69	609	499	112	931	871	155		
27	281	157	70	616	507	113	938	880	156		
28	289	165	71	624	516	114	946	888	157		
29	297	173	72	632	524	115	953	897	158		
30	305	180	73	639	533	116	960	906	159		
31	313	188	74	647	541	117	968	915	160		
32	321	196	75	654	550	118	975	924	161		
33	329	204	76	662	558	119	983	933	162		
34	337	211	77	669	567	120	990	941	163		
35	345	219	78	677	575	121	997	950	164		
36	353	227	79	684	584	122	1005	959	165		
37	361	235	80	692	592	123	1012	968	166		
38	369	243	81	700	601	124	1019	977	167		
39	377	251	82	707	610	125	1027	986	168		
40	385	259	83	715	618	126	1034	994	169		
41	393	267	84	722	627	127	1042	1003			
42	400	275	85	730	635	128	1049	1012			

The first column is the number of errors (ne = number of exceeded delays or number of wrong reports)

The second column is the number of samples for the pass limit (ns_p, ns=Number of samples= number of successes + number of exceedings or number of reports)

The third column is the number of samples for the fail limit (ns_f)

G.2.4 Pass fail decision rules

The pass fail decision rules apply for a single test, comprising one component in the test vector. The over all Pass /Fail conditions are defined in clause G.2.6

Having observed 0 errors, pass the test at 33+ samples, otherwise continue

Having observed 1 error, pass the test at 46+ samples, otherwise continue

Having observed 2 errors, pass the test at 58+ samples, otherwise continue

Having observed 10 errors, pass the test at 136+ samples, fail the test at 39 samples, otherwise continue Having observed 146 errors, pass the test at 1181+ samples, fail the test at 1173- samples, otherwise continue Having observed 147 errors, fail the test at 1182- samples,

Where x+ means: x or more, x- means x or less

NOTE 1: an ideal DUT passes after 33 samples. The maximum test time is 1181 samples.

G.2.5 Void

G.2.6 Test conditions for delay tests and UE measurement performance

Table G.2.6-1: test conditions

Test	Statistical independence	Number of components in the test vector, as specified in the test requirements and initial conditions of the applicable test	Over all Pass/Fail condition
All tests in clauses 4.4.3, 4.5, 4.6, 5.4.3, 5.5, 5.6, 6.1, 6.2, 6.3.1, 6.3.2.1, 6.3.2.3, 6.4.3, 6.5, 6.6, 7.1, 7.2, 7.3.1, 7.3.2.1, 7.3.2.3, 7.4.3, 7.5, 7.6 are delay tests of statistical nature while 4.3.2.2, 4.4.1, 5.3.2.2, 5.4.1, 6.3.2.2, 6.4.1, 7.3.2.2, 7.4.1 are not applicable, since they are deterministic.	Test procedure in all statistical tests ensures independency	1 per operating band (if tested, see 3A.3.3)	Full set of environmental conditions (5) per operating band
All tests in clauses 4.7, 5.7, 6.7 and 7.7 are UE level reports of statistical nature	Independency is assumed, although Layer 1 filtering is applied to the reported results	Full set of environmental conditions (5) per operating band	Full set of environmental conditions (5) per operating band

G.X Theory to derive the numbers in Table G.2.3-1 (informative)

TS 36.521-1 Annex G.X applies.

Annex H (normative): Default message contents for RRM

H.1

H.2 System information blocks message content exceptions

H.2.1 System information blocks message contents exceptions for NR intra frequency cell re-selection

SystemInformationBlockType2: for NR intra-frequency cell re-selection

Table H.2.1-1: SIB2: NR intra frequency cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.2-1			
Information Element	Value/remark	Comment	Condition
SIB2 ::= SEQUENCE {			
cellReselectionInfoCommon SEQUENCE {			
rangeToBestCell	Not present		
}			
intraFreqCellReselectionInfo SEQUENCE {			
q-RxLevMin	-70	-140 is actual value in dBm (-70 * 2 dBm)	dBm/15kHz
	-69	-137 is actual value in dBm (-69 * 2 + 1 dBm)	dBm/30kHz
smtc SEQUENCE {			
duration	sf1		SMTC.1
	sf5		SMTC.2
}			
deriveSSB-IndexFromCell	false		Asynchronous cells
	true		Synchronous cells
}			
}			

Condition	Explanation
SMTC.n	SMTC pattern n according to TS 38.133 [6] A.3.11
Synchronous cells	SSB indices of neigibour cells can be derived from timing of serving cell
Asynchronous cells	SSB indices of neigibour cells can not be derived from timing of serving cell

SystemInformationBlockType3: for NR intra-frequency cell re-selection

For NR Cell 2

Table H.2.1-2: SIB3: NR intra frequency cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.2-2			
Information Element	Value/remark	Comment	Condition
SIB3 ::= SEQUENCE {			
intraFreqNeighCellList SEQUENCE (SIZE (1maxCellIntra)) OF SEQUENCE {			
IntraFreqNeighCellInfo ::= SEQUENCE{			
physCellId	2	NR Cell 2 Id	
q-OffsetCell	dB0	0 is actual value in dB (0 * 2 dB)	
}			
}			
}			

SystemInformationBlockType1: for NR intra frequency cell re-selection

Table H.2.1-3: SIB1: NR intra frequency cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.1-2 Information Element	Value/remark	Comment	Condition
SIB1 ::= SEQUENCE {			
cellSelectionInfo SEQUENCE {			
q-RxLevMin	-70	-140 is actual value in dBm (-70 * 2 dBm)	dBm/15kHz
	-69	-137 is actual value in dBm (-69 * 2 +1 dBm)	dBm/30kHz
}			
}			

H.2.2 System information blocks message contents exceptions for NR inter frequency cell re-selection

SystemInformationBlockType2: for NR inter-frequency cell re-selection

Table H.2.2-1: SIB2: NR inter frequency cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.2-1			
Information Element	Value/remark	Comment	Condition
SIB2 ::= SEQUENCE {			
cellReselectionInfoCommon SEQUENCE {			
rangeToBestCell	Not present		
}			
cellReselectionServingFreqInfo SEQUENCE {			
s-NonIntraSearchP	25	50 is actual value in dB (25 * 2 dB)	NR Cell 1
	Not present		NR Cell 2
threshServingLowP	22	44 is actual value in dB (22 * 2 dB)	NR Cell 1
	22	44 is actual value in dB (22 * 2 dB)	NR Cell 2
cellReselectionPriority	4		NR Cell 1
}	5		NR Cell 2

intraFreqCellReselectionInfo SEQUENCE {		
smtc SEQUENCE {		
periodicityAndOffset CHOICE {		
sf20	0	
}		
duration	sf1	SMTC.1
	sf5	SMTC.2
}		
}		

Condition	Explanation
SMTC.n	SMTC pattern n according to TS 38.133 [6] A.3.11

SystemInformationBlockType4: for NR inter-frequency cell re-selection

For NR Cell 2

Table H.2.2-2: SIB4: NR inter frequency cell re-selection

Information Element	Value/remark	Comment	Condition
SIB4 ::= SEQUENCE {			
interFreqCarrierFreqList SEQUENCE (SIZE	1 Entry		
1maxFreq)) OF SEQUENCE {			
dl-CarrierFreq[1]	Downlink NR SSB ARFCN of NR Cell 2		
smtc[1] SEQUENCE {			
periodicityAndOffset CHOICE {			
sf20	0		
}			
duration	sf1		SMTC.1
	sf5		SMTC.2
}			
ssbSubcarrierSpacing[1]	kHz15		SSB.1 FR1
. 5	kHz30		SSB.2 FR1
deriveSSB-IndexFromCell[1]	false		Asynchronous cells
	true		Synchronous cells
q-RxLevMin[1]	-70	-140 is actual value in dBm (-70 * 2 dBm)	dBm/15kHz
	-69	-137 is actual value in dBm (-69 * 2 +1 dBm)	dBm/30kHz
threshX-HighP[1]	24	48 is actual value in dB (24 * 2 dB)	
threshX-LowP[1]	25	50 is actual value in dB (25 * 2 dB)	
cellReselectionPriority[1]	5	,	
q-OffsetFreq[1]	dB0	0 is actual value in dB (0 * 2 dB).	
}			

SystemInformationBlockType1: for NR inter frequency cell re-selection

Table H.2.2-3: SIB1: NR inter frequency cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.1-28			
Information Element	Value/remark	Comment	Condition
SIB1 ::= SEQUENCE {			
cellSelectionInfo SEQUENCE {			
q-RxLevMin	-70	-140 is actual value in dBm (-70 * 2 dBm)	dBm/15kHz
	-69	-137 is actual value in dBm (-69 * 2 +1 dBm)	dBm/30kHz
}			
}			

Condition	Explanation
SSB.n FRm	SSB pattern n in FRm according to TS 38.133 [6] A.3.10
SMTC.n	SMTC pattern n according to TS 38.133 [6] A.3.11
Synchronous cells	SSB indices of neigibour cells can be derived from timing of serving cell
Asynchronous cells	SSB indices of neigibour cells can not be derived from timing of serving cell

H.2.3 System information blocks message contents exceptions for NR inter-RAT cell re-selection

SystemInformationBlockType1: for inter-RAT NR – E-UTRA cell re-selection

Table H.2.3-1: SIB1: Inter-RAT NR - E-UTRA cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.1-28			
Information Element	Value/remark	Comment	Condition
SIB1 ::= SEQUENCE {			
cellSelectionInfo SEQUENCE {			
q-RxLevMin	-70	-140 is actual value in dBm (-70 * 2 dBm)	dBm/15kHz
	-69	-137 is actual value in dBm (-69 * 2 +1 dBm)	dBm/30kHz
}			
}			

SystemInformationBlockType2: for inter-RAT NR – E-UTRA cell re-selection

For NR Cell 1

Table H.2.3-2: SIB2: Inter-RAT NR - E-UTRA cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.2-1			
Information Element	Value/remark	Comment	Condition
SIB2 ::= SEQUENCE {			
cellReselectionServingFreqInfo SEQUENCE {			
s-NonIntraSearchP	25	50 is actual value in dB (25 * 2 dB)	
threshServingLowP	22	44 is actual value in dB (22 * 2 dB)	
cellReselectionPriority	4		higher priority
	5		lower priority

}		
intraFreqCellReselectionInfo SEQUENCE {		
smtc SEQUENCE {		
periodicityAndOffset CHOICE {		
sf20	0	
}		
duration	sf1	SMTC.1
	sf5	SMTC.2
}		
}		
}		

Condition	Explanation
SMTC.n	SMTC pattern n according to TS 38.133 [6] A.3.11
higher priority	NR cell re-selection to higher priority E-UTRA
lower priority	NR cell re-selection to lower priority E-UTRA

 $SystemInformationBlockType 5: for inter-RAT\ NR-E-UTRA\ cell\ re-selection$

For E-UTRA Cell 1

Table H.2.3-3: SIB5: Inter-RAT NR - E-UTRA cell re-selection

Derivation Path: TS 38.508-1 [14], Table 4.6.2-4			
Information Element	Value/remark	Comment	Condition
SIB5 ::= SEQUENCE {			
carrierFreqListEUTRA SEQUENCE (SIZE	1 Entry		
(1maxEUTRA-Carrier)) OF SEQUENCE {			
carrierFreq[1]	Downlink EUTRA ARFCN		
	of E-UTRA Cell 1		
allowedMeasBandwidth[1]	mbw6		
presenceAntennaPort1[1]	FALSE		
cellReselectionPriority[1]	5		higher priority
	4		lower priority
threshX-High	24	48 is actual value	
		in dB (24 * 2 dB)	
threshX-Low	25	50 is actual value	
		in dB (25 * 2 dB)	
q-RxLevMin	-70	-140 is actual	
		value in dBm (-70	
		* 2 dBm)	
eutra-FreqNeighCellList[1] SEQUENCE (SIZE			
(1maxCellEUTRA)) OF SEQUENCE {			
physCellId	0		
q-OffsetCell	dB0		
}			
}			
}			

Condition	Explanation
higher priority	NR cell re-selection to higher priority E-UTRA
lower priority	NR cell re-selection to lower priority E-UTRA

H.3 RRC message content exceptions

H.3.1 RRC messages and information elements contents exceptions for NR measurement configuration

RRCReconfiguration: to setup NR Measurement Configuration

Table H.3.1-1: RRCReconfiguration: NR measurement Configuration

Derivation Path: TS 38.508-1 [14], Table 4.6.1-13 with condition MEAS and NR			
Information Element	Value/remark	Comment	Condition
RRCReconfiguration ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcReconfiguration ::= SEQUENCE {			
measConfig	MeasConfig-DEFAULT	Measurements	
		configuration	
}			
}			
}			

MeasConfig-DEFAULT: Configuration for NR measurement

Table H.3.1-2: MeasConfig-DEFAULT: Configuration of NR measurement

Derivation path: 38.508-1 [14] table 4.6.3-69			
Information Element	Value/Remark	Comment	Condition
measConfig ::= SEQUENCE {			
measObjectToAddModList SEQUENCE (SIZE	1 entry		
(1maxNrofMeasId)) OF SEQUENCE {			
measObject[1]	0		
measObject[1] CHOICE { measObjectNR	MeasObjectNR-		
measobjective	DEFAULT with		
	Condition INTRA-		
	FREQ MO		
}			
measObjectId[2]	1		INTER-
			FREQ OR
			INTER-RAT
measObject[2] CHOICE {			
measObjectNR	MeasObjectNR-		INTER-
	DEFAULT with		FREQ
	Condition INTER-		
measObjectNR	FREQ MO MeasObjectNR-		Deactivated
measobjectivit	DEFAULT with		SCell
	Condition Deactivated		30011
	SCell		
measObjectEUTRA	MeasObjectEUTRA-		INTER-RAT
,	DEFAULT		
}			
}			
reportConfigToAddModList SEQUENCE(SIZE	1 entry		
(1maxReportConfigld)) OF SEQUENCE {			
reportConfigld[1]	ReportConfigId		
reportConfig[1] CHOICE {	Daniel Carefield D		INITOA
reportConfigNR	ReportConfigNR- DEFAULT		INTRA- FREQ OR
	DELAGE		INTER-
			FREQ OR
			Deactivated
			SCell
reportConfigInterRAT	ReportConfigInterRAT-		INTER-RAT
	DEFAULT		
}			
}			
measIdToAddModList SEQUENCE (SIZE	1 entry		
(1maxNrofMeasId)) OF SEQUENCE {	Magald		
measId[1] measObjectId[1]	MeasId 0		INTRA-
measObjectiu[1]	0		FREQ
	1		INTER-
	-		FREQ OR
			INTER-RAT
			OR
			Deactivated
			SCell
reportConfigId[1]	ReportConfigId		
}	0		
quantityConfig	QuantityConfig-		
	DEFAULT QuantityConfig	TS 38.508-1 Table	L3
	QuantityConfig	4.6.3-127	FILTERING
		7.0.0-121	NEEDED
measGapConfig	MeasGapConfig-		GAP
g	DEFAULT		NEEDED
}			
•	I	1	L

Condition	Explanation	
GAP NEEDED	Measurement gap is needed for measurement	
INTRA-FREQ	Configuration for intra-frequency NR measurement tests	
INTER-FREQ	Configuration for inter-frequency NR measurement tests	
INTER-RAT	Configuration for inter-RAT EUTRA measurement tests	
Deactivated SCell	Configuration for measurement on deactivated SCell tests	
L3 FILTERING NEEDED L3 filtering is needed for measurement		

MeasObjectNR-DEFAULT: NR measurement object configuration

Table H.3.1-3: MeasObjectNR-DEFAULT: NR intra-frequency measurement object configuration

Derivation Path: TS 38.508-1 [14], Table 4.6.3-76			
Information Element	Value/remark	Comment	Condition
MeasObjectNR::= SEQUENCE {			
ssbFrequency	ARFCN-ValueNR of the SSB associated to serving cell	frequency of the serving cell	INTRA-FREQ MO
	ARFCN-ValueNR of the SSB associated to SCell		Deactivated SCell
	ARFCN-ValueNR of the SSB associated to inter- frequency neighbour cell		INTER-FREQ MO
ssbSubcarrierSpacing	kHz15		SSB.1 FR1
1 3	kHz30		SSB.2 FR1
	kHz120		SSB.1 FR2
	kHz240		SSB.2 FR2
referenceSignalConfig SEQUENCE {			
ssb-ConfigMobility SEQUENCE {			
ssb-ToMeasure	Not present		
deriveSSB-IndexFromCell	false		Asynchronous cells
	true		Synchronous cells OR RLM
}			
}			
absThreshSS-BlocksConsolidation SEQUENCE {			
thresholdRSRP	0	SS-RSRP < -156dB	
} measCycleSCell-v1530	sf640		Deactivated SCell
}			

Condition	Explanation
SSB.n FR1	SSB pattern n in FR1 according to TS 38.133 [6] A.3.10.1.1
SSB.n FR2	SSB pattern n in FR2 according to TS 38.133 [6] A.3.10.1.2
INTRA-FREQ MO	Configuration for NR MO associated to intra-frequency carrier
INTER-FREQ MO	Configuration for NR MO associated to inter-frequency carrier
Synchronous cells	SSB indices of neighbourcells can be derived from timing of serving cell
Asynchronous cells	SSB indices of neighbourcells cannot be derived from timing of serving cell
RLM	Configuration for RLM tests

MeasObjectEUTRA-DEFAULT: EUTRA measurement object configuration for NR FR1 to E-UTRAN handover

Table H.3.1-3A: MeasObjectEUTRA-DEFAULT: InterRAT EUTRA measurement object configuration for FR1 to E-UTRAN handover

Derivation Path: TS 38.508-1 [14], Table 4.6.3-74			
Information Element	Value/remark	Comment	Condition
MeasObjectEUTRA ::= SEQUENCE {			
carrierFreq	ARFCN-ValueEUTRA with condition DL SSB		
allowedMeasBandwidth	mbw6		
cellsToAddModListEUTRAN SEQUENCE (SIZE (1maxCellMeasEUTRA)) OF SEQUENCE{			
cellIndexEUTRA	1		
physCellId	0		
cellIndividualOffset	dB0		
}			
eutra-PresenceAntennaPort1	false		
}			

ReportConfigNR-DEFAULT: NR Report Configuration

Table H.3.1-4: ReportConfigNR-DEFAULT(Thres): NR report configuration for event A3 with a3-offset = Thres dB

