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Technical Specification

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Contents

Foreword

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1 Scope

The present document specifies the 5G radio network layer signalling protocol for the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. The F1 Application Protocol (F1AP) supports the functions of F1 interface by signalling procedures defined in the present document. F1AP is developed in accordance to the general principles stated in TS 38.401 [4] and TS 38.470 [2].

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*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.470: "NG-RAN; F1 general aspects and principles".

[3] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[4] 3GPP TS 38.401: "NG-RAN; Architecture Description".

[5] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER)".

[6] 3GPP TS 38.300: "NR; Overall description; Stage-2".

[7] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage-2".

[8] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[9] 3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)".

[10] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[11] 3GPP TS 23.203: "Policy and charging control architecture".

[12] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[13] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".

[14] 3GPP TR 25.921: (version.7.0.0): "Guidelines and principles for protocol description and error".

[15] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".

[16] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".

[17] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".

[18] 3GPP TS 29.281: "General Packet Radio System (GPRS); Tunnelling Protocol User Plane (GTPv1-U) ".

[19] 3GPP TS 38.414: "NG-RAN; NG data transport".

[20] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[21] 3GPP TS 23.501: "System Architecture for the 5G System".

[22] 3GPP TS 38.472: "NG-RAN; F1 signalling transport".

[23] 3GPP TS 23.003: "Numbering, addressing and identification".

[24] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state ".

[25] 3GPP TS 36.104: "Base Station (BS) radio transmission and reception".

[26] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".

[27] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation".

[28] 3GPP TS 38.423: "NG-RAN; Xn application protocol (XnAP)".

[29] 3GPP TS 32.422: "Trace control and configuration management".

3 Definitions and abbreviations

3.1 Definitions

elementary procedure: F1AP consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between gNB-CU and gNB-DU. These Elementary Procedures are defined separately and are intended to be used to build up complete sequences in a flexible manner. If the independence between some EPs is restricted, it is described under the relevant EP description. Unless otherwise stated by the restrictions, the EPs may be invoked independently of each other as standalone procedures, which can be active in parallel. The usage of several F1AP EPs together is specified in stage 2 specifications (e.g., TS 38.470 [2]).

An EP consists of an initiating message and possibly a response message. Two kinds of EPs are used:

- **Class 1:** Elementary Procedures with response (success and/or failure).
- **Class 2:** Elementary Procedures without response.

For Class 1 EPs, the types of responses can be as follows:

Successful:

- A signalling message explicitly indicates that the elementary procedure successfully completed with the receipt of the response.

Unsuccessful:

- A signalling message explicitly indicates that the EP failed.
- On time supervision expiry (i.e., absence of expected response).

Successful and Unsuccessful:

- One signalling message reports both successful and unsuccessful outcome for the different included requests. The response message used is the one defined for successful outcome.

Class 2 EPs are considered always successful.

EN-DC operation: Used in this specification when the F1AP is applied for gNB-CU and gNB-DU in E-UTRAN.

gNB: as defined in TS 38.300 [6].

gNB-CU: as defined in TS 38.401 [4].

gNB-CU UE F1AP ID: as defined in TS 38.401 [4].

gNB-DU: as defined in TS 38.401 [4].

gNB-DU UE F1AP ID: as defined in TS 38.401 [4].

en-gNB: as defined in TS 37.340 [7].

UE-associated signalling: When F1AP messages associated to one UE uses the UE-associated logical F1-connection for association of the message to the UE in gNB-DU and gNB-CU.

UE-associated logical F1-connection: The UE-associated logical F1-connection uses the identities *GNB-CU UE F1AP ID* and *GNB-DU UE F1AP ID* according to the definition in TS 38.401 [4]. For a received UE associated F1AP message the gNB-CU identifies the associated UE based on the *GNB-CU UE F1AP ID* IE and the gNB-DU identifies the associated UE based on the *GNB-DU UE F1AP ID* IE. The UE-associated logical F1-connection may exist before the F1 UE context is setup in gNB-DU.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

5GC	5G Core Network
5QI	5G QoS Identifier
AMF	Access and Mobility Management Function
ARPI	Additional RRM Policy Index
CN	Core Network
CG	Cell Group
CGI	Cell Global Identifier
CP	Control Plane
DL	Downlink
EN-DC	E-UTRA-NR Dual Connectivity
EPC	Evolved Packet Core
IMEISV	International Mobile station Equipment Identity and Software Version number
NSSAI	Network Slice Selection Assistance Information
RANAC	RAN Area Code
RIM	Remote Interference Management
RIM-RS	RIM Reference Signal
RRC	Radio Resource Control
S-NSSAI	Single Network Slice Selection Assistance Information
SUL	Supplementary Uplink
TAC	Tracking Area Code
TAI	Tracking Area Identity

4 General

4.1 Procedure specification principles

The principle for specifying the procedure logic is to specify the functional behaviour of the terminating node exactly and completely. Any rule that specifies the behaviour of the originating node shall be possible to be verified with information that is visible within the system.

The following specification principles have been applied for the procedure text in clause 8:

- The procedure text discriminates between:

  1) Functionality which "shall" be executed.

     The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the REQUEST message of a Class 1 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.

  2) Functionality which "shall, if supported" be executed.

     The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

- Any required inclusion of an optional IE in a response message is explicitly indicated in the procedure text. If the procedure text does not explicitly indicate that an optional IE shall be included in a response message, the optional IE shall not be included. For requirements on including *Criticality Diagnostics* IE, see clause 10.

4.2 Forwards and backwards compatibility

The forwards and backwards compatibility of the protocol is assured by mechanism where all current and future messages, and IEs or groups of related IEs, include ID and criticality fields that are coded in a standard format that will not be changed in the future. These parts can always be decoded regardless of the standard version.