Information Element	Value/remark	Comment	Condition
ReportConfigNR::= SEQUENCE {			
reportType CHOICE {			
eventTriggered SEQUENCE {			
eventId CHOICE {			
eventA3 SEQUENCE {			
a3-Offset CHOICE {			
rsrp	Thres*2	a3 offset = Thres dB	
}			
hysteresis	0	0 dB	
timeToTrigger	ms0		
}			
eventA4 SEQUENCE {			
a4-Threshold CHOICE {			
rsrp	Thres dB	Thres dB = A4-threshold	
}			
hysteresis	0		
timeToTrigger	ms0		
}			
reportAmount	r2		
reportQuantity-RsIndexes SEQUENCE {			SSB Index
rsrp	true		
rsrq	false		
sinr	false		
}			
maxReportCells	2		
maxNrofRS-IndexesToReport	2		SSB Index
includeBeamMeasurements	false		SSB Index
}			
}			

Condition	Explanation
SSB Index	To include SSB Index

ReportConfigInterRAT-DEFAULT: InterRAT NR Report Configuration for NR FR1 to E-UTRAN handover

Table H.3.1-4A: ReportConfigInterRAT- DEFAULT (b2-Thres1, b2-Thres2): InterRAT NR report configuration for FR1 to E-UTRAN handover with b2-Threshold1 = b2-Thres1 and b2-Threshold2EUTRA = b2-Thres2 dBm

Derivation Path: 38.508-1 [4] Table 4.6.3-141			
Information Element	Value/remark	Comment	Condition
ReportConfigInterRAT ::= SEQUENCE {			
reportType CHOICE {			
eventTriggered SEQUENCE {			
eventId CHOICE {			
eventB2 SEQUENCE {			
b2-Threshold1 CHOICE {			
rsrp	b2-Thres1	b2-Thres1 – 156 dBm	
}			
b2-Threshold2EUTRA CHOICE {			
rsrp	b2-Thres2	b2-Thres2 – 156 dBm	
}			
hysteresis	0	0 dB	
timeToTrigger	ms0		
}			
}			
reportAmount	infinity		
reportQuantityCell SEQUENCE {			
rsrp	true		
rsrq	false		
sinr	false		
}			
}			
}			
}			

QuantityConfig-DEFAULT: NR quantity configuration when L3 filtering is not used

Table H.3.1-5: QuantityConfig-DEFAULT: NR quantity configuration when L3 filtering is not used

Derivation Path: TS 38.508-1 [14], Table 4.6.3-127			
Information Element	Value/remark	Comment	Condition
QuantityConfig::= SEQUENCE {			
quantityConfigNR-List SEQUENCE (SIZE	1 entry		
(1maxNrofQuantityConfig)) OF SEQUENCE {			
quantityConfigCell[1] SEQUENCE {			
ssb-FilterConfig SEQUENCE {			
filterCoefficientRSRP	fc0	No L3 filtering	
filterCoefficientRSRQ	fc0	No L3 filtering	
filterCoefficientRS-SINR	fc0	No L3 filtering	
}			
csi-RS-FilterConfig SEQUENCE {			
filterCoefficientRSRP	fc0	No L3 filtering	
filterCoefficientRSRQ	fc0	No L3 filtering	
filterCoefficientRS-SINR	fc0	No L3 filtering	
}			
}			
}			
quantityConfigEUTRA	Not present		
quantityConfigEUTRA SEQUENCE {			
filterCoefficientRSRP	fc0		
filterCoefficientRSRQ	fc0		
filterCoefficientRS-SINR	fc0		

INTRA-FREQ	Configuration for intra-frequency NR measurement tests
INTER-FREQ	Configuration for inter-frequency NR measurement tests
INTER-RAT	Configuration for inter-RAT EUTRA measurement tests

MeasGapConfig-DEFAULT: measurement gap configuration

Table H.3.1-6: MeasGapConfig: measurement gap configuration

Derivation Path: TS 38.508-1 [14], Table 4.6.3-70				
Information Element	Value/remark	Comment	Condition	
MeasGapConfig ::= SEQUENCE {				
gapFR2 CHOICE {			gapFR2	
setup SEQUENCE {				
gapOffset	39		Pattern #13	
mgl	ms5dot5		Pattern #13	
mgrp	ms40		Pattern #13	
mgta	ms0			
}				
}				
gapFR1 CHOICE {			gapFR1	
setup SEQUENCE {				
gapOffset	39		Pattern #2	
	19		Pattern #4	
mgl	ms3		Pattern #2	
	ms6		Pattern #4	
mgrp	ms40		Pattern #2	
-	ms20		Pattern #4	
mgta	ms0			
}				
}				
gapUE CHOICE {			gapUE	
setup SEQUENCE {				
gapOffset	39		Pattern #0 OR Pattern #2	
	0		RLM	
mgl	ms6		Pattern #0 OR RLM	
	ms3		Pattern #2	
mgrp	ms40		Pattern #0 OR Pattern #2 OR RLM	
mgta	ms0			
}				
}				
}				

Condition	Explanation
-----------	-------------

Pattern #0	Measurement gap pattern #0 defined in TS 38.133 [6] Table 9.1.2-1 is used for measurement tests
Pattern #2	Measurement gap pattern #2 defined in TS 38.133 [6] Table 9.1.2-1 is used for measurement tests
Pattern #4	Measurement gap pattern #4 defined in TS 38.133 [6] Table 9.1.2-1 is used for measurement tests
Pattern #13	Measurement gap pattern #13 defined in TS 38.133 [6] Table 9.1.2-1 is used for measurement tests
RLM	Measurement gap pattern for RLM tests
gapFR2	Indicates measurement gap configuration that applies to FR2 only. gapFR2 cannot be configured together with gapUE. In (NG)EN-DC or NE-DC, gapFR2 can only be set up by NR RRC
gapFR1	Indicates measurement gap configuration that applies to FR1 only. gapFR1 cannot be configured together with gapUE. In (NG)EN-DC, gapFR1 cannot be set up by NR RRC
gapUE	Indicates measurement gap configuration that applies to all frequencies (FR1 and FR2). If gapUE is configured, then neither gapFR1 nor gapFR2 can be configured. In (NG)ENDC, gapUE cannot be set up by NR RRC.

MeasResults-DEFAULT: measurement result for NR measurements

Table H.3.1-7: MeasResults: measurement result for NR measurements

Derivation Path: TS 38.508-1 [14], Table 4.6.3-79 with condition	1 A3		
Information Element	Value/remark	Comment	Condition
measResults SEQUENCE {			
measld	Measld		
measResultServingMOList SEQUENCE (SIZE	2 entries		
(1maxNrofServingCells)) OF SEQUENCE {			
servCellId[1]	ServCellIndex of NR		
	SpCell		
measResultServingCell[1] SEQUENCE {			
physCellId	PhysCellId of NR		
	SpCell		
measResult SEQUENCE {			
cellResults SEQUENCE {			
resultsSSB-Cell SEQUENCE {			
rsrp	(0127)		
rsrq	(0127)		
}			
}			
}			
}			
}			
servCellId[2]	ServCellIndex of NR SCell		Deactivated SCell
measResultServingCell[2] SEQUENCE {			Deactivated SCell
physCellId	PhysCellId of NR SCell		
measResult SEQUENCE {	,		
cellResults SEQUENCE {			
resultsSSB-Cell SEQUENCE {			
rsrp	(0127)		
rsrq	(0127)		
}			
}			
}			
}			
measResultNeighCells CHOICE {			
measResultListNR SEQUENCE (SIZE(1maxCellReport)) OF SEQUENCE {	1 entry		INTRA- FREQ OR INTER- FREQ
physCellId[1]	PhysCellId of NR neighbour Cell		
measResult[1] SEQUENCE {			
cellResults SEQUENCE {			
resultsSSB-Cell SEQUENCE {			
rsrp	(0127)		
}			
}			
rsIndexResults SEQUENCE {	n entires of ResultsPerSSB-Index	ResultsPerS SB-IndexList	SSB Index
resultsPerSSB-Index SEQUENCE {	entry [1]		
ssb-Index	SSB-Index	an SS-Block within an SS-Burst	
}			
}			
}			
}			
measResultListEUTRA SEQUENCE (SIZE (1maxCellReport)) OF SEQUENCE {	1 entry		INTER-RAT

eutra-PhysCellId [1]	PhysCellId of E-UTRA	
	neighbour Cell	
measResult[1] SEQUENCE {		
rsrp	(097)	
rsrq	(034)	
}		
cgi-Info	Not present	
}		
}		
}		

Condition	Explanation
SSB Index	To include SSB Index
INTRA-FREQ	Configuration for intra-frequency NR measurement tests
INTER-FREQ	Configuration for inter-frequency NR measurement tests
INTER-RAT	Configuration for inter-RAT EUTRA measurement tests
Deactivated SCell	Configuration for measurement on Deactivated SCell tests

RadioLinkMonitoringConfig -DEFAULT: Default configuration for RLM resources

Table H.3.1-8: RadioLinkMonitoringConfig-DEFAULT: Default configuration for RLM and BFD resources

Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 Information Element	Value/remark	Comment	Condition
	value/reiliai K	Comment	Condition
RadioLinkMonitoringConfig ::= SEQUENCE {	2		
failureDetectionResourcesToAddModList	3 entries		
SEQUENCE			
(SIZE(1maxNrofFailureDetectionResources)) OF			
SEQUENCE {	haan Falling		
purpose[1]	beamFailure		
detectionResource[1] CHOICE {	<u> </u>		
ssb-Index	0		SSB BFD
csi-RS-Index	NZP-CSI-RS-ResourceId		CSI-RS BFD
	of the BFD-RSspecified		OR SSB
	in TC		RLM or CSI-
			RS RLM
}			
purpose[2]	rlf		SSB RLM
detectionResource[2] CHOICE {			SSB RLM
ssb-Index	0		
}			
purpose[3]	rlf		FR2 AND
			SSB RLM
detectionResource[2] CHOICE {			FR2 AND
			SSB RLM
ssb-Index	1		
}			
}			
beamFailureInstanceMaxCount	n2		
beamFailureDetectionTimer	pbfd4		
}	P		

Condition	Explanation	
SSB RLM	Configuration for SSB based RLM test cases	
CSI-RS RLM	Configuration for CSI-RS based RLM test cases	
SSB BFD	D Configuration for SSB based BFD test cases	
CSI-RS BFD Configuration for CSI-RS based BFD test cases		
FR2	Configuration for FR2 SSB based RLM test cases	

RLF-TimersAndConstants-DEFAULT: Default parameters for RLM related timers and counters

Table H.3.1-9: RLF-TimersAndConstants-DEFAULT

Derivation Path: TS 38.508-1 [14], Table 4.6.3-150			
Information Element	Value/remark	Comment	Condition
RLF-TimersAndConstants ::= SEQUENCE {			
t310	ms0		
}			

BeamFailureRecoveryConfig-DEFAULT: Default configuration for CBD and contention-free RACH in link recovery

Table H.3.1-10: BeamFailureRecoveryConfig-DEFAULT

Derivation Path: TS 38.508-1 [14], clause 6.3.2			
Information Element	Value/remark	Comment	Condition
BeamFailureRecoveryConfig ::= SEQUENCE {			
rootSequenceIndex-BFR	0		
rach-ConfigBFR	RACH-ConfigGeneric- DEFAULT		
rsrp-ThresholdSSB	64	-95dBm	
candidateBeamRSList SEQUENCE (SIZE(1maxNrofCandidateBeams)) OF CHOICE {	1 entry		
ssb[1] SEQUENCE {			SSB
ssb	1		
ra-PreambleIndex	50		
}			
csi-RS[1] SEQUENCE {			CSI-RS
csi-RS	NZP-CSI-RS-Resourceld of the CSI-RS resource used for CBD		
ra-OccasionList	1		
ra-PreambleIndex	50		
}			
}			
ssb-perRACH-Occasion	oneFourth		
ra-ssb-OccasionMaskIndex	Not present		
recoverySearchSpaceId	SearchSpaceId of the search space used for BFD RAR in DL active BWP		
ra-Prioritization	Not present		
beamFailureRecoveryTimer	Not present		
msg1-SubcarrierSpacing-v1530	kHz120		

Condition	Explanation	
SSB	Configuration for SSB based CBD	
CSI-RS	Configuration for CSI-RS based CBD	

RACH-ConfigGeneric-DEFAULT: Default generic configuration for contention-free RACH in link recovery

Table H.3.1-11: RACH-ConfigGeneric-DEFAULT

Derivation Path: TS 38.508-1 [14], Table 4.6.3-13	30		
Information Element	Value/remark	Comment	Condition
RACH-ConfigGeneric ::= SEQUENCE {			
prach-ConfigurationIndex	144		
msg1-FDM	one		
zeroCorrelationZoneConfig	11		
preambleReceivedTargetPower	-120		
preambleTransMax	n200		
powerRampingStep	dB2		
ra-ResponseWindow	sl40		
}			

H.3.2 RRC messages and information elements contents exceptions for NR cell re-selection and handoverRACH-ConfigGeneric: for NR cell re-selection and handover

Table H.3.2-1: RACH-ConfigGeneric: NR cell re-selection and handover

Derivation Path: TS 38.508-1 [14], Table 4.6.3-130			
Information Element	Value/remark	Comment	Condition
RACH-ConfigGeneric ::= SEQUENCE {			
prach-ConfigurationIndex	102		
}			

Table H.3.2-2: RRCReconfiguration-HO

Derivation Path: TS 38.508-1, table 4.6.1-13			
Information Element	Value/remark	Comment	Condition
RRCReconfiguration::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcReconfiguration SEQUENCE {			
radioBearerConfig	RadioBearerConfig with conditions SRB1 and SRB2 and DRBn and Reestablish_PDCP		RBConfig_K eyChange
	RadioBearerConfig with conditions DRBn and Recover_PDCP		RBConfig_N oKeyChang e
secondaryCellGroup	Not present		
nonCriticalExtension SEQUENCE {			
masterCellGroup	CellGroupConfig with conditions PCell_change	OCTET STRING (CONTAINING CellGroupConfig)	
}			
}			
}			
}			

Condition	Explanation
RBConfig_KeyChange	RadioBearerConfig to perform Intra-NR handover with security key
	change
RBConfig _NoKeyChange	RadioBearerConfig to perform Intra-NR handover without security key
_	change

H.3.3 RRC messages and information elements contents exceptions for NR inter-RAT handover

MobilityFromNRCommand: for Inter-RAT NR handover

Table H.3.3-1: MobilityFromNRCommand: InterRAT NR handover

Derivation Path: TS 38.508-1 [14], Table 4.6.1-8			
Information Element	Value/remark	Comment	Condition
MobilityFromNRCommand::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-		
	TransactionIdentifier		
criticalExtensions CHOICE {			
mobilityFromNRCommand SEQUENCE {			
targetRAT-Type	eutra		
targetRAT-MessageContainer	OCTET STRING		
	including the		
	RRCConnectionReconfig		
	uration message		
	according TS 36.508 [2],		
	table 4.6.1-8 with		
	condition HO-TO-EUTRA		
nas-SecurityParamFromNR	The 4 LSB of the		
	downlink NAS COUNT		
lateNonCriticalExtension	Not present		
nonCriticalExtension SEQUENCE {}	Not present		
}			
}			
}			

H.3.4 E-UTRA RRC messages and information elements contents exceptions for NR measurement configuration

RRCConnectionReconfiguration: Includes the nr-SecondaryCellGroupConfig-r15 to convey NR RRCReconfiguration message as specified in TS 38.331 [13].

Table H.3.4-1: RRCConnectionReconfiguration: NR RRC Reconfiguration in EN-DC

Derivation Path: 36.508 [25], Table 4.6.1-8 with condition	on MCG_and_SCG		
Information Element	Value/remark	Comment	Condition
RRCConnectionReconfiguration ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE{			
rrcConnectionReconfiguration-r8 ::= SEQUENCE			
{			
setup SEQUENCE {			
nr-SecondaryCellGroupConfig-r15	RRCReconfiguration		
}			
}			
}			
}			
}			
}			

ULInformationTransferMRDC: uplink transfer of MR DC information for transferring the NR RRC Measurement Report message in EN-DC

Table H.3.4-2: ULInformationTransferMRDC: uplink transfer of MR DC information

Derivation Path: 36.508 [25], Table 4.6.1-27			
Information Element	Value/remark	Comment	Condition
ULInformationTransferMRDC ::= SEQUENCE {			
ul-DCCH-MessageNR-r15	OCTET STRING including the MeasurementReport		
}			

RRCConnectionReconfigurationComplete: Includes the scg-ConfigResponseNR to convey NR RRCReconfigurationComplete message as specified in TS 38.331 [13].

Table H.3.4-3: RRCConnectionReconfigurationComplete: NR RRC Reconfiguration Complete in ENDC

Derivation Path: 36.508 [25], Table 4.6.1-9: with colling Information Element	Value/remark	Comment	Condition
RRCConnectionReconfigurationComplete ::=			
SEQUENCE {			
rrc-TransactionIdentifier	RRC-		
	TransactionIdentifier-UL		
criticalExtensions CHOICE {			
rrcConnectionReconfigurationComplete-r8			
SEQUENCE {			
nonCriticalExtension SEQUENCE {			
scg-ConfigResponseNR-r15	OCTET STRING		
	including the		
	RRCReconfigurationCom		
	plete message according		
	TS 38.508-1, table 4.6.1-		
	14.		
}			
}			
}			
}			

MeasConfig-DEFAULT: Configures measurement gap that applies to FR1 only in EN-DC as specified in TS 38.331 [13].

Table H.3.4-4: MeasConfig-DEFAULT

Information Element	Value/remark	Comment	Condition
MeasConfig-DEFAULT ::= SEQUENCE {			
measGapConfig	MeasGapConfig-FR1		
fr1-Gap-r15	false		gapUE
fr1-Gap-r15	true		gapFR1
}			

Condition	Explanation
gapUE	fr1-Gap-r15 set to false indicates the gap is applicable for measurements on FR1 and
	FR2. E-UTRAN includes this field only when the UE is configured with (NG)EN-DC.
1	fr1-Gap-r15 set to true indicates the gap is only applicable for measurements on FR1. E-UTRAN includes this field only when the UE is configured with (NG)EN-DC.

MeasGapConfig-FR1: Configures FR1 measurement gap by LTE RRC in EN-DC as specified in TS 38.331 [13].

Table 3.4-5: MeasGapConfig-FR1

Derivation Path: 36.508 [25], Table 4.6.6-1A			
Information Element	Value/remark	Comment	Condition
MeasGapConfig-FR1 ::= CHOICE {			
setup SEQUENCE {			
gapOffset CHOICE {			
gp0	39	TGRP = 40 ms	Pattern #0
gp4-r15	19	TGRP = 20 ms	Pattern #4
}			
}			
}			

Condition	Explanation
Pattern #0	gp0 corresponds to gap offset of Gap Pattern Id "0" with MGRP = 40ms
Pattern #4	gp4-r15 corresponds to gap offset of Gap Pattern Id "4" with MGRP = 40ms (see TS 38.133, Table 9.1.2-1). It can be applied for (NG)EN-DC, see TS 38.133, Table 9.1.2-2.

H.3.5 RRC messages and information elements contents exceptions for NR radio link monitoring (RLM)

CSI-RS information elements contents exception for NR RLM SSB-Based test cases

Table H.3.5-1: CSI-MeasConfig

Derivation Path: TS 38.508-1 [14] Table 7.3.1-2			
Information Element	Value/remark	Comment	Condition
CSI-MeasConfig::= SEQUENCE {			
csi-SSB-ResourceSetToAddModList SEQUENCE	1 entry		
(SIZE (1maxNrofCSI-SSB-ResourceSets)) OF{			
CSI-SSB-ResourceSet SEQUENCE {			
csi-SSB-ResourceSetId	0		
csi-SSB-ResourceList SEQUENCE			
(SIZE(1maxNrofCSI-SSB-ResourcePerSet)) OF{			
SSB-Index	SSB-Index		
}			
}			
}			
csi-ResourceConfigToAddModList SEQUENCE (SIZE	2 entries		
(1maxNrofCSI-ResourceConfigurations)) OF{			
CSI-ResourceConfig[0]	CSI-ResourceConfig for		
	TRS		
CSI-ResourceConfig[1]	CSI-ResourceConfig		
}			
}			
csi_ReportConfigToAddModList	CSI-ReportConfig		
reportTriggerSize	Not present		
aperiodicTriggerStateList	Not present		
}			

Table H.3.5-2: CSI-ResourceConfig

Derivation Path: TS 38.331[13], clause 6.3.2			
Information Element	Value/remark	Comment	Condition
CSI-ResourceConfig ::= SEQUENCE {			
csi-ResourceConfigId	CSI-ResourceConfigId		
csi-RS-ResourceSetList CHOICE {			
nzp-CSI-RS-SSB SEQUENCE {			
csi-SSB-ResourceSetList SEQUENCE (SIZE	1 entry		
(1maxNrofCSI-SSB-ResourceSetsPerConfig)) OF{			
CSI-SSB-ResourceSetId[0]	0		
}			
}			
}			
}			

Table H.3.5-3: CSI-ResourceConfigld

Derivation Path: TS 38.331 [6], clause 6.3.2			
Information Element	Value/remark	Comment	Condition
CSI-ResourceConfigId	1		

Table H.3.5-4: CSI-ReportConfig

Derivation Path: TS 38.508[14] Table 4.6.3-39			
Information Element	Value/remark	Comment	Condition
CSI-ReportConfig ::= SEQUENCE {			
reportConfigId	CSI-ReportConfigId		
carrier	Not present		
resourcesForChannelMeasurement	1		
csi-IM-ResourcesForInterference	Not present		
nzp-CSI-RS-ResourcesForInterference	Not present		
reportConfigType CHOICE {			
periodic SEQUENCE {			
reportSlotConfig ::= CHOICE {			
slots5	0		
}			
pucch-CSI-ResourceList SEQUENCE (SIZE			
(1maxNrofBWPs)) OF{			
PUCCH_CSI_Resource[0] SEQUENCE {			
uplinkBandwidthPartId	BWP-Id		
pucch_Resource	9		
}			
}			
}			
}			
reportQuantity CHOICE {			
ssb-Index-RSRP	NULL,		
}			
reportFreqConfiguration	Not present		
codebookConfig	Not present		
cqi-Table	Table1		
subbandSize	Value1		
}			

H.3.6 RRC messages and IE content exceptions for L1-RSRP measurement for beam reporting

ServingCellConfig: Default generic configuration for enabling CSI measurements and reporting

Table H.3.6-1: ServingCellConfig

Derivation Path: TS 38.331 [6], clause 6.3.2			
Information Element	Value/remark	Comment	Condition
ServingCellConfig ::= SEQUENCE {			
csi-MeasConfig	CSI-MeasConfig	as configured in TS 38.508-1 [14], Table 4.6.3-38	
}			

CSI-ReportConfig: Default generic configuration for L1-RSRP measurements

Table H.3.6-2: CSI-ReportConfig

Derivation Path: TS 38.508-1 [14], Table 4.6.3-39			
Information Element	Value/remark	Comment	Condition
CSI-ReportConfig ::= SEQUENCE {			
resourcesForChannelMeasurement	CSI-ResourceConfigId		
csi-IM-ResourcesForInterference	Not present		
nzp-CSI-RS-ResourcesForInterference	Not present		
reportConfigType CHOICE {			
aperiodic SEQUENCE {			APERIODIC
reportSlotOffsetList	26		
}			
periodic SEQUENCE {			PERIODIC
reportSlotConfig ::= CHOICE {			
slot80	0	Periodicity 80	
		slots and offset 0	
pucch-CSI-ResourceList SEQUENCE {	1 entry		
(SIZE (1maxNrofBWPs)) OF SEQUENCE {			
uplinkBandwidthPartId	0		
pucch-Resource	8	PUCCH-format2	
		as configured in	
		TS 38.508-1 [14],	
		Table 4.6.3-112	
}			
}			
}			
}			
reportQuantity CHOICE {			
ssb-Index-RSRP	NULL		SS-RSRP
cri-RSRP	NULL		CSI-RSRP
}			
timeRestrictionForChannelMeasurements	configured		
groupBasedBeamReporting CHOICE {			
disabled SEQUENCE {			
nrofReportedRS	n2		
}			
}			
}			

Condition	Explanation	
APERIODIC	Configuration for aperiodic reporting	
PERIODIC	Configuration for periodic reporting	
SS-RSRP L1-RSRP measurement based on SSB		
CSI-RSRP	L1-RSRP measurement based on CSI-RS	

CSI-ResourceConfig: Default generic resource configuration for L1-RSRP measurements

Table H.3.6-3: CSI-ResourceConfig

Derivation Path: TS 38.508-1 [14], Table 4.6.3-41			
Information Element	Value/remark	Comment	Condition
CSI-ResourceConfig ::= SEQUENCE {			
csi-ResourceConfigId	CSI-ResourceConfigId		
csi-RS-ResourceSetList CHOICE {			
nzp-CSI-RS-SSB SEQUENCE {			
nzp-CSI-RS-ResourceSetList SEQUENCE (SIZE (1maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF {	1 entry		CSI-RS
NZP-CSI-RS-ResourceSetId[0]	0		
}			
csi-SSB-ResourceSetList SEQUENCE (SIZE (1maxNrofCSI-SSB-ResourceSetsPerConfig)) OF {	1 entry		SSB
CSI-SSB-ResourceSetId[0]	0		
}			
}			
}			
resourceType	periodic		PERIODIC
resourceType	aperiodic		APERIODIC
}			

Condition	Explanation
SSB	Configuration for SSB based CSI
CSI-RS	Configuration for CSI-RS based CSI

CSI-SSB-ResourceSet: Default SSB resource set configuration for L1-RSRP measurements

Table H.3.6-4: CSI-SSB-ResourceSet

Derivation Path: TS 38.508-1 [14], Table 4.6.3-47			
Information Element	Value/remark	Comment	Condition
CSI-SSB-ResourceSet ::= SEQUENCE {	1 entry		
csi-SSB-ResourceSetId	0		
csi-SSB-ResourceList SEQUENCE	2 entries		
(SIZE(1maxNrofCSI-SSB-ResourcePerSet)) OF {			
SSB-Index[0]	0		
SSB-Index[1]	1		
}			
}			

NZP-CSI-RS-ResourceSet: Default NZP-CSI-RS resource set configuration for L1-RSRP measurements

Table H.3.6-5: NZP-CSI-RS-ResourceSet

Derivation Path: 38.508-1 [14], Table 4.6.3-87			
Information Element	Value/remark	Comment	Condition
NZP-CSI-RS-ResourceSet ::= SEQUENCE {			
nzp-CSI-ResourceSetId	NZP-CSI-RS-		
	ResourceSetId		
nzp-CSI-RS-Resources SEQUENCE (SIZE	2 entries		
(1maxNrofNZP-CSI-RS-ResourcesPerSet)) OF {			
NZP-CSI-RS-ResourceId[0]	20		
NZP-CSI-RS-ResourceId[1]	21		
}			
aperiodicTriggeringOffset	6	value 6 corresponds to 24 slots	
}			

NZP-CSI-RS-Resource: Default NZP-CSI-RS- resource configuration for L1-RSRP measurements

Table H.3.6-6: NZP-CSI-RS-Resource

Derivation Path: 38.508-1 [14], Table 4.6.3-			
Information Element	Value/remark	Comment	Condition
NZP-CSI-RS-Resource ::= SEQUENCE {			
nzp-CSI-RS-Resourceld	NZP-CSI-RS-Resourceld		
resourceMapping	CSI-RS-		
	ResourceMapping		
powerControlOffset	0		
powerControlOffsetSS	db0		
scramblingID	0		
periodicityAndOffset	Not present		
qcl-InfoPeriodicCSI-RS	Not present		
}			

CSI-RS-ResourceMapping

Table H.3.6-7: CSI-RS-ResourceMapping

Derivation Path: 38.508-1 [14], Table 4.6.3-45			
Information Element	Value/remark	Comment	Condition
CSI-RS-ResourceMapping ::= SEQUENCE {			
frequencyDomainAllocation CHOICE {			
other	000001		
}			
nrofPorts	p1		
firstOFDMSymbolInTimeDomain			
-	6	for resource #0	
	10	for resource #1	
cdm-Type	noCDM		
density CHOICE {			
three	NULL		
}			
freqBand ::=SEQUENCE {			
startingRB	0		
nrofRBs	276		
}			
}			

CSI-AperiodicTriggerStateList

Table H.3.6-8: CSI-AperiodicTriggerStateList

Derivation Path: 38.508-1 [14], Table 4.6.3-32			
Information Element	Value/remark	Comment	Condition
CSI-AperiodicTriggerStateList ::= SEQUENCE (SIZE	1 entry		
(1maxNrOfCSI-AperiodicTriggers)) OF {			
CSI-AperiodicTriggerState[1] SEQUENCE	1 entry		
(SIZE(1maxNrofReportConfigPerAperiodicTrigger))			
OF {			
reportConfigId[1]	CSI-ReportConfigId		
resourcesForChannel[1] CHOICE {			
nzp-CSI-RS SEQUENCE {			
qcl-info SEQUENCE (SIZE(1maxNrofAP-CSI-	2 entries		
RS-ResourcesPerSet)) OF {			
TCI-StateId[1]	0		
TCI-StateId[2]	1		
}			
}			
}			
}			
}			

PDSCH-Config

Table H.3.6-9: PDSCH-Config

Derivation Path: TS 38.331 [6], clause 6.3.2			
Information Element	Value/remark	Comment	Condition
PDSCH-Config ::= SEQUENCE {			
dataScramblingIdentityPDSCH	0		
dmrs-DownlinkForPDSCH-MappingTypeA CHOICE {			
setup	DMRS-DownlinkConfig		
}			
tci-StatesToAddModList SEQUENCE(SIZE (1	2 entires		
maxNrofTCI-States)) OF {			
TCI-State[1] ::= SEQUENCE {			
tci-StateId	0		
qcl-Type1 SEQUENCE {			
cell	Not present		
bwp-ld	Not present		
referenceSignal CHOICE {			
ssb	0		
}			
}			
TCI-State[2] ::= SEQUENCE {			
tci-StateId	1		
qcl-Type1 SEQUENCE {			
cell	Not present		
bwp-ld	Not present		
referenceSignal CHOICE {			
ssb	1		
}			
}			
}			
}		<u> </u>	

H.3.7 RRC messages and information elements contents exceptions for NR cell search when DRX is used

MAC-CellGroupConfig: DRX configuration for NR serving cellTable H.3.7-1: MAC-CellGroupConfig: NR intra-frequency cell search when DRX is used

Derivation Path: TS 38.508-1, Table 4.6.3-68 Information Element	Value/remark	Comment	Condition
	value/remark	Comment	Condition
MAC-CellGroupConfig ::= SEQUENCE {		_	
drx-Config CHOICE {		1	
setup SEQUENCE {			
drx-onDurationTimer CHOICE {	1		DDV 1.00
milliSeconds	ms1		DRX.1 OR
			DRX.2 OR
		+	DRX.6
	ms6		DRX.3 OR
			DRX.7 OR
1		_	DRX.8
dry InactivityTimor	ms1		-
drx-InactivityTimer drx-RetransmissionTimerDL			
drx-RetransmissionTimerUL drx-RetransmissionTimerUL	sl1 sl1		
	SII		
drx-LongCycleStartOffset CHOICE {			DDV 1 - ::
ms40	0		DRX.1 or
			DRX.3
ms320	0		DRX.6 OR DRX.8
ms640	0		DRX.8 DRX.2 OR
1118040	0		DRX.2 OR DRX.7
)			DRX.1
shortDRX	not present		
drx-SlotOffset	0		
า			
<u>}</u>			
tag-Config SEQUENCE {			
tag-ToReleaseList	Not present		
tag-ToAddModList SEQUENCE (SIZE	1 entry		
(1maxNrofTAGs)) OF SEQUENCE {	1 entry		
tag-ld[1]	0		
timeAlignmentTimer[1]	ms500		DRX.1 OR
umezugiimentiimei[±]	1113300		DRX.1 OR
			DRX.6
	infinity		DRX.3 OR
	a minity		DRX.7 OR
			DRX.7 OR
}			51000
}			1

Condition	Explanation
DRX.1	DRX Configuration 1 according to TS 38.133 [6] A.3.3.1
DRX.2	DRX Configuration 2 according to TS 38.133 [6] A.3.3.2
DRX.3	DRX Configuration 3 according to TS 38.133 [6] A.3.3.3
DRX.6	DRX Configuration 6 according to TS 38.133 [6] A.3.3.6
DRX.7	DRX Configuration 7 according to TS 38.133 [6] A.3.3.7
DRX.8	DRX Configuration 8 according to TS 38.133 [6] A.3.3.8

MAC-MainConfig: DRX configuration for E-UTRAN serving cell

Table H.3.7-2: MAC-MainConfig

Derivation Path: 36.508, Table 4.8.2.1.5-1			
Information Element	Value/remark	Comment	Condition
MAC-MainConfig ::= SEQUENCE {			
drx-Config CHOICE {			
setup SEQUENCE {			
onDurationTimer	psf2		DRX.4 OR
			DRX.9
	psf6		DRX.5 OR
			DRX.10
drx-InactivityTimer	psf2		DRX.4
	psf1920		DRX.5 OR
			DRX.10
	psf100		DRX.9
longDRX-CycleStartOffset CHOICE {			
sf160	0		DRX.4
sf320	0		DRX.5
sf40	0		DRX.9
sf640	0		DRX.10
}			
}			
}			
timeAlignmentTimerDedicated	infinity		DRX.4 OR
			DRX.5
	sf500		DRX.9 OR
			DRX.10
] }			

Condition	Explanation
DRX.4	DRX Configuration 4 according to TS 38.133 [6] A.3.3.4
DRX.5	DRX Configuration 5 according to TS 38.133 [6] A.3.3.5
DRX.9	DRX Configuration 9 according to TS 38.133 [6] A.3.3.9
DRX.10	DRX Configuration 10 according to TS 38.133 [6] A.3.3.10

Annex I (normative): RRM OTA procedures

Annex I defines the RRM OTA procedures for the permitted testing methodologies defined in [32].

I.0 Test applicability per permitted test method

The applicability of each permitted test method for the different RRM Angle of Arrival (AoA) setups as defined in Section A.9 is defined in Table I.0-1.

Table I.0-1 Test Setup applicability per permitted test method

AoA Test Setup	No DUT antenna configuration declaration	DUT antenna configuration declaration				
		Configuration 1	Configuration 2	Configuration 3		
		(one antenna panel with D ≤	(More than one antenna	(Any phase		
		5 cm active at any one time)	panel D \leq 5 cm without	coherent		
			phase coherency between	antenna panel of		
			panels active at any one	any size)		
			time)			

Setup 1	IFF	DFF, DFF simplification, IFF	DFF, DFF simplification, IFF	IFF	
Setup 2a	IFF	DFF, DFF simplification, IFF	DFF, DFF simplification, IFF	IFF	
Setup 2b	IFF	DFF, DFF simplification, IFF	DFF, DFF simplification, IFF	IFF	
Setup 3	IFF	DFF, IFF	DFF, IFF	IFF	
NOTE: D = DUT radiating aperture declared by UE vendor.					

I.1 Direct far field (DFF)

I.1.1 RX beam peak direction search

Same measurement procedure as in clause Annex K.1.2 of TS 38.521-2 [18].

I.2 Direct far field (DFF) simplification

I.2.1 RX beam peak direction search

Same measurement procedure as in clause Annex K.2.2 of TS 38.521-2 [18].

I.3 Indirect far field (IFF)

I.3.2 RX beam peak direction search

Same measurement procedure as in clause Annex K.3.2 of TS 38.521-2 [18].