4.3 Specification notations

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

Procedure	When referring to an elementary procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Handover Preparation procedure.
Message	When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. HANDOVER REQUEST message.
IE	When referring to an information element (IE) in the specification the *Information Element Name* is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. *E-RAB ID* IE.
Value of an IE	When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in the specification enclosed by quotation marks, e.g. "Value".

5 F1AP services

F1AP provides the signalling service between gNB-DU and the gNB-CU that is required to fulfil the F1AP functions described in clause 7. F1AP services are divided into two groups:

Non UE-associated services:	They are related to the whole F1 interface instance between the gNB-DU and gNB-CU utilising a non UE-associated signalling connection.
UE-associated services:	They are related to one UE. F1AP functions that provide these services are associated with a UE-associated signalling connection that is maintained for the UE in question.

Unless explicitly indicated in the procedure specification, at any instance in time one protocol endpoint shall have a maximum of one ongoing F1AP procedure related to a certain UE.

6 Services expected from signalling transport

The signalling connection shall provide in sequence delivery of F1AP messages. F1AP shall be notified if the signalling connection breaks.

7 Functions of F1AP

The functions of F1AP are described in TS 38.470 [2].

8 F1AP procedures

8.1 List of F1AP Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs (see subclause 3.1 for explanation of the different classes):

Table 1: Class 1 procedures

Elementary Procedure	Initiating Message	Successful Outcome	Unsuccessful Outcome
		Response message	Response message
Reset	RESET	RESET ACKNOWLEDGE	
F1 Setup	F1 SETUP REQUEST	F1 SETUP RESPONSE	F1 SETUP FAILURE
gNB-DU Configuration Update	GNB-DU CONFIGURATION UPDATE	GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE	GNB-DU CONFIGURATION UPDATE FAILURE
gNB-CU Configuration Update	GNB-CU CONFIGURATION UPDATE	GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE	GNB-CU CONFIGURATION UPDATE FAILURE
UE Context Setup	UE CONTEXT SETUP REQUEST	UE CONTEXT SETUP RESPONSE	UE CONTEXT SETUP FAILURE
UE Context Release (gNB-CU initiated)	UE CONTEXT RELEASE COMMAND	UE CONTEXT RELEASE COMPLETE	
UE Context Modification (gNB-CU initiated)	UE CONTEXT MODIFICATION REQUEST	UE CONTEXT MODIFICATION RESPONSE	UE CONTEXT MODIFICATION FAILURE
UE Context Modification Required (gNB-DU initiated)	UE CONTEXT MODIFICATION REQUIRED	UE CONTEXT MODIFICATION CONFIRM	UE CONTEXT MODIFICATION REFUSE
Write-Replace Warning	WRITE-REPLACE WARNING REQUEST	WRITE-REPLACE WARNING RESPONSE	
PWS Cancel	PWS CANCEL REQUEST	PWS CANCEL RESPONSE	
GNB-DU RESOURCE COORDINATION	GNB-DU RESOURCE COORDINATION REQUEST	GNB-DU RESOURCE COORDINATION RESPONSE	

Table 2: Class 2 procedures

Elementary Procedure	Message
Error Indication	ERROR INDICATION
UE Context Release Request (gNB-DU initiated)	UE CONTEXT RELEASE REQUEST
Initial UL RRC Message Transfer	INITIAL UL RRC MESSAGE TRANSFER
DL RRC Message Transfer	DL RRC MESSAGE TRANSFER
UL RRC Message Transfer	UL RRC MESSAGE TRANSFER
UE Inactivity Notification	UE INACTIVITY NOTIFICATION
System Information Delivery	SYSTEM INFORMATION DELIVERY COMMAND
Paging	PAGING
Notify	NOTIFY
PWS Restart Indication	PWS RESTART INDICATION
PWS Failure Indication	PWS FAILURE INDICATION
gNB-DU Status Indication	GNB-DU STATUS INDICATION
RRC Delivery Report	RRC DELIVERY REPORT
Network Access Rate Reduction	NETWORK ACCESS RATE REDUCTION
Trace Start	TRACE START
Deactivate Trace	DEACTIVATE TRACE
DU-CU Radio Information Transfer	DU-CU RADIO INFORMATION TRANSFER
CU-DU Radio Information Transfer	CU-DU RADIO INFORMATION TRANSFER

8.2 Interface Management procedures

8.2.1 Reset

8.2.1.1 General

The purpose of the Reset procedure is to initialise or re-initialise the F1AP UE-related contexts, in the event of a failure in the gNB-CU or gNB-DU. This procedure does not affect the application level configuration data exchanged during, e.g., the F1 Setup procedure.

The procedure uses non-UE associated signalling.

8.2.1.2 Successful Operation

8.2.1.2.1 Reset Procedure Initiated from the gNB-CU

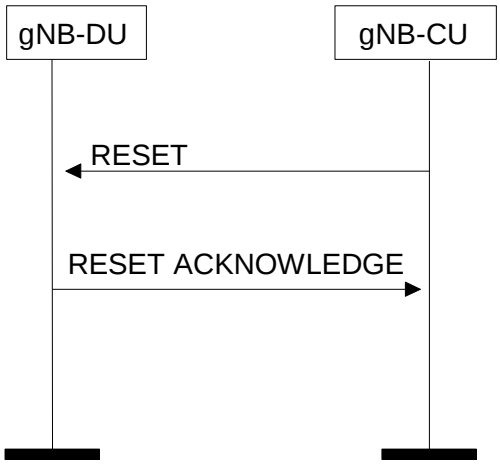

Figure 8.2.1.2.1-1: Reset procedure initiated from the gNB-CU. Successful operation

In the event of a failure at the gNB-CU, which has resulted in the loss of some or all transaction reference information, a RESET message shall be sent to the gNB-DU.

At reception of the RESET message the gNB-DU shall release all allocated resources on F1 and radio resources related to the UE association(s) indicated explicitly or implicitly in the RESET message and remove the indicated UE contexts including F1AP ID.

After the gNB-DU has released all assigned F1 resources and the UE F1AP IDs for all indicated UE associations which can be used for new UE-associated logical F1-connections over the F1 interface, the gNB-DU shall respond with the RESET ACKNOWLEDGE message. The gNB-DU does not need to wait for the release of radio resources to be completed before returning the RESET ACKNOWLEDGE message.

If the RESET message contains the *UE-associated logical F1-connection list* IE, then:

- The gNB-DU shall use the *gNB-CU UE F1AP ID* IE and/or the *gNB-DU UE F1AP ID* IE to explicitly identify the UE association(s) to be reset.

- The gNB-DU shall include in the RESET ACKNOWLEDGE message, for each UE association to be reset, the *UE-associated logical F1-connection Item* IE in the *UE-associated logical F1-connection list* IE. The *UE-associated logical F1-connection Item* IEs shall be in the same order as received in the RESET message and shall include also unknown UE-associated logical F1-connections. Empty *UE-associated logical F1-connection Item* IEs, received in the RESET message, may be omitted in the RESET ACKNOWLEDGE message.

- If the *gNB-CU UE F1AP ID* IE is included in the *UE-associated logical F1-connection Item* IE for a UE association, the gNB-DU shall include the *gNB-CU UE F1AP ID* IE in the corresponding *UE-associated logical F1-connection Item* IE in the RESET ACKNOWLEDGE message.

- If the *gNB-DU UE F1AP ID* IE is included in the *UE-associated logical F1-connection Item* IE for a UE association, the gNB-DU shall include the *gNB-DU UE F1AP ID* IE in the corresponding *UE-associated logical F1-connection Item* IE in the RESET ACKNOWLEDGE message.

Interactions with other procedures:

If the RESET message is received, any other ongoing procedure (except for another Reset procedure) on the same F1 interface related to a UE association, indicated explicitly or implicitly in the RESET message, shall be aborted.

8.2.1.2.2 Reset Procedure Initiated from the gNB-DU

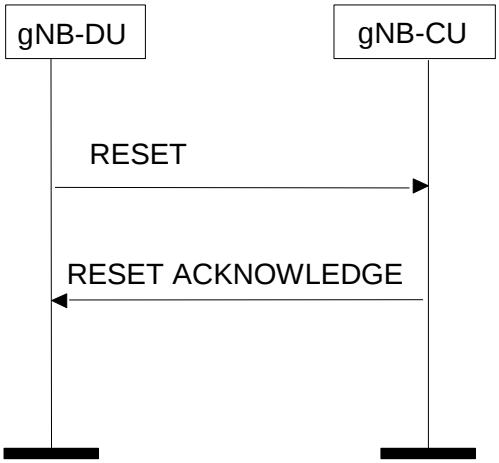

Figure 8.2.1.2.2-1: Reset procedure initiated from the gNB-DU. Successful operation

In the event of a failure at the gNB-DU, which has resulted in the loss of some or all transaction reference information, a RESET message shall be sent to the gNB-CU.

At reception of the RESET message the gNB-CU shall release all allocated resources on F1 related to the UE association(s) indicated explicitly or implicitly in the RESET message and remove the F1AP ID for the indicated UE associations.

After the gNB-CU has released all assigned F1 resources and the UE F1AP IDs for all indicated UE associations which can be used for new UE-associated logical F1-connections over the F1 interface, the gNB-CU shall respond with the RESET ACKNOWLEDGE message.

If the RESET message contains the *UE-associated logical F1-connection list* IE, then:

- The gNB-CU shall use the *gNB-CU UE F1AP ID* IE and/or the *gNB-DU UE F1AP ID* IE to explicitly identify the UE association(s) to be reset.
- The gNB-CU shall in the RESET ACKNOWLEDGE message include, for each UE association to be reset, the *UE-associated logical F1-connection* Item IE in the *UE-associated logical F1-connection list* IE. The *UE-associated logical F1-connection Item* IEs shall be in the same order as received in the RESET message and shall include also unknown UE-associated logical F1-connections. Empty *UE-associated logical F1-connection Item* IEs, received in the RESET message, may be omitted in the RESET ACKNOWLEDGE message.
- If the *gNB-CU UE F1AP ID* IE is included in the *UE-associated logical F1-connection Item* IE for a UE association, the gNB-CU shall include the *gNB-CU UE F1AP ID* IE in the corresponding *UE-associated logical F1-connection Item* IE in the RESET ACKNOWLEDGE message.
- If the *gNB-DU UE F1AP ID* IE is included in a *UE-associated logical F1-connection Item* IE for a UE association, the gNB-CU shall include the *gNB-DU UE F1AP ID* IE in the corresponding *UE-associated logical F1-connection Item* IE in the RESET ACKNOWLEDGE message.

Interactions with other procedures:

If the RESET message is received, any other ongoing procedure (except for another Reset procedure) on the same F1 interface related to a UE association, indicated explicitly or implicitly in the RESET message, shall be aborted.

8.2.1.3 Abnormal Conditions

Not applicable.

8.2.2 Error Indication

8.2.2.1 General

The Error Indication procedure is initiated by a node in order to report detected errors in one incoming message, provided they cannot be reported by an appropriate failure message.

If the error situation arises due to reception of a message utilising UE associated signalling, then the Error Indication procedure uses UE associated signalling. Otherwise the procedure uses non-UE associated signalling.