Annex J (informative): Change history

	Change history						
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New
						· ·	version
2017-08	RAN5#76		-	-	-	Introduction of TS 38.533	0.0.1
		R5-184115	-	-	-	Added specification structure including headers up to third level	0.0.2
	RAN5#81		-	-	-	Added references and common sections	0.1.0
2018-11	RAN5#81		-	-	-	Added RMCs, OCGN, SMTC and SSB configurations to Annex A	0.1.0
2018-11		R5-187996	-	-	-	Added test cases 6.7.1.1.1 to 6.7.1.2.2	0.1.0
2018-11	RAN5#81		-	-	-	Added test cases 4.6.2.1 to 4.6.2.8	0.1.0
	RAN5#81		-	-	-	Added test cases 5.6.2.1 to 5.6.2.4	0.1.0
2018-11	RAN5#81		-	-	-	Added test cases 6.6.2.1 to 6.6.2.8	0.1.0
		R5-188000	-	-	-	Added test cases 7.6.2.1 to 7.6.2.4	0.1.0
2018-11	RAN5#81		-	-	-	Added test case 4.4.1.1	0.1.0
2018-11	RAN5#81		<u> </u>	-	-	Added test cases 4.7.1.1.1 to 4.7.1.2.2	0.1.0
2018-11	RAN5#81		-	-	-	Added Annexes B to H	0.1.0
2018-11	RAN5#81	R5-188011	-	-	-	Added test case 4.4.3.1	0.1.0
2019-01	RAN5#4 5G-NR AH	R5-190448	-	-	-	Updating FR1 MU for timing measurements	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190476	-	-	-	Addition of band group power offsets	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190477	-	-	-	Update of the annexes	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190478	-	-	-	Changes to 4.7.1.x tests	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190479	-	-	-	Addition of 4.7.2.x tests	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190480	-	-	-	Addition of 4.7.4.x tests	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190481	-	-	-	Changes to 6.7.1.x tests	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190482	-	-	-	Addition of 6.7.2.x tests	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190483	-	-	-	Addition of 6.7.4.x tests	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190512	-	-	-	Addition of EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode test case 4.5.1.5	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190513	-	-	-	Addition of EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in non-DRX mode test case 4.5.1.6	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190514	-	-	-	Addition of EN-DC FR1 radio link monitoring out-of-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode test case 4.5.1.7	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190515	-	-	-	Addition of EN-DC FR1 radio link monitoring in-sync test for PSCell configured with CSI-RS-based RLM RS in DRX mode test case 4.5.1.8	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190516	-	-	-	Addition of EN-DC FR1 interruptions at transitions between active and non-active during DRX in synchronous EN-DC test case 4.5.2.1	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190517	-	-	-	Addition of EN-DC FR1 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC test case 4.5.2.2	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190518	-	-	-	Addition of EN-DC FR1 interruptions during measurements on deactivated NR SCC in synchronous EN-DC test case 4.5.2.3	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190519	-	-	-	Addition of EN-DC FR1 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC test case 4.5.2.4	0.2.0

2019-01	RAN5#4 5G-NR AH	R5-190520	-	-	-	Addition of EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC test case 4.5.2.5	0.2.0
2019-01	RAN5#4 5G-NR	R5-190582	-	-	-	Annex F correction	0.2.0
2019-01	AH RAN5#4 5G-NR	R5-190803	-	-	-	Update Annex G in TS 38.533	0.2.0
2019-01	AH RAN5#4 5G-NR AH	R5-190874	-	-	-	Addition of NR test case 6.6.1.1-reporting without gap non-DRX	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190875	-	-	-	Addition of NR test case 6.6.1.2-reporting without gap DRX	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190876	-	-	-	Addition of NR test case 6.6.1.3-with gap non DRX	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190877	-	-	-	Addition of NR test case 6.6.1.4-with gap DRX	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190878	-	-	-	Addition of NR test case 6.6.1.5-without gap non DRX SBI reading	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190879	-	-	-	Addition of NR test case 6.6.1.6-with gap non DRX SBI reading	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190880	-	-	-	CR to 38.533 annex for event triggered reorting test cases	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190881	-	-	-	Addition of EN-DC FR1 event triggered reporting test case 4.6.1.5	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190882	-	-	-	Addition of EN-DC FR1 event triggered reporting test case 4.6.1.6	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190883	-	-	-	Addition of EN-DC FR1 event triggered reporting test case 4.6.1.3	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190884	-	-	-	Addition of EN-DC FR1 event triggered reporting test case 4.6.1.4	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190885	-	-	-	Addition of defualt config for event triggered test cases	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190886	-	-	-	Introduction of 5G RRM TC 4.5.3.1	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190887	-	-	-	Introduction of 5G RRM TC 4.5.3.2	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190888	-	-	-	Introduction of 5G RRM TC 4.5.3.3	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190889	-	-	-	Introduction of 5G RRM TC 4.6.1.1	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190890	-	-	-	Introduction of 5G RRM TC 4.6.1.2	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190891	-	-	-	Introduction of 5G RRM TC 5.5.3.1	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190892	-	-	-	Introduction of 5G RRM TC 6.6.3.1	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190893	-	-	-	pCR for Addition of TC 6.5.1.3 NR SA FR1 RLM OOS in DRX	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190894	-	-	-	pCR for Addition of TC 6.4.3.1 NR SA FR1 TAA Accuracy	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190895	-	-	-	pCR for Modification of TC 4.4.3.1 EN-DC FR1 TAA accuracy	0.2.0

						1	
2019-01	RAN5#4 5G-NR AH	R5-190896	-	-	-	pCR for Addition of TC 6.5.1.1 NR SA FR1 RLM OOS	0.2.0
2019-01	RAN5#4 5G-NR	R5-190897	-	-	-	pCR for Addition of TC 4.5.1.1 EN-DC FR1 RLM OOS	0.2.0
2019-01	AH RAN5#4 5G-NR AH	R5-190898	-	-	-	pCR for Addition of TC 4.5.1.3 EN-DC FR1 RLM OOS in DRX	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190899	-	-	-	Update to EN-DC FR1 transmit timing accuracy test	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190900	-	-	-	Addition of EN-DC FR1 RLM IS non-DRX test with SSB-based RLM RS	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190901	-	-	-	Addition of EN-DC FR1 RLM IS DRX test with SSB-based RLM RS	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190902	-	-	-	Addition of NR SA FR1 RLM IS non-DRX test with SSB-based RLM RS	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190903	-	-	-	Addition of NR SA FR1 RLM IS DRX test with SSB-based RLM RS	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190904	-	-	-	Correction of RRM 5G Test Cases 4.6.2 - EN-DC FR1-FR1 Inter- frequency measurements	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190905	-	-	-	Correction of RRM 5G Test Cases 6.6.2 - NR SA FR1-FR1 Inter- frequency measurements	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190906	-	-	-	Correction of RRM 5G Test Cases 7.6.2 - NR SA FR2-FR2 Inter- frequency measurements	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190907	-	-	-	Addition of RRM Test Cases 4.5.2.6: EN-DC FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190908	-	-	-	Addition of RRM Test Cases 5.5.2.1: EN-DC FR2 interruptions at transitions between active and non-active during DRX in synchronous EN-DC	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190909	-	-	-	Addition of RRM Test Cases 5.5.2.2: EN-DC FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190910	-	-	-	Addition of RRM Test Cases 5.5.2.3: EN-DC FR2 interruptions during measurements on deactivated NR SCC in synchronous EN-DC	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190911	-	-	-	Addition of RRM Test Cases 5.5.2.4: EN-DC FR2 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190912	-	-	-	Addition of RRM Test Cases 5.5.2.5: EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190913	-	-	-	Addition of RRM Test Cases 5.5.2.6: EN-DC FR2 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190914	-	-	-	Addition of RRM Test Cases 6.1.1.1: NR SA FR1 cell re-selection	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190915	-	-	-	Addition of RRM Test Cases 6.1.1.2: NR SA FR1-FR1 cell reselection	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190916	-	-	-	Addition of cell re-selection to higher priority E-UTRAN test case 6.1.2.1	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190917	-	-	-	Addition of cell re-selection to lower priority E-UTRAN test case 6.1.2.2	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190918	-	-	-	Addition of SA NR to E-UTRAN handover test case 6.3.1.4	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190919	-	-	-	Addition of SA NR to E-UTRAN handover test case 6.3.1.5	0.2.0
2019-01	RAN5#4 5G-NR AH	R5-190920	-	-	-	Addition of NR SA FR1 UE UL carrier RRC reconfiguration delay test case 6.5.4.1	0.2.0

2019-01	RAN5#4	R5-190921				Addition of NR SA FR1 CSI-RS based RLM out-of-sync non-DRX	0.2.0
	5G-NR		-	-	-	test case 6.5.1.5	
	AH						
2019-01	RAN5#4	R5-190922				Addition of NR SA FR1 CSI-RS based RLM in-sync non-DRX test	0.2.0
	5G-NR		-	-	-	case 6.5.1.6	ĺ
	AH						
2019-01	RAN5#4	R5-190923				Addition of NR SA FR1 CSI-RS based RLM out-of-sync in DRX test	0.2.0
	5G-NR		-	-	-	case 6.5.1.7	
	AH						
2019-01	RAN5#4	R5-190924				Addition of NR SA FR1 CSI-RS based RLM in-sync in DRX test case	0.2.0
	5G-NR		-	-	-	6.5.1.8	ĺ
	AH						ĺ
2019-01	RAN5#4	R5-190987				38.533 Common Section updates to clarify leverage across	0.2.0
	5G-NR		-	-	-	architecture options	ĺ
	AH						
2019-03		R5-191484	-	_	-	Correction Annex G	0.3.0
		R5-191485	_	_	-	Correction NSA Options	0.3.0
		R5-191486	_	_	-	Modifications NSA FR1 SS-RSRP tests	0.3.0
2019-03					-	,	0.3.0
		R5-191487				Modifications NSA FR1 SS-RSRQ tests	
		R5-191488	-	-	-	Modifications NSA FR1 L1-RSRP tests	0.3.0
2019-03		R5-191489	-	-	-	Modifications SA FR1 SS-RSRP tests	0.3.0
		R5-191490	-	-		Modifications SA FR1 SS-RSRQ tests	0.3.0
2019-03	RAN5#82	R5-191491	-	-	-	Modifications SA FR1 L1-RSRP tests	0.3.0
2019-03	RAN5#82	R5-191492	-	-	-	Addition NSA FR1 BWP switch tests	0.3.0
		R5-191493	-	-	-	Addition SA FR1 BWP switch tests	0.3.0
	RAN5#82	R5-191494	-	-	-	Addition NSA FR2 BWP switch tests	0.3.0
		R5-191494			-		0.3.0
			-			Addition SA FR2 BWP switch tests	
		R5-191720	-	-	-	addition of cell mapping for BFD and measurement	0.3.0
2019-03		R5-191924	-	-	-	Correction of default message contents for RRM	0.3.0
2019-03	RAN5#82	R5-191926	_	_	_	Addition of event-triggered reporting Test Cases to Cell configuration	0.3.0
						mapping in Annex E	
2019-03	RAN5#82	R5-191930	-	-	-	Correction of 5G RRM Test Case 4.6.2.3	0.3.0
2019-03	RAN5#82	R5-191931	-	-	-	Correction of 5G RRM Test Case 4.6.2.4	0.3.0
2019-03		R5-191934	-	-	-	Correction of 5G RRM Test Case 4.6.2.7	0.3.0
2019-03		R5-191935	-	_	-	Correction of 5G RRM Test Case 4.6.2.8	0.3.0
2019-03		R5-191936	_	_	-	Addition of Minimum conformance requirements 5.6.2.0	0.3.0
		R5-191937	-	<u> </u>	-		0.3.0
	RAN5#82			-		Correction of 5G RRM Test Case 5.6.2.1	
2019-03		R5-191938	-	-	-	Correction of 5G RRM Test Case 5.6.2.2	0.3.0
		R5-191939	-	-	-	Correction of 5G RRM Test Case 5.6.2.3	0.3.0
		R5-191940	-	-	-	Correction of 5G RRM Test Case 5.6.2.4	0.3.0
2019-03	RAN5#82	R5-191945	-	-	-	Addition of Minimum conformance requirements 7.6.2.0	0.3.0
2019-03	RAN5#82	R5-191946	-	-	-	Correction of 5G RRM Test Case 7.6.2.1	0.3.0
2019-03	RAN5#82	R5-191947	-	-	-	Correction of 5G RRM Test Case 7.6.2.2	0.3.0
		R5-191948	-	-	-	Correction of 5G RRM Test Case 7.6.2.3	0.3.0
		R5-191949	-	_	-	Correction of 5G RRM Test Case 7.6.2.4	0.3.0
		R5-191950	-	-	-	Correction of 5G RRM Test Case 7.6.2.5	0.3.0
					_		
2019-03		R5-191951	-	-	-	Correction of 5G RRM Test Case 7.6.2.6	0.3.0
2019-03		R5-191952	-	-		Correction of 5G RRM Test Case 7.6.2.7	0.3.0
2019-03		R5-191953	-	-	-	Correction of 5G RRM Test Case 7.6.2.8	0.3.0
2019-03		R5-192062	-		-	Update of EN-DC FR1 event triggered reporting test case 4.6.1.6	0.3.0
2019-03		R5-192063	-			Update of EN-DC FR1 event triggered reporting test case 4.6.1.3	0.3.0
2019-03		R5-192064	-	-	-	Update of EN-DC FR1 event triggered reporting test case 4.6.1.4	0.3.0
2019-03		R5-192221	-	-	-	Update on RRC_Connected generic procedure within RRM tests	0.3.0
2019-03	RAN5#82	R5-192477			<u> </u>	Introduction of FR1 EN-DC Contention based random access Test	0.3.0
		102-711	-	-	-	Case	3.5.0
2019-03	RAN5#82	R5-192478			 	Introduction of FR1 EN-DC non-Contention based random access	0.3.0
2019-03	ZANO#8Z	170-1924/8	-	-	-		0.3.0
0010.00	DANIE (100	DE 400475			 	Test case	000
2019-03	RAN5#82	R5-192479	_	-	-	Introduction of FR1 standalone Contention based random access	0.3.0
					<u> </u>	Test case	<u> </u>
2019-03	RAN5#82	R5-192480	_	_	l ₋	Introduction of FR1 standalone Non-contention based random	0.3.0
						access Test case	
2019-03	RAN5#82	R5-192481	-	-	-	Updated to 5G RRM TC 4.6.1.1	0.3.0
2019-03		R5-192482	-	-	-	Updated to 5G RRM TC 4.6.1.2	0.3.0
2019-03		R5-192483	-	-	-	Addition of NR test case 6.7.1.3.1-absolute RSRP	0.3.0
2019-03		R5-192484	-	-	-	Addition of NR test case 6.7.1.3.2-relative RSRP	0.3.0
			-		-	Addition of NR test case 6.5.5.3 FR1 CSI-RS BFD nonDRX	0.3.0
2019-03		R5-192485	-	_	-		
2019-03	RAN5#82		-	-	-	Addition of NR test case 6.5.5.4 FR1 CSI-RS BFD DRX	0.3.0
2019-03		R5-192487	-	-	-	Addition of NR test case 7.5.5.1 FR2 SSB BFD nonDRX	0.3.0
2019-03		R5-192488	-	-	-	Addition of NR test case 7.5.5.2 FR2 SSB BFD DRX	0.3.0
2019-03		R5-192489				Addition of NR test case 7.5.5.3 FR2 CSI-RS BFD nonDRX	0.3.0
2019-03	RAN5#82	R5-192490	-	-	-	Addition of NR test case 7.5.5.4 FR2 CSI-RS BFD DRX	0.3.0
2019-03		R5-192492	-	-	-	Correction of 5G RRM Test Case 4.6.2.1	0.3.0
						•	