8.2.2.2 Successful Operation

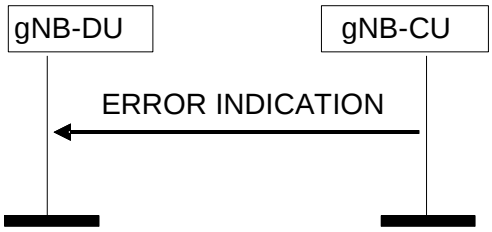

Figure 8.2.2.2-1: Error Indication procedure, gNB-CU originated. Successful operation

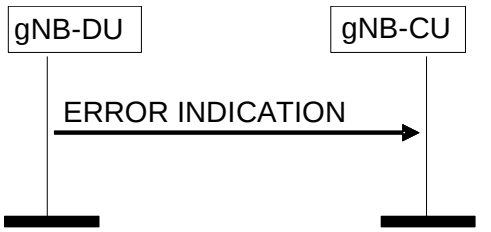

Figure 8.2.2.2-2: Error Indication procedure, gNB-DU originated. Successful operation

When the conditions defined in clause 10 are fulfilled, the Error Indication procedure is initiated by an ERROR INDICATION message sent from the receiving node.

The ERROR INDICATION message shall contain at least either the *Cause* IE or the *Criticality Diagnostics* IE. In case the Error Indication procedure is triggered by utilising UE associated signalling the *gNB-CU UE F1AP ID* IE and *gNB-DU UE F1AP ID* IE shall be included in the ERROR INDICATION message. If one or both of the *gNB-CU UE F1AP ID* IE and the *gNB-DU UE F1AP ID* IE are not correct, the cause shall be set to appropriate value, e.g., "Unknown or already allocated gNB-CU UE F1AP ID", "Unknown or already allocated gNB-DU UE F1AP ID" or "Unknown or inconsistent pair of UE F1AP ID".

8.2.2.3 Abnormal Conditions

Not applicable.

8.2.3 F1 Setup

8.2.3.1 General

The purpose of the F1 Setup procedure is to exchange application level data needed for the gNB-DU and the gNB-CU to correctly interoperate on the F1 interface. This procedure shall be the first F1AP procedure triggered for the F1-C interface instance after a TNL association has become operational.

NOTE: If F1-C signalling transport is shared among multiple F1-C interface instances, one F1 Setup procedure is issued per F1-C interface instance to be setup, i.e. several F1 Setup procedures may be issued via the same TNL association after that TNL association has become operational.

The procedure uses non-UE associated signalling.

This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also re-initialises the F1AP UE-related contexts (if any) and erases all related signalling connections in the two nodes like a Reset procedure would do.

8.2.3.2 Successful Operation

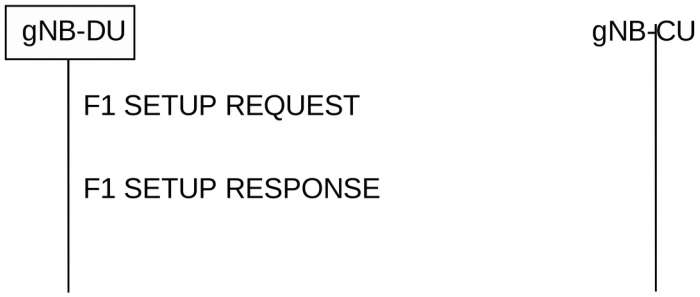

Figure 8.2.3.2-1: F1 Setup procedure: Successful Operation

The gNB-DU initiates the procedure by sending a F1 SETUP REQUEST message including the appropriate data to the gNB-CU. The gNB-CU responds with a F1 SETUP RESPONSE message including the appropriate data.

The exchanged data shall be stored in respective node and used as long as there is an operational TNL association. When this procedure is finished, the F1 interface is operational and other F1 messages may be exchanged.

If the F1 SETUP REQUEST message contains the *gNB-DU Name* IE, the gNB-CU may use this IE as a human readable name of the gNB-DU.

If the F1 SETUP REQUEST message contains the *gNB-DU Served Cells List* IE, the gNB-CU shall take into account as specified in TS 38.401 [4].

For NG-RAN, the gNB-DU shall include the *gNB-DU System Information* IE and the *TAI Slice Support List* IE.

The gNB-CU may include the *Cells to be Activated List* IE in the F1 SETUP RESPONSE message. The *Cells to be Activated List* IE includes a list of cells that the gNB-CU requests the gNB-DU to activate. The gNB-DU shall activate the cells included in the *Cells to be Activated List* IE and reconfigure the physical cell identity for cells for which the *NR PCI* IE is included.

For NG-RAN, the gNB-CU shall include the *gNB-CU System Information* IE in the F1 SETUP RESPONSE message.

For NG-RAN, the gNB-DU may include the *RAN Area Code* IE in the F1 SETUP REQUEST message. The gNB-CU may use it according to TS 38.300 [6].

For NG-RAN, the gNB-CU may include *Available PLMN List* IE, and optionally also *Extended Available PLMN List* IE, if the available PLMN(s) are different from what gNB-DU has provided in F1 SETUP REQUEST message, gNB-DU shall take this into account and only broadcast the PLMN(s) included in the received Available PLMN list(s).

The *Latest RRC Version Enhanced* IE shall be included in the F1 SETUP REQUEST message and in the F1 SETUP RESPONSE message.

If in F1 SETUP REQUEST message, the *Cell Direction* IE is present, the gNB-CU should use it to understand whether the cell is for UL or DL only. If in F1 SETUP REQUEST message, the *Cell Direction* IE is omitted in the *Served Cell Information* IE it shall be interpreted as that the Cell Direction is Bi-directional.