2010.02	DANE#02	DE 100400		1		Convention of EC DDM Test Cons. 4 C 2 2	
		R5-192493	-	-	-	Correction of 5G RRM Test Case 4.6.2.2	0.3.0
		R5-192494	-	-	-	Correction of 5G RRM Test Case 4.6.2.5	0.3.0
				-	-	Correction of 5G RRM Test Case 4.6.2.6	0.3.0
			-	<u> </u>	-	Correction of 5G RRM Test Case 6.6.2.1	0.3.0
		R5-192497	-	-	-	Correction of 5G RRM Test Case 6.6.2.2	0.3.0
-				-	-	Correction of 5G RRM Test Case 6.6.2.3	0.3.0
			-	-	-	Correction of 5G RRM Test Case 6.6.2.4	0.3.0
		R5-192500	<u> </u>	-	-	Update of EN-DC FR1 event triggered reporting test case 4.6.1.5	0.3.0
				-	-	Update to EN-DC FR1 transmit timing accuracy test	0.3.0
2019-03	RAN5#82	R5-192674	-	-	-	Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM	0.3.0
0010.00	DANE #00	DE 400075				RS	0.00
$\overline{}$		R5-192675	-	-	-	Update to EN-DC FR1 RLM IS DRX test with SSB-based RLM RS	0.3.0
2019-03	RAN5#82	R5-192676	-	-	-	Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM	0.3.0
0010.00	DANE #00	DE 400077				RS	0.00
-		R5-192677	-	-	-	Update to NR SA FR1 RLM IS DRX test with SSB-based RLM RS	0.3.0
		R5-192678	-	-	-	pCR for modification of TAAA TC for EN-DC FR1	0.3.0
2019-03	RAN#83	RP-190161		-	-	Presented to the RAN#83 plenary for 1-step approval	1.0.0
2019-03	RAN#83	-	-	-	-	Upgraded to Rel-15 with small editorial changes	15.0.0
2019-06	RAN#84		0100	-	F	Update the test case number of TC 4.3.2.2.2	15.1.0
	RAN#84	R5-193755	0102	-	F	Update of Minimum conformance requirements 6.6.1.0	15.1.0
2019-06	RAN#84		0104	-	F	Update of EN-DC RLM in-sync in non-DRX test case 4.5.1.6	15.1.0
2019-06	RAN#84	R5-193759	0105	-	F	Update of EN-DC RLM out-of-sync in DRX test case 4.5.1.7	15.1.0
2019-06	RAN#84		0106		F	Update of EN-DC RLM in-sync in DRX test case 4.5.1.8	15.1.0
2019-06	RAN#84	R5-193761	0107	-	F	Addition of Minimum conformance requirements 6.3.2	15.1.0
2019-06	RAN#84	R5-193762	0108	-	F	Addition of NR RRM TC 6.3.2.1.1-Intra Freq RRC Re-establishment	15.1.0
	RAN#84	R5-193763	0109		F	Addition of FR1-FR1 re-establishment test case 6.3.2.1.2	15.1.0
2019-06	RAN#84	R5-193764	0110	-	F	Addition of FR1 RRC connection release with redirection test case	15.1.0
						6.3.2.3.1	
2019-06	RAN#84	R5-193765	0111	-	F	Addition of FR1-E-UTRA RRC connection release with redirection	15.1.0
						test case 6.3.2.3.2	
2019-06	RAN#84	R5-193766	0112	-	F	Update of TC 6.5.1.5 SA FR1 CSI-RS RLM OOS non-DRX	15.1.0
2019-06	RAN#84	R5-193767	0113	-	F	Update of TC 6.5.1.6 SA FR1 CSI-RS RLM IS non-DRX	15.1.0
2019-06	RAN#84	R5-193768	0114	-	F	Update of TC 6.5.1.7 SA FR1 CSI-RS RLM OOS DRX	15.1.0
2019-06	RAN#84	R5-193769	0115	-	F	Update of TC 6.5.1.8 SA FR1 CSI-RS RLM IS DRX	15.1.0
2019-06	RAN#84	R5-193770	0116	-	F	Addition of Minimum conformance requirements 6.5.5.0	15.1.0
2019-06	RAN#84	R5-193771	0117	-	F	Update of TC 6.5.5.3 SA FR1 CSI-RS BFD non-DRX	15.1.0
2019-06	RAN#84	R5-193772	0118	-	F	Update of TC 6.5.5.4 SA FR1 CSI-RS BFD DRX	15.1.0
2019-06	RAN#84	R5-193773	0119	-	F	Addition of Minimum conformance requirements 7.5.5.0	15.1.0
2019-06	RAN#84	R5-193774	0120	-	F	Update of TC 7.5.5.1 SA FR2 SSB BFD non-DRX	15.1.0
2019-06	RAN#84	R5-193775	0121	-	F	Update of TC 7.5.5.2 SA FR2 SSB BFD DRX	15.1.0
2019-06	RAN#84	R5-193776	0122	-	F	Update of TC 7.5.5.3 SA FR2 CSI-RS BFD non-DRX	15.1.0
2019-06	RAN#84	R5-193777	0123	-	F	Update of TC 7.5.5.4 SA FR2 CSI-RS BFD DRX	15.1.0
2019-06	RAN#84	R5-193778	0124	-	F	Addition of Minimum conformance requirements 7.6.1.0	15.1.0
2019-06	RAN#84	R5-193779	0125	-	F	Addition of 7.6.1.1 SA FR2 RRM measurement no-gap non-DRX	15.1.0
2019-06	RAN#84	R5-193780	0126	-	F	Addition of 7.6.1.2 SA FR2 RRM measurement no-gap DRX	15.1.0
2019-06		R5-193781		-	F	Addition of 7.6.1.3 SA FR2 RRM measurement gap non-DRX	15.1.0
2019-06	RAN#84		0128	-	F	Addition of 7.6.1.4 SA FR2 RRM measurement gap DRX	15.1.0
2019-06	RAN#84		0130	-	F	Update of FR1 cell re-selection test case 6.1.1.1	15.1.0
2019-06	RAN#84	R5-193785	0131	-	F	Update of FR1-FR1 cell re-selection test case 6.1.1.2	15.1.0
2019-06	RAN#84	R5-193786	0132	1-	F	Update of FR1-EUTRA higher priority cell re-selection test case	15.1.0
						6.1.2.1	-
2019-06	RAN#84	R5-193787	0133	-	F	Update of FR1-EUTRA lower priority cell re-selection test case	15.1.0
	1			<u> </u>	<u> </u>	6.1.2.2	
				1	F	Update of FR1-EUTRA handover known cell test case 6.3.1.4	15.1.0
2019-06	RAN#84	R5-193788	0134	ι-		III a data at C C 4 4 CA ED4 DDM assessment as a second as DDV	
2019-06	RAN#84	R5-193790	0136	-	F	Update of 6.6.1.1 SA FR1 RRM measurement no-gap non-DRX	15.1.0
2019-06 2019-06	RAN#84 RAN#84	R5-193790 R5-193791	0136 0137	- -	F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX	15.1.0
2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792	0136 0137 0138	- - -	F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX	15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793	0136 0137 0138 0139	- - - -	F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX	15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792	0136 0137 0138	- - - -	F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case	15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794	0136 0137 0138 0139 0140	- - - -	F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5	15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793	0136 0137 0138 0139	- - - - -	F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case	15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795	0136 0137 0138 0139 0140	- - - - -	F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812	0136 0137 0138 0139 0140 0141	- - - - - -	F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812	0136 0137 0138 0139 0140	- - - - - -	F F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements Introduction of TC 4.5.5.4 EN-DC FR1 CSI-RS-based beam failure	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812 R5-193872	0136 0137 0138 0139 0140 0141 0145 0146	- - - - - -	F F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements Introduction of TC 4.5.5.4 EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812 R5-193872 R5-193949	0136 0137 0138 0139 0140 0141	- - - - - - - -	F F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements Introduction of TC 4.5.5.4 EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX Correction of PRACH Configurations	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812 R5-193872 R5-193949	0136 0137 0138 0139 0140 0141 0145 0146	- - - - - - - -	F F F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements Introduction of TC 4.5.5.4 EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX Correction of PRACH Configurations Additional of new reference used in RRM test spec	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812 R5-193872 R5-193949 R5-194328 R5-194329	0136 0137 0138 0139 0140 0141 0145 0146 0148 0153	- - - - - - - - -	F F F F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements Introduction of TC 4.5.5.4 EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX Correction of PRACH Configurations Additional of new reference used in RRM test spec Correction of reference spec number in RRM spec	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812 R5-193872 R5-193949 R5-194328 R5-194329 R5-194494	0136 0137 0138 0139 0140 0141 0145 0146 0148 0153 0154 0165	- - - - - - - - - - -	F F F F F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements Introduction of TC 4.5.5.4 EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX Correction of PRACH Configurations Additional of new reference used in RRM test spec Correction of reference spec number in RRM spec Addition missing Editor's note 4.5.2.5	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0
2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06 2019-06	RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84 RAN#84	R5-193790 R5-193791 R5-193792 R5-193793 R5-193794 R5-193795 R5-193812 R5-193872 R5-193949 R5-194328 R5-194329 R5-194494 R5-194549	0136 0137 0138 0139 0140 0141 0145 0146 0148 0153 0154	- - - - - - - - - - - -	F F F F F F F	Update of 6.6.1.2 SA FR1 RRM measurement no-gap DRX Update of 6.6.1.3 SA FR1 RRM measurement gap non-DRX Update of 6.6.1.4 SA FR1 RRM measurement gap DRX Update of FR1 event-triggered without gap with SSB index test case 6.6.1.5 Update of FR1 event-triggered with gap with SSB index test case 6.6.1.6 Addition of 6.3.2.2 minimum conformance requirements Introduction of TC 4.5.5.4 EN-DC FR1 CSI-RS-based beam failure detection and link recovery in DRX Correction of PRACH Configurations Additional of new reference used in RRM test spec Correction of reference spec number in RRM spec	15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0 15.1.0