If the *Intended TDD DL-UL Configuration IE* is present in the F1 SETUP REQUEST message, the receiving gNB-CU shall use the received information for Cross Link Interference management. The gNB-CU may merge the Intended TDD DL-UL Configuration information received from two or more gNB-DUs. The gNB-CU shall consider the received *Neighbour Cell Information List* IE content valid until reception of an update of the IE for the same cell(s).

If the *Aggressor gNB Set* ID IE is included in the *Served Cell Information* IE, the gNB-CU shall, if supported, take it into account.

If the *Victim gNB Set* ID IE is included in the *Served Cell Information* IE, the gNB-CU shall, if supported, take it into account.

If the F1 SETUP REQUEST message contains the *Transport Layer Addresses Info* IE, the gNB-CU shall, if supported, take into account for IPSec tunnel establishment.

If the F1 SETUP RESPONSE message contains the *Transport Layer Addresses Info* IE, the gNB-DU shall, if supported, take into account for IPSec tunnel establishment.

8.2.3.3 Unsuccessful Operation

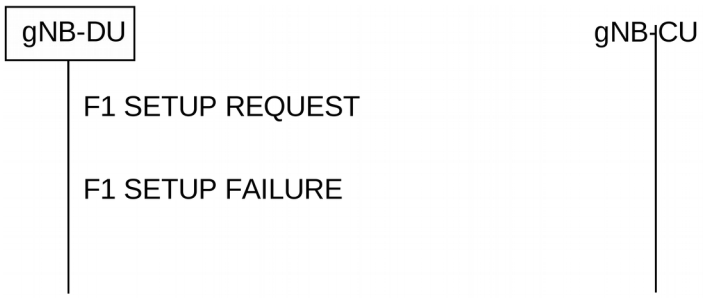

Figure 8.2.3.3-1: F1 Setup procedure: Unsuccessful Operation

If the gNB-CU cannot accept the setup, it should respond with a F1 SETUP FAILURE and appropriate cause value.

If the F1 SETUP FAILURE message includes the *Time To Wait* IE, the gNB-DU shall wait at least for the indicated time before reinitiating the F1 setup towards the same gNB-CU.

8.2.3.4 Abnormal Conditions

Not applicable.

8.2.4 gNB-DU Configuration Update

8.2.4.1 General

The purpose of the gNB-DU Configuration Update procedure is to update application level configuration data needed for the gNB-DU and the gNB-CU to interoperate correctly on the F1 interface. This procedure does not affect existing UE-related contexts, if any. The procedure uses non-UE associated signalling.

8.2.4.2 Successful Operation

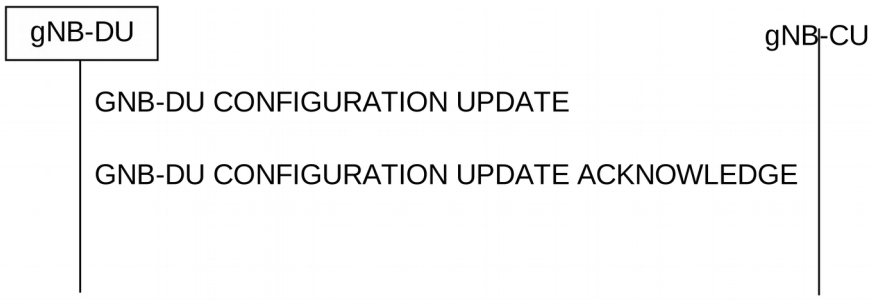

Figure 8.2.4.2-1: gNB-DU Configuration Update procedure: Successful Operation

The gNB-DU initiates the procedure by sending a GNB-DU CONFIGURATION UPDATE message to the gNB-CU including an appropriate set of updated configuration data that it has just taken into operational use. The gNB-CU responds with GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message to acknowledge that it successfully updated the configuration data. If an information element is not included in the GNB-DU CONFIGURATION UPDATE

message, the gNB-CU shall interpret that the corresponding configuration data is not changed and shall continue to operate the F1-C interface with the existing related configuration data.

The updated configuration data shall be stored in both nodes and used as long as there is an operational TNL association or until any further update is performed.

If g*NB-DU ID* IE is contained in the GNB-DU CONFIGURATION UPDATE message for a newly established SCTP association, the gNB-CU will associate this association with the related gNB-DU.

If *Served Cells To Add Item* IE is contained in the GNB-DU CONFIGURATION UPDATE message, the gNB-CU shall add cell information according to the information in the *Served Cell Information IE*. For NG-RAN, the gNB-DU shall include the *gNB-DU System Information* IE.

If *Served Cells To Modify Item* IE is contained in the GNB-DU CONFIGURATION UPDATE message, the gNB-CU shall modify information of cell indicated by *Old NR CGI* IE according to the information in the *Served Cell Informatio*n IE and overwrite the served cell information for the affected served cell. Further, if the *gNB-DU System Information* IE is present the gNB-CU shall store and replace any previous information received.

If *Served Cells To Delete Item* IE is contained in the GNB-DU CONFIGURATION UPDATE message, the gNB-CU shall delete information of cell indicated by *Old NR CGI* IE.

If *Cells Status Item* IE is contained in the GNB-DU CONFIGURATION UPDATE message, the gNB-CU shall update the information about the cells, as described in TS 38.401 [4]. If if the *Switching Off Ongoing* IE is present in the *Cells Status Item* IE, contained in the GNB-DU CONFIGURATION UPDATE message, and the corresponding *Service State IE* is set to “Out-of-Service”, the gNB-CU shall ignore the *Switching Off Ongoing* IE.

If *Cells to be Activated List Item* IE is contained in the GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message, the gNB-DU shall activate the cell indicated by *NR CGI* IE and reconfigure the physical cell identity for cells for which the *NR PCI* IE is included.

If *Cells to be Activated List Item* IE is contained in the GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message and the indicated cells are already activated, the gNB-DU shall update the cell information received in *Cells to be Activated List Item* IE.

If *Cells to be Deactivated List Item* IE is contained in the GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message, the gNB-DU shall deactivate all the cells with NR CGI listed in the IE.

If *Dedicated SI Delivery Needed UE List* IE is contained in the GNB-DU CONFIGURATION UPDATE message, the gNB-CU should take it into account when informing the UE of the updated system information via the dedicated RRC message.

For NG-RAN, the gNB-CU shall include the *gNB-CU System Information* IE in the GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message. The *SIB type to Be Updated List* IE shall contain the full list of SIBs to be broadcast.

For NG-RAN, the gNB-DU may include the *RAN Area Code* IE in the GNB-DU CONFIGURATION UPDATE message. The gNB-CU shall store and replace any previously provided *RAN Area Code* IE by the received *RAN Area Code* IE.

If *Available PLMN List* IE, and optionally also *Extended Available PLMN List* IE, is contained in GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message, the gNB-DU shall overwrite the whole available PLMN list and update the corresponding system information.

If in GNB-DU CONFIGURATION UPDATE message, the *Cell Direction* IE is present, the gNB-CU should use it to understand whether the cell is for UL or DL only. If in GNB-DU CONFIGURATION UPDATE message, the *Cell Direction* IE is omitted in the *Served Cell Information* IE it shall be interpreted as that the Cell Direction is Bi-directional.

If the GNB-DU CONFIGURATION UPDATE message includes *gNB-DU TNL Association To Remove List* IE, and the *Endpoint IP address* IE and the *Port Number* IE for both TNL endpoints of the TNL association(s) are included in the *gNB-DU TNL Association To Remove List* IE, the gNB-CU shall, if supported, consider that the TNL association(s) indicated by both received TNL endpoints will be removed by the gNB-DU. If the *Endpoint IP address* IE, or the *Endpoint IP address* IE and the *Port Number* IE for one or both of the TNL endpoints is included in the *gNB-DU TNL Association To Remove List* IE in GNB-DU CONFIGURATION UPDATE message, the gNB-CU shall, if supported, consider that the TNL association(s) indicated by the received endpoint IP address(es) will be removed by the gNB-DU.

If the *Neighbour Cell Information List* IE is present in the GNB-DU CONFIGURATION UPDATE message, the receiving gNB-CU shall use the received information for Cross Link Interference management. The gNB-CU may merge the Intended TDD DL-UL Configuration information received from two or more gNB-DUs. The gNB-CU shall consider the received *Neighbour Cell Information List* IE content valid until reception of an update of the IE for the same cell(s).

If the *Aggressor gNB Set* ID IE is included in the *Served Cell Information* IE, the gNB-CU shall, if supported, take it into account.

If the *Victim gNB Set* ID IE is included in the *Served Cell Information* IE, the gNB-CU shall, if supported, take it into account.

If the GNB-DU CONFIGURATION UPDATE message includes *Transport Layer Addresses Info* IE, the gNB-CU shall, if supported, take into account for IPSec tunnel establishment.

If the GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message includes *Transport Layer Addresses Info* IE, the gNB-CU shall, if supported, take into account for IPSec tunnel establishment.

8.2.4.3 Unsuccessful Operation

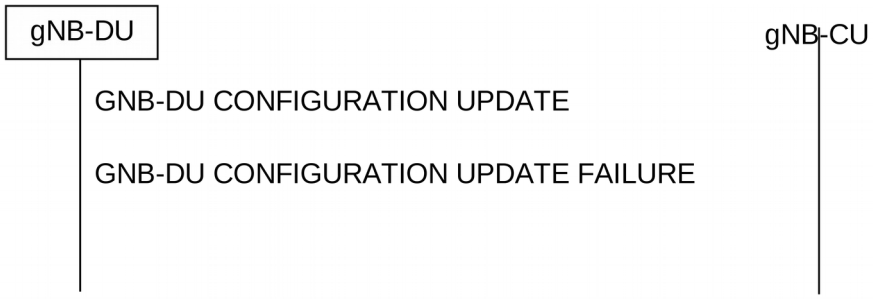

Figure 8.2.4.3-1: gNB-DU Configuration Update procedure: Unsuccessful Operation

If the gNB-CU cannot accept the update, it shall respond with a GNB-DU CONFIGURATION UPDATE FAILURE message and appropriate cause value.

If the GNB-DU CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE, the gNB-DU shall wait at least for the indicated time before reinitiating the GNB-DU CONFIGURATION UPDATE message towards the same gNB-CU.

8.2.4.4 Abnormal Conditions

Not applicable.

8.2.5 gNB-CU Configuration Update

8.2.5.1 General

The purpose of the gNB-CU Configuration Update procedure is to update application level configuration data needed for the gNB-DU and gNB-CU to interoperate correctly on the F1 interface. This procedure does not affect existing UE-related contexts, if any. The procedure uses non-UE associated signalling.

8.2.5.2 Successful Operation

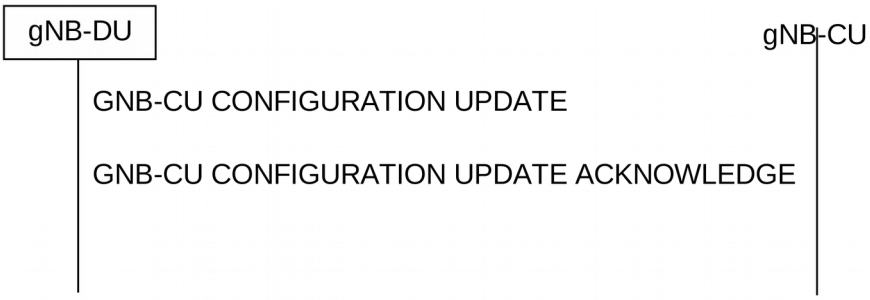

Figure 8.2.5.2-1: gNB-CU Configuration Update procedure: Successful Operation

The gNB-CU initiates the procedure by sending a GNB-CU CONFIGURATION UPDATE message including the appropriate updated configuration data to the gNB-DU. The gNB-DU responds with a GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE message to acknowledge that it successfully updated the configuration data. If an information element is not included in the GNB-CU CONFIGURATION UPDATE message, the gNB-DU shall interpret that the corresponding configuration data is not changed and shall continue to operate the F1-C interface with the existing related configuration data.