2019-06 RANNER R5-194505 0179 F Correction of SG RRM Test Case 5.6.2								
2019-06 RANNIB4 R5-194565 0109 F Correction of SG RRM Test Case 5 0.2 15.1.0	2019-06	RAN#84	R5-194552	0176	-	F	Correction of 5G RRM Test Case 5.6.2.4	15.1.0
2019-06 RANNEW R5-194507 018 F Correction of Bot RRM Test Case 5.6.28 15.1.0					-			
2019-06 RANIBA R5-194567 0181 F Correction of Minimum conformance requirements 6.6.2.0 15.1.0 2019-06 RANIBA R5-194566 0189 F Correction of SG RRM Test Case 7.6.2.2 15.1.0 2019-06 RANIBA R5-194566 0199 F Correction of SG RRM Test Case 7.6.2.3 15.1.0 2019-06 RANIBA R5-194566 0199 F Correction of SG RRM Test Case 7.6.2.4 15.1.0 2019-06 RANIBA R5-194567 0191 F Correction of SG RRM Test Case 7.6.2.4 15.1.0 2019-06 RANIBA R5-194567 0191 F Correction of SG RRM Test Case 7.6.2.5 15.1.0 2019-06 RANIBA R5-194567 0191 F Correction of SG RRM Test Case 7.6.2.6 15.1.0 2019-06 RANIBA R5-194570 0192 F Correction of SG RRM Test Case 7.6.2.6 15.1.0 2019-06 RANIBA R5-194570 0193 F Correction of SG RRM Test Case 7.6.2.6 15.1.0 2019-06 RANIBA R5-194570 0193 F Correction of SG RRM Test Case 7.6.2.7 15.1.0 2019-06 RANIBA R5-194570 0194 F Correction of SG RRM Test Case 7.6.2.8 15.1.0 2019-06 RANIBA R5-194570 0194 F Correction of SG RRM Test Case 7.6.2.8 15.1.0 2019-06 RANIBA R5-194570 0195 F Correction of SG RRM Test Case 7.6.2.8 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RANIBA R5-194570 0208 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019				-	-			
2019-06 RANB94 R5-194562 0186 . F Correction of Sir RMT Best Case 7.6.2.2 15.1.0 2019-06 RANB94 R5-194566 0188 . F Correction of Sir RMT Best Case 7.6.2.3 15.1.0 2019-06 RANB94 R5-194566 0190 . F Correction of Sir RMT Best Case 7.6.2.4 15.1.0 2019-06 RANB94 R5-194566 0190 . F Correction of Sir RMT Best Case 7.6.2.4 15.1.0 2019-06 RANB94 R5-194566 0190 . F Correction of Sir RMT Best Case 7.6.2.4 15.1.0 2019-06 RANB94 R5-194566 0192 . F Correction of Sir RMT Best Case 7.6.2.6 15.1.0 2019-06 RANB94 R5-194568 0192 . F Correction of Sir RMT Best Case 7.6.2.6 15.1.0 2019-06 RANB94 R5-194569 0193 . F Correction of Sir RMT Best Case 7.6.2.6 15.1.0 2019-06 RANB94 R5-194570 0196 . F Correction of Sir RMT Best Case 7.6.2.7 15.1.0 2019-06 RANB94 R5-194573 0196 . F Correction of Sir RMT Best Case 7.6.2.7 15.1.0 2019-06 RANB94 R5-194573 0197 . F Correction of Sir RMT Best Case 7.6.2.1 15.1.0 2019-06 RANB94 R5-194573 0197 . F Correction of Sir RMT Best Case 7.6.2.1 15.1.0 2019-06 RANB94 R5-194573 0197 . F Correction of Sir RMT Best Case 7.3.2.1.2 . 15.1.0 2019-06 RANB94 R5-194573 0197 . F Correction of Sir RMT Best Case 7.3.2.1.2 . 15.1.0 2019-06 RANB94 R5-194573 0197 . F Correction of Sir RMT Best Case 7.3.2.1.2 . 15.1.0 2019-06 RANB94 R5-194573 0197 . F Correction of Sir RMT Best Case 7.3.2.1.2 . 15.1.0 2019-06 RANB94 R5-194573 0197 . F Correction of Sir RMT Best Case 7.3.2.1.2 . 15.1.0 2019-06 RANB94 R5-194507 0191 . F Correction of Sir RMT Best Case 7.3.2.1.2 . 15.1.0 2019-06 RANB94 R5-194507 0191 . F Correction of Sir RMT Best Case 7.3.2.1 . 15.1.0 2019-06 RANB94 R5-194507 0191 . F Correction of Sir RMT Best Case 7.3.2.1 . 15.1.0 2019-06 RANB94 R5-194507 0191 . F Correction of				0180	-			15.1.0
2019-06 RANN94 R5-194566 0.189 F Correction of 5G RRM Test Case 7.6.2 2 15.1 0 2019-06 RANN94 R5-194566 0.189 F Correction of 5G RRM Test Case 7.6.2 3 15.1 0 2019-06 RANN94 R5-194567 0.191 F Correction of 5G RRM Test Case 7.6.2 5 15.1 0 2019-06 RANN94 R5-194567 0.191 F Correction of 5G RRM Test Case 7.6.2 5 15.1 0 2019-06 RANN94 R5-194569 0.192 F Correction of 5G RRM Test Case 7.6.2 5 15.1 0 2019-06 RANN94 R5-194569 0.193 F Correction of 5G RRM Test Case 7.6.2 6 15.1 0 2019-06 RANN94 R5-194570 0.194 F Correction of 5G RRM Test Case 7.6.2 6 15.1 0 2019-06 RANN94 R5-194570 0.194 F Correction of 5G RRM Test Case 7.6.2 7 15.1 0 2019-06 RANN94 R5-194572 0.195 F Correction of 5G RRM Test Case 7.6.2 1 15.1 0 2019-06 RANN94 R5-194572 0.195 F Correction of 5G RRM Test Case 7.6.2 1 15.1 0 2019-06 RANN94 R5-19470 0.208 F Correction of 5G RRM Test Case 7.6.2 1 15.1 0 2019-06 RANN94 R5-194700 0.208 F Correction of 5G RRM Test Case 7.6.2 1 15.1 0 2019-06 RANN94 R5-194700 0.210 F Update to RNDC FR1 RRM IS DRX test with SSE-based RLM RS 15.1 0 10.1 0 1	2019-06	RAN#84	R5-194557	0181	-	F	Correction of Minimum conformance requirements 6.6.2.0	15.1.0
2019-06 RANNB4 RS-194566 0190 F Correction of \$6 RRM Test Case 7.6.2.3 15.1.0 2019-06 RANNB4 RS-194566 0190 F Correction of \$6 RRM Test Case 7.6.2.5 15.1.0 2019-06 RANNB4 RS-194566 0192 F Correction of \$6 RRM Test Case 7.6.2.5 15.1.0 2019-06 RANNB4 RS-194569 0193 F Correction of \$6 RRM Test Case 7.6.2.5 15.1.0 2019-06 RANNB4 RS-194569 0193 F Correction of \$6 RRM Test Case 7.6.2.7 15.1.0 2019-06 RANNB4 RS-194570 0194 F Correction of \$6 RRM Test Case 7.6.2.7 15.1.0 2019-06 RANNB4 RS-194571 0195 F Correction of \$6 RRM Test Case 7.6.2.7 15.1.0 2019-06 RANNB4 RS-194572 0196 F Correction of \$6 RRM Test Case 7.6.2.1 15.1.0 2019-06 RANNB4 RS-194573 0196 F Correction of \$6 RRM Test Case 7.6.2.1 15.1.0 2019-06 RANNB4 RS-194573 0107 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 2019-06 RANNB4 RS-194573 0107 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 2019-06 RANNB4 RS-194570 0208 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 2019-06 RANNB4 RS-194570 0208 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 2019-06 RANNB4 RS-194570 0210 F Update to READ CFR1 transmit timing acturacy lest 15.1.0 2019-06 RANNB4 RS-194700 0214 F Update to READ CFR1 transmit timing acturacy lest 15.1.0 2019-06 RANNB4 RS-194701 0214 F Update to READ FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RANNB4 RS-195013 0216 F Update to RLM SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RANNB4 RS-195013 0216 F Update to RLM SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RANNB4 RS-195013 0216 F Update to RLM SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RANNB4 RS-195013 0216 F Update to RLM SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RANNB4 RS-195013 0216 F Update to RLM SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RANNB4 RS-19		RAN#84	R5-194562	0186	-	F	Correction of Minimum conformance requirements 7.6.2.0	15.1.0
2019-06 RANNB4 RF-19456 0191 F Correction of SG RRM Test Case 7.6.2.4 15.1.0	2019-06	RAN#84	R5-194564	0188	-	F	Correction of 5G RRM Test Case 7.6.2.2	15.1.0
2019-06 RANNB4 R5-194567 0191 F Correction of \$G RRM Test Case 7.6.2.5 15.1.0	2019-06	RAN#84	R5-194565	0189	-	F	Correction of 5G RRM Test Case 7.6.2.3	15.1.0
2019-06 RANN94 R5-194667 0191 F Correction of \$6 RRM Test Case 7.6.2.5 15.1.0 2019-06 RANN94 R5-19468 0192 F Correction of \$6 RRM Test Case 7.6.2.6 15.1.0 2019-06 RANN94 R5-19459 0194 F Correction of \$6 RRM Test Case 7.6.2.7 15.1.0 2019-06 RANN94 R5-19457 0194 F Correction of \$6 RRM Test Case 7.6.2.7 15.1.0 15.1.0 2019-06 RANN94 R5-19457 0194 F Correction of \$6 RRM Test Case 7.6.2.8 15.1.0 15.1.0 2019-06 RANN94 R5-19457 0196 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 15.1.0 2019-06 RANN94 R5-19457 0196 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 15.1.0 2019-06 RANN94 R5-19470 0208 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 2019-06 RANN94 R5-19470 0209 F Correction of \$6 RRM Test Case 7.3.2.1.2 15.1.0 2019-06 RANN94 R5-19470 0210 F Update to RN-DC FR1 RRM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-19470 0211 F Update to RN-SA FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-19470 0212 F Update to RN-SA FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-19471 0214 F Update to RN-DC FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-19471 0216 F Update to RN-DC FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-19471 0216 F Update to RN-DC FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-195013 0156 F Update to RN-DC FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-195013 0156 F Update to RN-DC FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-195013 0156 F E Update to RN-DC FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-195013 0144 F Update to RN-DC FR1 RLM IS DRX test with \$59-based RLM RS 15.1.0 2019-06 RANN94 R5-195013 0144 F Update to RN-DC FR1 RLM IS DRX					-	F		•
2019-06 RANIR84 R5-194568 0193 - F Correction of \$6 RRM Test Case 7.6.2.6 15.1.0					-			_
2019-06 RANMB4 R 5-194579 0194 F Correction of Six RRM Test Case 7.6.2.7 51,51.0					-			
2019-06 RAN#84 R5-194570 0194 F Correction of SG RRM Test Case 7.6.2 R 15.1.0					<u> </u>			
2019-06 RAN#84 R5-194572 0195 - F Correction of Minimum conformance requirements 7:3.2.1.0 15.1.0					-			
2019-06 RANM84 R 5-194572 0.1945 F Correction of Sig RRM Test Case 7.3.2.1.1 1.5.1.0					-			
2019-06 RAMW94 R5-194573 0.197 F Correction of \$50 RRM Test Case 7.32.1.2 15.1.0			1 		-			+
2019-06 RAM/94 R5-194700 0208 F Clean-up in EN-DC FR1 transmit timing accuracy test 15.1.0					-			+
2019-06 RANNEM R5-194702 0210 F Update to RND-C FRI, RLM IS DRX test with SSB-based RLM RS 15.1.0					-	_		
2019-06 RAN#94 R5-194703 0211 F Update to NR SA FRI RLM IS nOn-DRX test with SSB-based RLM R5-109704 0212 F Update to NR SA FRI RLM IS DRX test with SSB-based RLM RS 15.10 0219-06 RAN#94 R5-194713 0216 F Update to E-UTRA configuration for RRM EN-DC tests to align with 15.10 0219-06 RAN#94 R5-194713 0216 F Update to E-UTRA configuration for RRM EN-DC tests to align with 15.10 0219-06 RAN#94 R5-195013 0156 I F Update to E-UTRA configuration for RRM EN-DC tests to align with 15.10 0219-06 RAN#94 R5-195013 0156 I F Update to EN-DC FRI RRM tests in clause 4.5.3 15.10 1								
SE 1919-06 RANW84 RS-194704 0212 F Update to RY SA FRI RLM IS DRX test with SSB-based RLM RS 15.1.0	2019-06	RAN#84	R5-194702	0210	-	F	Update to EN-DC FR1 RLM IS DRX test with SSB-based RLM RS	15.1.0
2019-06 RANW84 RS-194704 0212 -	2019-06	RAN#84	R5-194703	0211	-	F	Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM	15.1.0
2019-06							RS	
2019-06 RANWB4 RE-194713 2016 F Update to E-UTRA configuration for RRM EN-DC tests to align with 15.1.0 2019-06 RANWB4 RE-195013 0156 F Update to EN-DC FR1 RRM tests in clause 4.5.3 15.1.0 2019-06 RANWB4 RE-195016 0198 1 F Update to EN-DC FR1 RRM tests in clause 4.5.3 15.1.0 2019-06 RANWB4 RE-195017 0129 1 F Addition of default configuration in Annex H 15.1.0 2019-06 RANWB4 RE-195018 0143 1 F Update of 6.3.2.2 random access 15.1.0 2019-06 RANWB4 RE-195019 0144 1 F Update of 6.3.2.2 random access 15.1.0 2019-06 RANWB4 RE-195020 0151 1 F Update of 6.3.2.2 random access 15.1.0 2019-06 RANWB4 RE-195020 0151 1 F Update of 6.3.2.2 random access 15.1.0 2019-06 RANWB4 RE-195020 0151 1 F Update of 6.3.2.2 random access 15.1.0 2019-06 RANWB4 RE-195020 0207 1 F Modification of EN-DC FR1 RRM tests in cluase 4.6.1 15.1.0 2019-06 RANWB4 RE-195020 0200 1 F Modification of EN-DC FR1 SSB RLM OOS in non-DRX 15.1.0 2019-06 RANWB4 RE-195026 0200 1 F Modification of EN-DC FR1 SSB RLM OOS in non-DRX 15.1.0 2019-06 RANWB4 RE-195020 0201 1 F Modification of SA FR1 SSB RLM OOS in non-DRX 15.1.0 2019-06 RANWB4 RE-195020 0203 1 F Modification of SA FR1 SSB RLM OOS in non-DRX 15.1.0 2019-06 RANWB4 RE-195020 0203 1 F Modification of SA FR1 SSB RLM OOS in DRX 15.1.0 2019-06 RANWB4 RE-195030 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RANWB4 RE-195030 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RANWB4 RE-195030 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RANWB4 RE-195030 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RANWB4 RE-195030 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RANWB4 RE-195030	2019-06	RAN#84	R5-194704	0212	[-	F	Update to NR SA FR1 RLM IS DRX test with SSB-based RLM RS	15.1.0
Core spec update			R5-194710	0214	-	F		
2019-06 RANN/84 R5-194713 0216 - F Update to EN-DC FR1 RRIM ISDRX test with SSB-based RLM RS 15.1.0			1	1			1 '	
2019-06 RANI/B4 R5-195013 0156 1 F Updated to EN-DC FR1 RRM tests in clause 4.5.3 15.1.0	2019-06	RAN#84	R5-194713	0216	-	F		15.1.0
2019-06 RANW84 R5-195016 0198 1 F Test tolerance and measurement uncertainty in Annex F for Inter- 15.1.0					1			
Preg measurement lest cases				-				
2019-06 RAN#84 R5-195018 0143 1 F Addition of default configuration in Annex H 15.1.0	2013 00	10 114/104	110 100010	0130	-	'	1	15.1.0
2019-06 RAN#84 R5-195018 0.143 1 F Update of 6.3.2.2.1 random access 15.1.0	2010.06	D / NI#0 /	DE 105017	0120	1	-		15 1 0
2019-06 RAN#84 R5-195029 D144 1 F Update of 6.3.2.2 2 non-contention random access 15.1.0							<u> </u>	
2019-06 RAN#84 RS-195021 0207 1				_	_			
2019-06 RAN#84 RS-195021 0207 1 F Modification of EN-DC FR1 TAAA 15.1.0							, , , 	
2019-06 RAN#84 RS-195025 0200 1 F Modification of EN-DC FR1 SSB RLM OOS in non-DRX 15.1.0								
2019-06 RAN#84 R5-195025 0200 1 F Modification of EN-DC FR1 SSB RLM OOS in DRX 15.1.0					_			
2019-06 RAN/#84 R5-195026 0201 1 F Modification of NR SA FR1 TSAA 15.1.0								
2019-06 RAN#84 R5-195027 0202 1 F Modification of SA FR1 SSB RLM OOS in non-DRX 15.1.0					1		Modification of EN-DC FR1 SSB RLM OOS in DRX	15.1.0
2019-06 RAN#84 R5-195028 0203 1 F Modification of SA FR1 SSB RLM OOS in DRX 15.1.0	2019-06	RAN#84	R5-195026	0201	1	F	Modification of NR SA FR1 TAAA	15.1.0
2019-06 RAN#84 R5-19503 0204 1 F Modification of EN-DC FR2 TAAA 15.1.0 2019-06 RAN#84 R5-19503 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in non-DRX 15.1.0 2019-06 RAN#84 R5-19503 0206 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RAN#84 R5-195032 0219 1 F Update to EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RAN#84 R5-195033 0220 1 F Update to EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RAN#84 R5-195033 0220 1 F Update to EN-DC FR2 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195034 0221 1 F Addition of EN-DC FR2 Transmit Timing Accuracy tests 15.1.0 2019-06 RAN#84 R5-195035 0209 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195030 0150 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0150 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0178 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0178 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0178 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Correction of 5G RRM Test Case 5.6.2.6 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Correction of 6d fault message content for RRM in Annex H 15.1.0 RS 2019-06 RAN#84 R5-195040 0166 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195040 0166 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195040 0166 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195040 013 1 F Update t	2019-06	RAN#84	R5-195027	0202	1	F	Modification of SA FR1 SSB RLM OOS in non-DRX	15.1.0
2019-06 RAN#84 R5-195029 0204 1 F Modification of EN-DC FR2 TAAA 15.1.0 2019-06 RAN#84 R5-195030 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RAN#84 R5-195031 0206 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RAN#84 R5-195032 0219 1 F Update to EN-DC FR2 SSB RLM OOS in DRX 15.1.0 2019-06 RAN#84 R5-195033 0220 1 F Update to EN-DC FR2 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195034 0221 1 F Addition of EN-DC FR2 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RAN#84 R5-195035 0209 1 F Update to EN-DC FR2 Transmit Timing Accuracy tests 15.1.0 2019-06 RAN#84 R5-195030 0150 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0150 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0150 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0150 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195030 0178 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Correction of SG RRM Test Case 5.6.2.6 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Correction of SG RRM Test Case 5.6.2.6 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195040 0166 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195040 0166 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195040 0167 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Update to NR SA FR1 RLM	2019-06	RAN#84	R5-195028	0203	1	F	Modification of SA FR1 SSB RLM OOS in DRX	15.1.0
2019-06 RAN#84 R5-195030 0205 1 F Modification of EN-DC FR2 SSB RLM OOS in non-DRX 15.1.0				0204	1	F	Modification of EN-DC FR2 TAAA	
2019-06 RAN#84 R5-195031 0206 1 F Modification of EN-DC FR2 SSB RLM OOS in DRX 15.1.0								
2019-06 RAN#84 R5-195032 0219 1 F Update to EN-DC FR2 RLM IS non-DRX test with SSB-based RLM 15.1.0								
RS 2019-06 RAN#84 R5-195033 0220 1 F Update to EN-DC FR2 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RAN#84 R5-195035 0209 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195036 0150 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195037 0155 1 F Updated to cell configuration mapping table for RRM tests 15.1.0 2019-06 RAN#84 R5-195038 0147 1 F Introduction of TC 6.5.2.1 NR SA FR1 interruptions during measurements on deactivated NR SCC 2019-06 RAN#84 R5-195039 0178 1 F Correction of 5G RRM Test Case 5.6.2.6 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Correction of default message content for RRM in Annex H 15.1.0 2019-06 RAN#84 R5-195040 0217 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195042 0218 1 F Update to NR SA FR1 RLM IS DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195045 0215 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS RS 2019-06 RAN#84 R5-195045 0103 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195045 0103 1 F Update to EN-DC RLM out-of-sync in non-DRX test case 4.5.1.5 15.1.0 2019-06 RAN#84 R5-195173 0167 1 F Correction of SG RRM Test Case 7.6.2.1 15.1.0 2019-06 RAN#84 R5-195173 0167 1 F Correction of SG RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of SG RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0170 1 F Correction of SG RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Correction of SG RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F C			 					
2019-06	2019-00	KAN#04	K3-193032	0219	1	ľ		15.1.0
2019-06	2010.06	D 4 N 14 0 4	DE 105022	0220	1	┢		15 1 0
2019-06							<u> </u>	
RS 2019-06 RAN#84 R5-195036 0150 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 15.1.0								
2019-06 RAN#84 R5-195036 0150 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 15.1.0	2019-06	RAN#84	R5-195035	0209	1	-		15.1.0
2019-06 RAN#84 R5-195037 0155 1 F Updated to cell configuration mapping table for RRM tests 15.1.0						<u> </u>		
2019-06 RAN#84 R5-195038 0147 1 F Introduction of TC 6.5.2.1 NR SA FR1 interruptions during measurements on deactivated NR SCC 2019-06 RAN#84 R5-195039 0178 1 F Correction of 5G RRM Test Case 5.6.2.6 15.1.0 2019-06 RAN#84 R5-195040 0166 1 F Correction of default message content for RRM in Annex H 15.1.0 2019-06 RAN#84 R5-195041 0217 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 RS 2019-06 RAN#84 R5-195042 0218 1 F Update to NR SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RAN#84 R5-195043 0215 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM 15.1.0 2019-06 RAN#84 R5-195044 0187 1 F Correction of 5G RRM Test Case 7.6.2.1 15.1.0 2019-06 RAN#84 R5-195045 0103 1 F Update of EN-DC RLM out-of-sync in non-DRX test case 4.5.1.5 15.1.0 2019-06 RAN#84 R5-195079 0223 F RRM implementation of FR2 UL demod OTA tests using single pol 15.1.0 2019-06 RAN#84 R5-195173 0167 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0172 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0172 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195185 0182 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Correc								
measurements on deactivated NR SCC								
2019-06 RAN#84 R5-195039 0178 1 F Correction of 5G RRM Test Case 5.6.2.6 15.1.0	2019-06	RAN#84	R5-195038	0147	1	F		15.1.0
2019-06 RAN#84 R5-195040 0166 1 F Correction of default message content for RRM in Annex H 15.1.0 2019-06 RAN#84 R5-195041 0217 1 F Update to NR SA FR1 RLM IS non-DRX test with SSB-based RLM RS 15.1.0 2019-06 RAN#84 R5-195042 0218 1 F Update to NR SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0 2019-06 RAN#84 R5-195043 0215 1 F Update to EN-DC FR1 RLM IS non-DRX test with SSB-based RLM RS 15.1.0 2019-06 RAN#84 R5-195044 0187 1 F Correction of 5G RRM Test Case 7.6.2.1 15.1.0 2019-06 RAN#84 R5-195045 0103 1 F Update of EN-DC RLM out-of-sync in non-DRX test case 4.5.1.5 15.1.0 2019-06 RAN#84 R5-195099 0223 - F RRM implementation of FR2 UL demod OTA tests using single pol RX TE 15.1.0 2019-06 RAN#84 R5-195173 0167 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 <t< td=""><td></td><td></td><td></td><td></td><td><u> </u></td><td></td><td></td><td></td></t<>					<u> </u>			
2019-06					1			
RS 2019-06 RAN#84 R5-195042 0218 1 F Update to NR SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0	2019-06	RAN#84	R5-195040	0166	1	F	Correction of default message content for RRM in Annex H	15.1.0
RS 2019-06 RAN#84 R5-195042 0218 1 F Update to NR SA FR1 RLM IS DRX test with SSB-based RLM RS 15.1.0		RAN#84		0217	1	F		
2019-06				1				
2019-06	2019-06	RAN#84	R5-195042	0218	1	F		15.1.0
RS				 			\ '	
2019-06 RAN#84 R5-195044 0187 1 F Correction of 5G RRM Test Case 7.6.2.1 15.1.0 2019-06 RAN#84 R5-195045 0103 1 F Update of EN-DC RLM out-of-sync in non-DRX test case 4.5.1.5 15.1.0 2019-06 RAN#84 R5-195099 0223 - F RRM implementation of FR2 UL demod OTA tests using single pol RX TE 15.1.0 2019-06 RAN#84 R5-195173 0167 1 F Correction of Minimum conformance requirements 4.6.2.0 15.1.0 2019-06 RAN#84 R5-195174 0168 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195176 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0171 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0		" " " " " " " " " " " " " " " " " " "	100040		-	Ι.		
2019-06 RAN#84 R5-195045 0103 1 F Update of EN-DC RLM out-of-sync in non-DRX test case 4.5.1.5 15.1.0 2019-06 RAN#84 R5-195099 0223 - F RRM implementation of FR2 UL demod OTA tests using single pol RX TE 15.1.0 2019-06 RAN#84 R5-195173 0167 1 F Correction of Minimum conformance requirements 4.6.2.0 15.1.0 2019-06 RAN#84 R5-195174 0168 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195176 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0171 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test	2010-06	R∆N#91	R5-105044	0187	1	F		15 1 0
2019-06 RAN#84 R5-195099 0223 - F RRM implementation of FR2 UL demod OTA tests using single pol RX TE 15.1.0 2019-06 RAN#84 R5-195173 0167 1 F Correction of Minimum conformance requirements 4.6.2.0 15.1.0 2019-06 RAN#84 R5-195174 0168 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195176 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195177 0171 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195180 0172 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test 15.1.0								
Rx TE					+			
2019-06 RAN#84 R5-195173 0167 1 F Correction of Minimum conformance requirements 4.6.2.0 15.1.0 2019-06 RAN#84 R5-195174 0168 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195176 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195177 0171 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0172 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1	Z019-00	ran#84	LK2-TA20AA	0223	-	ا ا		15.1.0
2019-06 RAN#84 R5-195174 0168 1 F Correction of 5G RRM Test Case 4.6.2.1 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195176 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195177 0171 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0172 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance	2010.00	DANUCA	DE 405470	01.07	1	┢		15 1 0
2019-06 RAN#84 R5-195175 0169 1 F Correction of 5G RRM Test Case 4.6.2.2 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195176 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195177 0171 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0172 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0								
2019-06 RAN#84 R5-195176 0170 1 F Correction of 5G RRM Test Case 4.6.2.3 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195177 0171 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0172 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0					_	_		
2019-06 RAN#84 R5-195177 0171 1 F Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance 15.1.0 2019-06 RAN#84 R5-195179 0172 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0								
2019-06 RAN#84 R5-195179 0172 1 F Correction of Minimum conformance requirements 5.6.2.0 15.1.0 2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0		-						
2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0	2019-06	RAN#84			1	F	Correction of 5G RRM Test Case 4.6.2.4 with FR1 Test tolerance	15.1.0
2019-06 RAN#84 R5-195182 0142 1 F Addition of FR1-E-UTRAN event-triggered reporting in DRX test case 6.6.3.2 15.1.0 2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0	2019-06	RAN#84	R5-195179	0172	1		Correction of Minimum conformance requirements 5.6.2.0	15.1.0
case 6.6.3.2					1	F	Addition of FR1-E-UTRAN event-triggered reporting in DRX test	
2019-06 RAN#84 R5-195185 0158 1 F Update of FR1 Test tolerance and uncertainties in AnnexF 15.1.0 2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0							1	
2019-06 RAN#84 R5-195186 0182 1 F Correction of 5G RRM Test Case 6.6.2.1 with FR1 Test tolerance 15.1.0	2019-06	RAN#84	R5-195185	0158	1	F		15.1.0
				 			\ '	
TEATS ON TRANSPORT HAD ESSENT INTO THE TRANSPORTED OF A INTERNATIONAL DESCRIPTION AND A COMMISSION OF A PROPERTY O		RAN#84	R5-195187	0183	1	F	Correction of 5G RRM Test Case 6.6.2.2 with FR1 Test tolerance	15.1.0

2019-06 2019-06	RAN#84 RAN#84	R5-195188 R5-195189	0184 0185	1	F	Correction of 5G RRM Test Case 6.6.2.3 with FR1 Test tolerance Correction of 5G RRM Test Case 6.6.2.4 with FR1 Test tolerance	15.1.0 15.1.0
2019-06	RAN#84	R5-195189 R5-195445	0152	2	IF F	Updated to SA FR1 RRM tests in clause 6.6.3	15.1.0
2019-06	RAN#84	-	-	-	-	Administrative release upgrade to match the release of 3GPP TS 38.508-1 and TS 38.521-1 which were upgraded at RAN#84 to Rel-16 due to Rel-16 relevant CR(s)	16.0.0
2019-09	RAN#85	R5-195563	0228	-	F	Addition of 5.6.1.0 minimum requirements	16.1.0
2019-09	RAN#85	R5-195568	0233	-	F	Update of 6.1.1.2 inter-freq cell re-selection	16.1.0
2019-09	RAN#85	R5-195569	0234	-	F	Update of 6.1.2.1 inter-RAT cell re-selection to higher priority	16.1.0
2019-09	RAN#85	R5-195571	0236	-	F	Update of 6.3.1.4 inter-RAT handover to known cell	16.1.0
2019-09	RAN#85	R5-195573	0238	-	F	Update Test Tolerance of 6.3.2.1.1 intra-freq RRC re-establishment	16.1.0
2019-09	RAN#85	R5-195574	0239	-	F	Update Test Tolerance of 6.3.2.1.2 inter-freq RRC re-establishment	16.1.0
2019-09	RAN#85	R5-195575	0240	-	F	Update Test Tolerance of 6.3.2.3.1 NR RRC redirection	16.1.0
2019-09	RAN#85	R5-195576	0241	-	F	Update Test Tolerance of 6.3.2.3.2 inter-RAT RRC redirection	16.1.0
2019-09	RAN#85	R5-195577	0242	-	F	Update of 6.5.1.5 RLM out-of-sync non-DRX	16.1.0
2019-09	RAN#85	R5-195578	0243	-	F	Update of 6.5.1.6 RLM in-sync non-DRX	16.1.0
2019-09	RAN#85	R5-195579	0244	-	F	Update of 6.5.1.7 RLM out-of-sync in DRX	16.1.0
2019-09	RAN#85	R5-195580	0245	-	F	Update of 6.5.1.8 RLM in-sync in DRX	16.1.0
2019-09	RAN#85	R5-195581	0246	-	F	Update of 6.5.5.3 CSI-RS-based BFD non-DRX	16.1.0
2019-09	RAN#85	R5-195582	0247	-	F	Update of 6.5.5.4 CSI-RS-based BFD in DRX	16.1.0
2019-09	RAN#85	R5-195596	0248	-	F	Addition of minimum conformance requirements for FR2 EN-DC CSI-RS based RLM	16.1.0
2019-09	RAN#85	R5-195601	0253	-	F	Addition of minimum conformance requirements for FR2 EN-DC CSI-RS based BFD	16.1.0
2019-09	RAN#85	R5-195604	0256	-	F	Addition of minimum conformance requirements for SA FR2 reselection	16.1.0
2019-09	RAN#85	R5-195605	0257	-	F	Addition of NR test case 7.1.1.1-intra freq reselection	16.1.0
2019-09	RAN#85	R5-195606	0258	-	F	Addition of NR test case 7.1.1.2-inter freq reselection	16.1.0
2019-09	RAN#85	R5-195608	0260	-	F	Addition of NR test case 8.4.2.1-without SBI non-DRX	16.1.0
2019-09	RAN#85	R5-195609	0261	-	F	Addition of NR test case 8.4.2.2-without SBI DRX	16.1.0
2019-09	RAN#85	R5-195610	0262	-	F	Addition of NR test case 8.4.2.3-with SBI non-DRX	16.1.0
2019-09	RAN#85	R5-195611	0263	-	F	Addition of NR test case 8.4.2.4-with SBI DRX	16.1.0
2019-09	RAN#85	R5-195612	0264	-	F	Addition of minimum conformance requirements for FR1 EN-DC CSI-RS based RLM	16.1.0
2019-09	RAN#85	R5-195623	0275	-	F	Correction of NR test case 5.5.2.1-interruption transition DRX sync	16.1.0
2019-09	RAN#85	R5-195624	0276	-	F	Correction of NR test case 5.5.2.2-interruption transition DRX async	16.1.0
2019-09	RAN#85	R5-195625	0277	-	F	Correction of NR test case 5.5.2.3-interruption NR deactivated SCell sync	16.1.0
2019-09	RAN#85	R5-195626	0278	-	F	Correction of NR test case 5.5.2.4-interruption NR deactivated SCell async	16.1.0
2019-09	RAN#85	R5-195627	0279	-	F	Correction of NR test case 5.5.2.5-interruption LTE deactivated SCell sync	16.1.0
2019-09	RAN#85	R5-195628	0280	-	F	Correction of NR test case 5.5.2.6-interruption LTE deactivated SCell async	16.1.0
2019-09	RAN#85	R5-195629	0281	-	F	Correction of NR test case 7.5.5.1-SSB BFD non-DRX	16.1.0

						1	
2019-09	RAN#85	R5-195630	0282	-	F	Correction of NR test case 7.5.5.2-SSB BFD DRX	16.1.0
2019-09	RAN#85	R5-195631	0283	-	F	Correction of NR test case 7.5.5.3-CSI-RS BFD non-DRX	16.1.0
2019-09	RAN#85	R5-195632	0284	-	F	Correction of NR test case 7.5.5.4-CSI-RS BFD DRX	16.1.0
2019-09	RAN#85	R5-195633	0285	-	F	Correction of NR test case 7.6.1.1-without gap non-DRX	16.1.0
2019-09	RAN#85	R5-195634	0286	-	F	Correction of NR test case 7.6.1.2-without gap DRX	16.1.0
2019-09	RAN#85	R5-195636	0288	-	F	Correction of NR test case 7.6.1.4-with gap DRX	16.1.0
2019-09	RAN#85	R5-196140	0295	-	F	Update NR operating band groups	16.1.0
2019-09	RAN#85	R5-196250	0296	-	F	Correction to EN-DC FR1 event-triggered reporting without gap TC 4.6.1.1 and 4.6.1.2	16.1.0
2019-09	RAN#85	R5-196503	0301	-	F	Updated to EN-DC FR1 RRM tests in clause 4.5.3	16.1.0
2019-09	RAN#85	R5-196504	0302	-	F	Updated to EN-DC FR2 RRM tests in clause 5.5.3	16.1.0
2019-09	RAN#85	R5-196547	0304	-	F	Update of FR1 Test tolerance and uncertainties in AnnexF	16.1.0
2019-09	RAN#85	R5-196601	0306	-	F	Correction of the reference for test frequencies and test mode - Chapter 4	16.1.0
2019-09	RAN#85	R5-196602	0307	-	F	Correction of the reference for test frequencies and test mode - Chapter 6	16.1.0
2019-09	RAN#85	R5-196603	0308	-	F	Editorial Corrections to section 5.5	16.1.0
2019-09	RAN#85	R5-196659	0309	-	F	Editorial corrections of Annex A	16.1.0
2019-09	RAN#85	R5-196660	0310	-	F	Correction of RRM Test Case 7.3.2.1.1	16.1.0
2019-09	RAN#85	R5-196661	0311	-	F	Correction of RRM Test Case 7.3.2.1.2	16.1.0
2019-09	RAN#85	R5-196662	0312	-	F	Correction of cell configuration mapping for RRM Test Cases in Annex E.3	16.1.0
2019-09	RAN#85	R5-196666	0316	-	F	Correction of RRM Test Case 5.6.2.1	16.1.0
2019-09	RAN#85	R5-196667	0317	-	F	Correction of RRM Test Case 5.6.2.2	16.1.0
2019-09	RAN#85	R5-196668	0318	-	F	Correction of RRM Test Case 5.6.2.3	16.1.0
2019-09	RAN#85	R5-196669	0319	-	F	Correction of RRM Test Case 5.6.2.4	16.1.0
2019-09	RAN#85	R5-196670	0320	-	F	Correction of RRM Test Case 5.6.2.5	16.1.0
2019-09	RAN#85	R5-196671	0321	-	F	Correction of RRM Test Case 5.6.2.6	16.1.0
2019-09	RAN#85	R5-196672	0322	-	F	Correction of RRM Test Case 5.6.2.7	16.1.0
2019-09	RAN#85	R5-196673	0323	-	F	Correction of RRM Test Case 5.6.2.8	16.1.0
2019-09	RAN#85	R5-196674	0324	-	F	Addition of minimum conformance requirements for L1-RSRP measurement RRM FR1 test cases	16.1.0
2019-09	RAN#85	R5-196675	0325	-	F	Addition of SSB based L1-RSRP measurement RRM test case 4.6.3.1	16.1.0
2019-09	RAN#85	R5-196676	0326	-	F	Addition of SSB based L1-RSRP measurement RRM test case 4.6.3.2	16.1.0
2019-09	RAN#85	R5-196677	0327	-	F	Addition of CSI-RS based L1-RSRP measurement RRM test case 4.6.3.3	16.1.0
2019-09	RAN#85	R5-196679	0329	-	F	Addition of minimum conformance requirements for L1-RSRP measurement RRM FR2 test cases	16.1.0
2019-09	RAN#85	R5-196680	0330	-	F	Addition of SSB based L1-RSRP measurement RRM test case	16.1.0
	1	1	1	1	1	I and the second	1

					1	5.6.3.1	
2019-09	RAN#85	R5-196681	0331	-	F	Addition of SSB based L1-RSRP measurement RRM test case 5.6.3.2	16.1.0
2019-09	RAN#85	R5-196682	0332	-	F	Addition of CSI-RS based L1-RSRP measurement RRM test case 5.6.3.3	16.1.0
2019-09	RAN#85	R5-196735	0334	-	F	Editorial to fix conversion issues with two equations	16.1.0
2019-09	RAN#85	R5-196736	0335	-	F	Adding Chapter 8	16.1.0
2019-09	RAN#85	R5-196737	0336	-	F	New test 4.5.7.1	16.1.0
2019-09	RAN#85	R5-196738	0337	-	F	New test 4.5.5.1	16.1.0
2019-09	RAN#85	R5-196739	0338	-	F	New test 4.5.5.2	16.1.0
2019-09	RAN#85	R5-196740	0339	-	F	New test 4.7.3.1	16.1.0
2019-09	RAN#85	R5-196741	0340	-	F	New test 4.7.3.2	16.1.0
2019-09	RAN#85	R5-196742	0341	-	F	New test 6.7.3.1	16.1.0
2019-09	RAN#85	R5-196743	0342	-	F	New test 6.7.3.2	16.1.0
2019-09	RAN#85	R5-196925	0351	-	F	Modification of EN-DC FR2 TAAA Section 5.4.3.1	16.1.0
2019-09	RAN#85	R5-196943	0360	-	F	Addition of CSI-RS based L1-RSRP measurement RRM test case 5.6.3.4	16.1.0
2019-09	RAN#85	R5-197361	0357	1	F	Modification of SA FR1 TAAA Section 6.4.3.1	16.1.0
2019-09	RAN#85	R5-197364	0290	1	F	Update of NR UE Tx Timing Accuracy Test	16.1.0
2019-09	RAN#85	R5-197366	0235	1	F	Update Test Tolerance of 6.1.2.2 inter-RAT cell re-selection to lower priority	16.1.0
2019-09	RAN#85	R5-197396	0346	1	F	Update NSA Event trigger reporting test case	16.1.0
2019-09	RAN#85	R5-197397	0352	1	F	Modification of EN-DC FR2 SSB-RLM OOS Section 5.5.1.1	16.1.0
2019-09	RAN#85	R5-197398	0353	1	F	Modification of EN-DC FR2 SSB-RLM OOS in DRX Section 5.5.1.3	16.1.0
2019-09	RAN#85	R5-197399	0354	1	F	Modification of Synchronous EN-DC FR2 RRC DL BWP Switch in non-DRX Section 5.5.6.2.1	16.1.0
2019-09	RAN#85	R5-197400	0355	1	F	Modification of SA FR1 Handover with unknown Target Cell Section 6.3.1.2	16.1.0
2019-09	RAN#85	R5-197401	0356	1	F	Modification of SA FR1-FR1 Handover with unknown Target Cell Section 6.3.1.3	16.1.0
2019-09	RAN#85	R5-197402	0224	1	F	Update of 4.6.1.3 event with gap non-DRX	16.1.0
2019-09	RAN#85	R5-197403	0225	1	F	Update of 4.6.1.4 event with gap in DRX	16.1.0
2019-09	RAN#85	R5-197404	0226	1	F	Update of 4.6.1.5 event without gap with ssb index	16.1.0
2019-09	RAN#85	R5-197405	0227	1	F	Update of 4.6.1.6 event with gap with ssb index	16.1.0
2019-09	RAN#85	R5-197406	0314	1	F	Correction of 5G RRM Inter Frequency measurements EN-DC test cases	16.1.0
2019-09	RAN#85	R5-197407	0229	1	F	Addition of 5.6.1.1 event without gap non-DRX	16.1.0
2019-09	RAN#85	R5-197408	0230	1	F	Addition of 5.6.1.2 event without gap in DRX	16.1.0
2019-09	RAN#85	R5-197409	0231	1	F	Addition of 5.6.1.3 event with gap non-DRX	16.1.0
2019-09	RAN#85	R5-197410	0232	1	F	Addition of 5.6.1.4 event with gap in DRX	16.1.0
2019-09	RAN#85	R5-197411	0249	1	F	Addition of NR test case 5.5.1.5-CSI-RS RLM OOS non-DRX	16.1.0
2019-09	RAN#85	R5-197412	0250	1	F	Addition of NR test case 5.5.1.6-CSI-RS RLM IS non-DRX	16.1.0

2019-09	RAN#85	R5-197413	0251	1	F	Addition of NR test case 5.5.1.7-CSI-RS RLM OOS DRX	16.1.0
2019-09	RAN#85	R5-197414	0252	1	F	Addition of NR test case 5.5.1.8-CSI-RS RLM IS DRX	16.1.0
2019-09	RAN#85	R5-197415	0254	1	F	Addition of NR test case 5.5.5.3-CSI-RS BFD non-DRX	16.1.0
2019-09	RAN#85	R5-197416	0255	1	F	Addition of NR test case 5.5.5.4-CSI-RS BFD DRX	16.1.0
2019-09	RAN#85	R5-197417	0259	1	F	Addition of minimum conformance requirements for inter-RAT NR measurements	16.1.0
2019-09	RAN#85	R5-197418	0289	1	F	Correction of default configuration in annex H	16.1.0
2019-09	RAN#85	R5-197419	0303	1	F	Updated to cell configuration mapping table for RRM tests	16.1.0
2019-09	RAN#85	R5-197420	0313	1	F	Correction of default message content for RRM in Annex H	16.1.0
2019-09	RAN#85	R5-197422	0305	1	F	Clarification on NE-DC tests for RRM	16.1.0
2019-09	RAN#85	R5-197423	0343	1	F	Addition RRM FR2 test setups into TS 38.533	16.1.0
2019-09	RAN#85	R5-197424	0345	1	F	Update TDD UL-DL Config based on TS 38.133	16.1.0
2019-09	RAN#85	R5-197425	0347	1	F	Modification of EN-DC FR1 UE Transmit Timing Section 4.4.1.1	16.1.0
2019-09	RAN#85	R5-197426	0265	1	F	Correction of NR test case 4.5.1.5-CSI-RS RLM OOS non-DRX	16.1.0
2019-09	RAN#85	R5-197427	0266	1	F	Correction of NR test case 4.5.1.6-CSI-RS RLM IS non-DRX	16.1.0
2019-09	RAN#85	R5-197428	0267	1	F	Correction of NR test case 4.5.1.7-CSI-RS RLM OOS DRX	16.1.0
2019-09	RAN#85	R5-197429	0268	1	F	Correction of NR test case 4.5.1.8-CSI-RS RLM IS DRX	16.1.0
2019-09	RAN#85	R5-197430	0269	1	F	Correction of NR test case 4.5.2.1-interruption transition DRX sync	16.1.0
2019-09	RAN#85	R5-197431	0270	1	F	Correction of NR test case 4.5.2.2-interruption transition DRX async	16.1.0
2019-09	RAN#85	R5-197432	0271	1	F	Correction of NR test case 4.5.2.3-interruption NR deactivated SCell sync	16.1.0
2019-09	RAN#85	R5-197433	0272	1	F	Correction of NR test case 4.5.2.4-interruption NR deactivated SCell async	16.1.0
2019-09	RAN#85	R5-197434	0273	1	F	Correction of NR test case 4.5.2.5-interruption LTE deactivated SCell sync	16.1.0
2019-09	RAN#85	R5-197435	0274	1	F	Correction of NR test case 4.5.2.6-interruption LTE deactivated SCell async	16.1.0
2019-09	RAN#85	R5-197436	0328	1	F	Addition of CSI-RS based L1-RSRP measurement RRM test case 4.6.3.4	16.1.0
2019-09	RAN#85	R5-197437	0315	1	F	Correction of 5G RRM Inter Frequency measurements SA test cases	16.1.0
2019-09	RAN#85	R5-197570	0294	1	F	Annex E and F FR1 Test tolerance update for SS-RSRP	16.1.0
2019-09	RAN#85	R5-197584	0344	1	F	Addition Annex for RRM OTA procedures in TS 38.533	16.1.0
2019-09	RAN#85	R5-197607	0287	1	F	Correction of NR test case 7.6.1.3-with gap non-DRX.	16.1.0
2019-09	RAN#85	R5-197611	0237	1	F	Update of 6.3.1.5 inter-RAT handover to unknown cell	16.1.0
2019-09	RAN#85	R5-197612	0291	1	F	Update of SSB-based RLM in-sync test cases	16.1.0
2019-09	RAN#85	R5-197624	0297	1	F	Correction to PRACH configurations for FR1	16.1.0
2019-09	RAN#85	R5-197651	0348	2	F	Modification of EN-DC FR1 TAAA Section 4.4.3.1	16.1.0
2019-09	RAN#85	R5-197652	0349	2	F	Modification of EN-DC FR1 SSB-RLM OOS Section 4.5.1.1	16.1.0
2019-09	RAN#85	R5-197653	0350	2	F	Modification of EN-DC FR1 SSB-RLM OOS DRX Section 4.5.1.3	16.1.0
2019-09	RAN#85	R5-197654	0358	2	F	Modification of SA FR1 SSB RLM OOS in non-DRX Section 6.5.1.1	16.1.0

2019-09 2019-09 2019-12 2019-1	RAN#85	R5-197655	0359	2	F	THE RESIDENCE OF THE CO. T. L. C. S. L.	
2019-09 2019-09 2019-12 2019-1			1	-	-	Modification of SA FR1 SSB RLM OOS in DRX Section 6.5.1.3	16.1.0
2019-09		R5-197656	0292	2	F	FR1 Test tolerance update for SS-RSRP NSA FR1 test cases	16.1.0
2019-12 2019-1	RAN#85	R5-197657	0300	2	F	Correction to EN-DC FR1 radio link monitoring TC 4.5.1.1 and 4.5.1.2	16.1.0
2019-12 2019-1	RAN#85	R5-197658	0293	2	F	FR1 Test tolerance update for SS-RSRP SA FR1 test cases	16.1.0
2019-12 2019-12 2019-12	RAN#86	R5-197794	0369		F	Update Test Tolerance of 4.5.2.1 interruptions active and non-active in sync	16.2.0
2019-12 2019-12	RAN#86	R5-197795	0370		F	Update Test Tolerance of 4.5.2.2 interruptions active and non-active in async	16.2.0
2019-12	RAN#86	R5-197804	0379		F	Update Test Tolerance of 6.6.3.1 inter-RAT measurement non-DRX	16.2.0
	RAN#86	R5-197805	0380		F	Update Test Tolerance of 6.6.3.2 inter-RAT measurement DRX	16.2.0
2019-12	RAN#86	R5-197813	0382		F	Addition of minimum conformance requirements 5.5.5.0.1-SSB based BFD	16.2.0
	RAN#86	R5-197814	0383		F	Addition of minimum conformance requirements 8.2.1.0-inter-RAT reselection	16.2.0
2019-12	RAN#86	R5-197815	0384		F	Addition of minimum conformance requirements 8.3.1.0-inter-RAT handover	16.2.0
2019-12	RAN#86	R5-197816	0385		F	Addition of minimum conformance requirements 8.4.1.0-inter-RAT SFTD delay	16.2.0
2019-12	RAN#86	R5-197817	0386		F	Addition of minimum conformance requirements 8.5.1.0-inter-RAT SFTD accuracy	16.2.0
2019-12	RAN#86	R5-197820	0389		F	Addition of NR test case 8.2.1.1-high priority NR reselection	16.2.0
2019-12	RAN#86	R5-198029	0394		F	Update NSA SS-RSRP tests for 4Rx connection diagram	16.2.0
2019-12	RAN#86	R5-198032	0397		F	Align Annex D to TS 38.133	16.2.0
2019-12	RAN#86	R5-198289	0400		F	Correction of PRACH index in 6.1.1.1, 6.3.2.2.1 and 6.3.2.2.2	16.2.0
2019-12	RAN#86	R5-198415	0404		F	Correction to NR SA FR1 timing advance adjustment accuracy TC 6.4.3.1	16.2.0
2019-12	RAN#86	R5-198416	0405		F	Correction to intra-frequency event-triggered reporting TC 6.6.1.1, 6.6.1.2, 6.6.1.3	16.2.0
2019-12	RAN#86	R5-198421	0410		F	Correction to FR1 SA random access test cases	16.2.0
2019-12	RAN#86	R5-198472	0412		F	Correct message contents for 5.6.2.x tests	16.2.0
2019-12	RAN#86	R5-198477	0416		F	Correction to Annex E	16.2.0
2019-12	RAN#86	R5-198518	0418		F	Update PUSCH symbol length as message exception in 6.4.1.1 in TS 38.533	16.2.0
2019-12	RAN#86	R5-198519	0419		F	Update 4.4.3.1 test requirements	16.2.0
2019-12	RAN#86	R5-198545	0420		F	Update 4.7.1.1.1 test requirements in TS 38.533	16.2.0
2019-12	RAN#86	R5-198549	0421		F	Updated to cell configuration mapping table for RRM tests	16.2.0
2019-12	RAN#86	R5-198550	0422		F	Minimum conformance requirements updated for 5G RRM Inter-RAT measurements tests	16.2.0
2019-12	RAN#86	R5-198551	0423		F	Minimum conformance requirements updated for 5G RRM SCell activation and deactivation delay tests	16.2.0
2019-12		R5-198558	0428	+-	F	5G RRM Spec 3GPP style correction in clause 4 and 5	16.2.0
2019-12	RAN#86		1				