The updated configuration data shall be stored in the respective node and used as long as there is an operational TNL association or until any further update is performed.

If *Cells to be Activated List Item* IE is contained in the GNB-CU CONFIGURATION UPDATE message, the gNB-DU shall activate the cell indicated by *NR CGI* IE and reconfigure the physical cell identity for which the *NR PCI* IE is included.

If *Cells to be Deactivated List Item* IE is contained in the GNB-CU CONFIGURATION UPDATE message, the gNB-DU shall deactivate the cell indicated by *NR CGI* IE.

If *Cells to be Activated List Item* IE is contained in the GNB-CU CONFIGURATION UPDATE message and the indicated cells are already activated, the gNB-DU shall update the cell information received in *Cells to be Activated List Item* IE.

If the *gNB-CU System Information* IE is contained in the gNB-CU CONFIGURATION UPDATE message, the gNB-DU shall include the *Dedicated SI Delivery Needed UE List* IE in the GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE message for UEs that are unable to receive system information from broadcast.

If *Dedicated SI Delivery Needed UE List* IE is contained in the GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE message, the gNB-CU should take it into account when informing the UE of the updated system information via the dedicated RRC message.

If the *gNB-CU TNL Association To Add List* IE is contained in the gNB-CU CONFIGURATION UPDATE message, the gNB-DU shall, if supported, use it to establish the TNL association(s) with the gNB-CU. The gNB-DU shall report to the gNB-CU, in the gNB-CU CONFIGURATION UPDATE ACKNOWLEDGE message, the successful establishment of the TNL association(s) with the gNB-CU as follows:

- A list of TNL address(es) with which the gNB-DU successfully established the TNL association shall be included in the gNB-CU *TNL Association Setup List* IE;
- A list of TNL address(es) with which the gNB-DU failed to establish the TNL association shall be included in the *gNB-CU TNL Association Failed To Setup List* IE.

If the GNB-CU CONFIGURATION UPDATE message includes *gNB-CU TNL Association To Remove List* IE, and the *Endpoint IP address* IE and the *Port Number* IE for both TNL endpoints of the TNL association(s) are included in the *gNB-CU TNL Association To Remove List* IE, the gNB-DU shall, if supported, initiate removal of the TNL association(s) indicated by both received TNL endpoints towards the gNB-CU. If the *Endpoint IP address* IE, or the *Endpoint IP address* IE and the *Port Number* IE for one or both of the TNL endpoints is included in the *gNB-CU TNL Association To Remove List* IE, the gNB-DU shall, if supported, initiate removal of the TNL association(s) indicated by the received endpoint IP address(es).

If the *gNB-CU TNL Association To Update List* IE is contained in the gNB-CU CONFIGURATION UPDATE message the gNB-DU shall, if supported, overwrite the previously stored information for the related TNL Association(s).

If the *TNL Association usage* IE is included in the *gNB-CU TNL Association To Add List* IE or the *gNB-CU TNL Association To Update List* IE, the gNB-DU node shall, if supported, use it as described in TS 38.472 [22].

For NG-RAN, the gNB-CU shall include the *gNB-CU System Information* IE in the GNB-CU CONFIGURATION UPDATE message. The *SIB type to Be Updated List* IE shall contain the full list of SIBs to be broadcast.

If *Protected E-UTRA Resources List* IE is contained in the GNB-CU CONFIGURATION UPDATE message, the gNB-DU shall protect the corresponding resource of the cells indicated by *E-UTRA Cells List* IE for spectrum sharing between E-UTRA and NR.

If the GNB-CU CONFIGURATION UPDATE message contains the *Protected E-UTRA Resource Indication* IE, the receiving gNB-DU should forward it to lower layers and use it for cell-level resource coordination. The gNB-DU shall consider the received *Protected E-UTRA Resource Indication* IE when expressing its desired resource allocation during gNB-DU Resource Coordination procedure. The gNB-DU shall consider the received *Protected E-UTRA Resource Indication* IE content valid until reception of a new update of the IE for the same gNB-DU.

If *Available PLMN List* IE, and optionally also *Extended Available PLMN List* IE, is contained in GNB-CU CONFIGURATION UPDATE message, the gNB-DU shall overwrite the whole available PLMN list and update the corresponding system information.

If *Cells Failed to be Activated Item* IE is contained in the GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE message, the gNB-CU shall consider that the indicated cells are out-of-service as defined in TS 38.401 [4].

If the *Neighbour Cell Information List* IE is present in the GNB-CU CONFIGURATION UPDATE message, the receiving gNB-DU shall use the received information for Cross Link Interference management. The gNB-DU shall consider the received *Neighbour Cell Information List* IE content valid until reception of an update of the IE for the same cell(s). If the *Intended TDD DL-UL Configuration NR* IE is absent from the *Neighbour Cell Information List* IE, whereas the corresponding *NR CGI* IE is present, the receiving gNB-DU shall remove the previously stored *Neighbour Cell Information* IE corresponding to the NR CGI.