2019-12	RAN#86	R5-198575	0432		F	Correction of minimum conformance requirements 5.6.3.0	16.2.0
2019-12	RAN#86	R5-198577	0434		F	Correction of clause 3 definitions, symbols and abbreviations	16.2.0
2019-12	RAN#86	R5-198578	0435		F	Correction of RRM Test Case 4.6.3.1	16.2.0
2019-12	RAN#86	R5-198581	0438		F	Correction of RRM Test Case 4.6.3.4	16.2.0
2019-12	RAN#86	R5-198582	0439		F	Correction of RRM Test Case 5.6.2.1	16.2.0
2019-12	RAN#86	R5-198583	0440		F	Correction of RRM Test Case 5.6.2.2	16.2.0
2019-12	RAN#86	R5-198584	0441		F	Correction of RRM Test Case 5.6.2.3	16.2.0
2019-12	RAN#86	R5-198585	0442		F	Correction of RRM Test Case 5.6.2.4	16.2.0
2019-12	RAN#86	R5-198586	0443		F	Correction of RRM Test Case 5.6.2.5	16.2.0
2019-12	RAN#86	R5-198587	0444		F	Correction of RRM Test Case 5.6.2.6	16.2.0
2019-12	RAN#86	R5-198588	0445		F	Correction of RRM Test Case 5.6.2.7	16.2.0
2019-12	RAN#86	R5-198589	0446		F	Correction of RRM Test Case 5.6.2.8	16.2.0
2019-12	RAN#86	R5-198594	0451		F	Correction of RRM Test Case 7.6.2.1	16.2.0
2019-12	RAN#86	R5-198595	0452		F	Correction of RRM Test Case 7.6.2.2	16.2.0
2019-12	RAN#86	R5-198596	0453		F	Correction of RRM Test Case 7.6.2.3	16.2.0
2019-12	RAN#86	R5-198597	0454		F	Correction of RRM Test Case 7.6.2.4	16.2.0
2019-12	RAN#86	R5-198598	0455		F	Correction of RRM Test Case 7.6.2.5	16.2.0
2019-12	RAN#86	R5-198599	0456		F	Correction of RRM Test Case 7.6.2.6	16.2.0
2019-12	RAN#86	R5-198601	0458		F	Correction of RRM Test Case 7.6.2.8	16.2.0
2019-12	RAN#86	R5-198692	0471		F	Addition of RRM Test Case 6.6.4.1	16.2.0
2019-12	RAN#86	R5-198693	0472		F	Addition of RRM Test Case 6.6.4.2	16.2.0
2019-12	RAN#86	R5-198694	0473		F	Addition of RRM Test Case 6.6.4.3	16.2.0
2019-12	RAN#86	R5-198695	0474		F	Addition of RRM Test Case 6.6.4.4	16.2.0
2019-12	RAN#86	R5-198696	0475		F	Addition of RRM Test Case 7.6.3.1	16.2.0
2019-12	RAN#86	R5-198697	0476		F	Addition of RRM Test Case 7.6.3.2	16.2.0
2019-12	RAN#86	R5-198698	0477		F	Addition of RRM Test Case 7.6.3.3	16.2.0
2019-12	RAN#86	R5-198699	0478		F	Addition of RRM Test Case 7.6.3.4	16.2.0
2019-12	RAN#86	R5-199364	0365	1	F	Update Test Tolerance of 4.5.1.5 RLM OOS non-DRX	16.2.0
2019-12	RAN#86	R5-199365	0367	1	F	Update Test Tolerance of 4.5.1.7 RLM OOS DRX	16.2.0
2019-12	RAN#86	R5-199366	0375	1	F	Update Test Tolerance of 6.5.1.5 SA RLM OOS non-DRX	16.2.0
2019-12	RAN#86	R5-199367	0377	1	F	Update Test Tolerance of 6.5.1.7 SA RLM OOS DRX	16.2.0
2019-12	RAN#86	R5-199368	0366	1	F	Update Test Tolerance of 4.5.1.6 RLM in-sync non-DRX	16.2.0
2019-12	RAN#86	R5-199369	0368	1	F	Update Test Tolerance of 4.5.1.8 RLM in-sync DRX	16.2.0
2019-12	RAN#86	R5-199370	0376	1	F	Update Test Tolerance of 6.5.1.6 SA RLM in-sync non-DRX	16.2.0
2019-12	RAN#86	R5-199371	0378	1	F	Update Test Tolerance of 6.5.1.8 SA RLM in-sync DRX	16.2.0
2019-12	RAN#86	R5-199379	0417	1	F	Update 4.4.1.1 test procedure in TS 38.533	16.2.0
2019-12	RAN#86	R5-199380	0479	1	F	Update 4.5.1.1 and 4.5.1.2 in TS 38.533	16.2.0
2019-12	RAN#86	R5-199381	0406	1	F	Correction to NR SA FR1 SS-RSRP absolute and relative	16.2.0

2019-12 RANIF86 R5-199389 0402 1 F Correction to NR SA Cell re-selection tests 16 2019-12 RANIF86 R5-199390 0436 1 F Correction of RRM Test Case 4.6.3.2 16 2019-12 RANIF86 R5-199391 0437 1 F Correction of RRM Test Case 4.6.3.3 16 2019-12 RANIF86 R5-199392 0387 1 F Addition of NR test case 5.5.5.1-ENDC FR2 SSB BFD no-DRX 16 2019-12 RANIF86 R5-199393 0388 1 F Addition of NR test case 5.5.5.2-ENDC FR2 SSB BFD DRX 16 2019-12 RANIF86 R5-199394 0431 1 F Correction of minimum conformance requirements 5.6.2.0 16 2019-12 RANIF86 R5-199395 0395 1 F Update SA SS-RSRP tests for 4Rx connection diagram 16 2019-12 RANIF86 R5-199396 0403 1 F Correction to NR SA FR1 UE transmit timing accuracy TC 6.4.1.1 16 2019-12 RANIF86 R5-199398 0361 1 F Add AoA Setup 4 for FR2 RRM Test cases 16 2019-12 RANIF86 R5-199399 0390 1 F Addition of NR test case 8.3.1.1-known handover 16 2019-12 RANIF86 R5-199400 0391 1 F Addition of NR test case 8.4.1.2-SFTD delay pon-DRX 16 2019-12 RANIF86 R5-199401 0392 1 F Addition of NR test case 8.4.1.2-SFTD delay pon-DRX 16 2019-12 RANIF86 R5-199402 0393 1 F Addition of NR test case 8.5.1.1-SFTD accuracy 16 2019-12 RANIF86 R5-199405 0424 1 F Addition of NR test case 8.5.1.1-SFTD accuracy 16 2019-12 RANIF86 R5-199405 0424 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16 2019-12 RANIF86 R5-199405 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16 2019-12 RANIF86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16 2019-12 RANIF86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16 2019-12 RANIF86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16 2019-12 RANIF86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16 2019-12 RANIF86								
Name Res 199390 0436 1 F Correction of RRM Test Case 4.6.3.2 16 2019-12 RAN#86 Res 199391 0437 1 F Correction of RRM Test Case 4.6.3.3 16 2019-12 RAN#86 Res 199392 0387 1 F Addition of NR test case 5.5.5.1-ENDC FR2 SSB BFD no-DRX 16 2019-12 RAN#86 Res 199393 0388 1 F Addition of NR test case 5.5.5.2-ENDC FR2 SSB BFD DRX 16 2019-12 RAN#86 Res 199394 0431 1 F Correction of minimum conformance requirements 5.6.2.0 16 2019-12 RAN#86 Res 199395 0395 1 F Update SA SS-RSRP tests for 4Rx connection diagram 16 2019-12 RAN#86 Res 199396 0403 1 F Correction to RRM Test Case 7.6.2.7 16 2019-12 RAN#86 Res 199397 0457 1 F Correction of RRM Test Case 7.6.2.7 16 2019-12 RAN#86 Res 199398 0361 1 F Add AoA Setup 4 for FR2 RRM Test cases 16 2019-12 RAN#86 Res 199399 0390 1 F Addition of NR test case 8.3.1.1-known handover 16 2019-12 RAN#86 Res 199400 0391 1 F Addition of NR test case 8.4.1.2-SFTD delay non-DRX 16 2019-12 RAN#86 Res 199400 0392 1 F Addition of NR test case 8.4.1.2-SFTD delay DRX 16 2019-12 RAN#86 Res 199400 0393 1 F Addition of NR test case 8.4.1.2-SFTD delay DRX 16 2019-12 RAN#86 Res 199400 0393 1 F Addition of NR test case 8.8.1.1-SFTD accuracy 16 2019-12 RAN#86 Res 199400 0413 1 F Clean up RRM message contents in Annex H 16 2019-12 RAN#86 Res 199400 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16 2019-12 RAN#86 Res 199400 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16 2019-12 RAN#86 Res 199400 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16 2019-12 RAN#86 Res 199400 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16 2019-12 RAN#86 Res 199400 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16 2019-12 RAN#86 Res 199400							measurement accuracy Intra-frequency measurements	
Naniwa	2019-12	RAN#86	R5-199389	0402	1	F	Correction to NR SA Cell re-selection tests	16.2.0
2019-12 RAN/#86 R5-199392 0387 1	2019-12	RAN#86	R5-199390	0436	1	F	Correction of RRM Test Case 4.6.3.2	16.2.0
2019-12 RAN/#86 R5-199393 0388 1	2019-12	RAN#86	R5-199391	0437	1	F	Correction of RRM Test Case 4.6.3.3	16.2.0
2019-12 RAN#86 R5-199394 0431 1 F Correction of minimum conformance requirements 5.6.2.0 16.	2019-12	RAN#86	R5-199392	0387	1	F	Addition of NR test case 5.5.5.1-ENDC FR2 SSB BFD no-DRX	16.2.0
2019-12 RAN#86 R5-199395 0395 1 F Update SA SS-RSRP tests for 4Rx connection diagram 16.	2019-12	RAN#86	R5-199393	0388	1	F	Addition of NR test case 5.5.5.2-ENDC FR2 SSB BFD DRX	16.2.0
2019-12 RAN#86 R5-199396 0403 1 F Correction to NR SA FR1 UE transmit timing accuracy TC 6.4.1.1 16.	2019-12	RAN#86	R5-199394	0431	1	F	Correction of minimum conformance requirements 5.6.2.0	16.2.0
2019-12 RAN#86 R5-199397 0457 1 F Correction of RRM Test Case 7.6.2.7 16.	2019-12	RAN#86	R5-199395	0395	1	F	Update SA SS-RSRP tests for 4Rx connection diagram	16.2.0
2019-12 RAN#86 R5-199398 0361 1 F Add AoA Setup 4 for FR2 RRM Test cases 16.	2019-12	RAN#86	R5-199396	0403	1	F	Correction to NR SA FR1 UE transmit timing accuracy TC 6.4.1.1	16.2.0
2019-12 RAN#86 R5-199399 0390 1 F Addition of NR test case 8.3.1.1-known handover 16.	2019-12	RAN#86	R5-199397	0457	1	F	Correction of RRM Test Case 7.6.2.7	16.2.0
2019-12 RAN#86 R5-199400 0391 1 F Addition of NR test case 8.4.1.1-SFTD delay non-DRX 16. 2019-12 RAN#86 R5-199401 0392 1 F Addition of NR test case 8.4.1.2-SFTD delay DRX 16. 2019-12 RAN#86 R5-199402 0393 1 F Addition of NR test case 8.5.1.1-SFTD accuracy 16. 2019-12 RAN#86 R5-199403 0396 1 F Addition of NR test case 8.5.1.1-SFTD accuracy 16. 2019-12 RAN#86 R5-199404 0413 1 F Clean up RRM message contents in Annex H 16. 2019-12 RAN#86 R5-199405 0424 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16. 2019-12 RAN#86 R5-199406 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16. 2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199409 0401 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 RLM IS test with DRX 16.	2019-12	RAN#86	R5-199398	0361	1	F	Add AoA Setup 4 for FR2 RRM Test cases	16.2.0
2019-12 RAN#86 R5-199401 0392 1 F Addition of NR test case 8.4.1.2-SFTD delay DRX 16. 2019-12 RAN#86 R5-199402 0393 1 F Addition of NR test case 8.5.1.1-SFTD accuracy 16. 2019-12 RAN#86 R5-199403 0396 1 F Align Annex A to TS 38.133 16. 2019-12 RAN#86 R5-199404 0413 1 F Clean up RRM message contents in Annex H 16. 2019-12 RAN#86 R5-199405 0424 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16. 2019-12 RAN#86 R5-199406 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16. 2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199409 0401 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 RLM IS test with DRX 16.	2019-12	RAN#86	R5-199399	0390	1	F	Addition of NR test case 8.3.1.1-known handover	16.2.0
2019-12 RAN#86 R5-199402 0393 1 F Addition of NR test case 8.5.1.1-SFTD accuracy 16. 2019-12 RAN#86 R5-199403 0396 1 F Align Annex A to TS 38.133 16. 2019-12 RAN#86 R5-199404 0413 1 F Clean up RRM message contents in Annex H 16. 2019-12 RAN#86 R5-199405 0424 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16. 2019-12 RAN#86 R5-199406 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16. 2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 RLM IS test with DRX 16.	2019-12	RAN#86	R5-199400	0391	1	F	Addition of NR test case 8.4.1.1-SFTD delay non-DRX	16.2.0
2019-12 RAN#86 R5-199404 0413 1 F Align Annex A to TS 38.133 16. 2019-12 RAN#86 R5-199404 0413 1 F Clean up RRM message contents in Annex H 16. 2019-12 RAN#86 R5-199405 0424 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16. 2019-12 RAN#86 R5-199406 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16. 2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 RLM IS test with DRX 16.	2019-12	RAN#86	R5-199401	0392	1	F	Addition of NR test case 8.4.1.2-SFTD delay DRX	16.2.0
2019-12 RAN#86 R5-199405 0424 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16. 2019-12 RAN#86 R5-199406 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16. 2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199409 0401 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 RLM IS test with DRX 16.	2019-12	RAN#86	R5-199402	0393	1	F	Addition of NR test case 8.5.1.1-SFTD accuracy	16.2.0
2019-12 RAN#86 R5-199405 0424 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.5 16. 2019-12 RAN#86 R5-199406 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16. 2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 RLM IS test with DRX 16.	2019-12	RAN#86	R5-199403	0396	1	F	Align Annex A to TS 38.133	16.2.0
2019-12 RAN#86 R5-199406 0425 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.6 16. 2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199537 0481 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F U	2019-12	RAN#86	R5-199404	0413	1	F	Clean up RRM message contents in Annex H	16.2.0
2019-12 RAN#86 R5-199407 0426 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.7 16. 2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86	2019-12	RAN#86	R5-199405	0424	1	F	New 5G RRM Inter-RAT measurement TC 8.4.2.5	16.2.0
2019-12 RAN#86 R5-199408 0427 1 F New 5G RRM Inter-RAT measurement TC 8.4.2.8 16. 2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199406	0425	1	F	New 5G RRM Inter-RAT measurement TC 8.4.2.6	16.2.0
2019-12 RAN#86 R5-199409 0433 1 F Correction of message content in Annex H 16. 2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199407	0426	1	F	New 5G RRM Inter-RAT measurement TC 8.4.2.7	16.2.0
2019-12 RAN#86 R5-199436 0470 1 F Introduction of n29 and n65 to 38.533 16. 2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199408	0427	1	F	New 5G RRM Inter-RAT measurement TC 8.4.2.8	16.2.0
2019-12 RAN#86 R5-199499 0401 1 F Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1 16. 2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199409	0433	1	F	Correction of message content in Annex H	16.2.0
2019-12 RAN#86 R5-199515 0381 1 F Update Test Tolerance in Annex F 16. 2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199436	0470	1	F	Introduction of n29 and n65 to 38.533	16.2.0
2019-12 RAN#86 R5-199517 0481 1 F Update General parameters in test case 4.5.1.2 16. 2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199499	0401	1	F	Correction to EN-DC FR1 UE transmit timing accuracy TC 4.4.1.1	16.2.0
2019-12 RAN#86 R5-199533 0482 1 F Update NSA FR2 RLM IS non-DRX test 16. 2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199515	0381	1	F	Update Test Tolerance in Annex F	16.2.0
2019-12 RAN#86 R5-199534 0483 1 F Update NSA FR2 RLM IS test with DRX 16. 2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199517	0481	1	F	Update General parameters in test case 4.5.1.2	16.2.0
2019-12 RAN#86 R5-199535 0484 1 F Update NSA FR2 Timing Accuracy Test 16.	2019-12	RAN#86	R5-199533	0482	1	F	Update NSA FR2 RLM IS non-DRX test	16.2.0
	2019-12	RAN#86	R5-199534	0483	1	F	Update NSA FR2 RLM IS test with DRX	16.2.0
2019-12 RAN#86 R5-199544 0399 1 F Add applicable test methods for RRM FR2 16.	2019-12	RAN#86	R5-199535	0484	1	F	Update NSA FR2 Timing Accuracy Test	16.2.0
	2019-12	RAN#86	R5-199544	0399	1	F	Add applicable test methods for RRM FR2	16.2.0
2019-12 RAN#86 R5-199550 0463 1 F Addition of NR SA FR1 Handover with known Target Cell Section 6.3.1.1	2019-12	RAN#86	R5-199550	0463	1	F		16.2.0
2019-12 RAN#86 R5-199551 0464 1 F Modification of NR SA FR1 Handover with unknown Target Cell Section 6.3.1.2	2019-12	RAN#86	R5-199551	0464	1	F		16.2.0
2019-12 RAN#86 R5-199552 0465 1 F Modification of NR SA FR1-FR1 Handover with unknown Target Cell 16. Section 6.3.1.3	2019-12	RAN#86	R5-199552	0465	1	F		16.2.0
2019-12 RAN#86 R5-199583 0409 1 F Correction to FR1 NSA random access test cases 16.	2019-12	RAN#86	R5-199583	0409	1	F	Correction to FR1 NSA random access test cases	16.2.0