If the GNB-CU CONFIGURATION UPDATE message includes *Transport Layer Addresses Info* IE, the gNB-DU shall, if supported, take into account for IPSec tunnel establishment.

If the GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE message includes *Transport Layer Addresses Info* IE, the gNB-DU shall, if supported, take into account for IPSec tunnel establishment.

8.2.5.3 Unsuccessful Operation

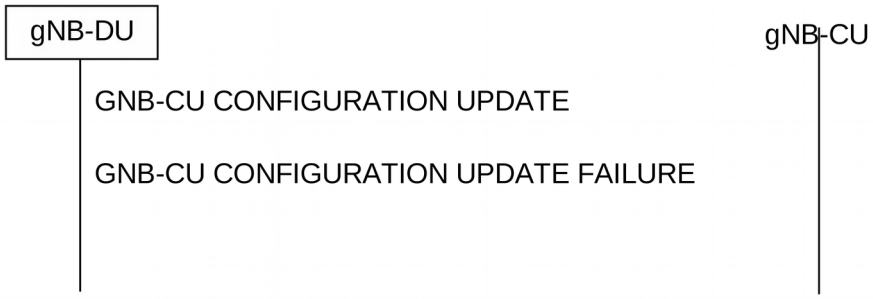

Figure 8.2.5.3-1: gNB-CU Configuration Update: Unsuccessful Operation

If the gNB-DU cannot accept the update, it shall respond with a GNB-CU CONFIGURATION UPDATE FAILURE message and appropriate cause value.

If the GNB-CU CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE, the gNB-CU shall wait at least for the indicated time before reinitiating the GNB-CU CONFIGURATION UPDATE message towards the same gNB-DU.

8.2.5.4 Abnormal Conditions

Not applicable.

8.2.6 gNB-DU Resource Coordination

8.2.6.1 General

The purpose of the gNB-DU Resource Coordination procedure is to enable coordination of radio resource allocation between a gNB-CU and a gNB-DU for the purpose of spectrum sharing between E-UTRA and NR. This procedure is to be used only for the purpose of spectrum sharing between E-UTRA and NR.

The procedure uses non-UE-associated signalling.

8.2.6.2 Successful Operation

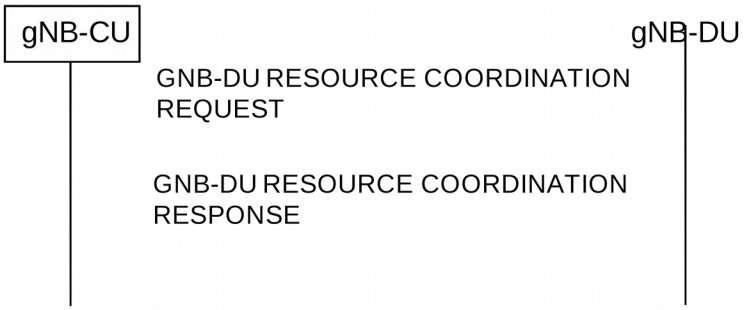

Figure 8.2.6.2-1: gNB-DU Resource Coordination, successful operation

A gNB-CU initiates the procedure by sending the GNB-DU RESOURCE COORDINATION REQUEST message to a gNB-DU over the F1 interface.

The gNB-DU extracts the *E-UTRA – NR Cell Resource Coordination Request Container* IE and it replies by sending the GNB-DU RESOURCE COORDINATION RESPONSE message.

In case of NR-initiated gNB-DU Resource Coordination procedure, the *Ignore Coordination Request Container* IE shall be present and set to “yes” and the *E-UTRA – NR Cell Resource Coordination Request Container* IE in the GNB-DU RESOURCE COORDINATION REQUEST message shall be ignored.

8.2.7 gNB-DU Status Indication

8.2.7.1 General

The purpose of the gNB-DU Status Indication procedure is informing the gNB-CU that the gNB-DU is overloaded so that overload reduction actions can be applied. The procedure uses non-UE associated signalling.

8.2.7.2 Successful Operation

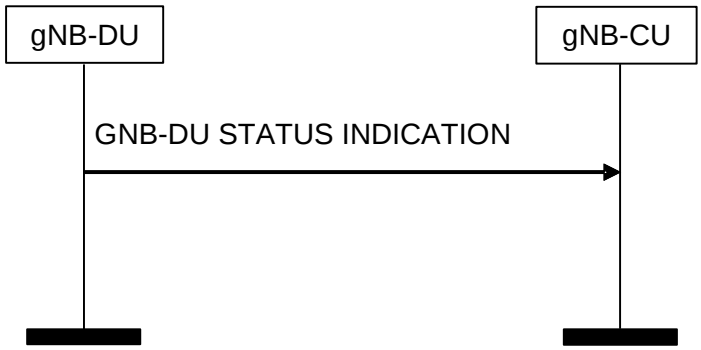

Figure 8.2.7.2-1: gNB-DU Status Indication procedure

If the *gNB-DU Overload Information* IE in the GNB-DU STATUS INDICATION message indicates that the gNB-DU is overloaded, the gNB-CU shall apply overload reduction actions until informed, with a new GNB-DU STATUS INDICATION message, that the overload situation has ceased.

The detailed overload reduction policy is up to gNB-CU implementation.

8.2.7.3 Abnormal Conditions

Void.

8.2.8 F1 Removal

8.2.8.1 General

The purpose of the F1 Removal procedure is to remove the interface instance and all related resources between the gNB-DU and the gNB-CU in a controlled manner. If successful, this procedure erases any existing application level configuration data in the two nodes.

NOTE: In case the signalling transport is shared among several F1-C interface instances, and the TNL association is still used by one or several F1-C interface instances, the initiating node should not initiate the removal of the TNL association.

The procedure uses non-UE-associated signaling.

8.2.8.2 Successful Operation

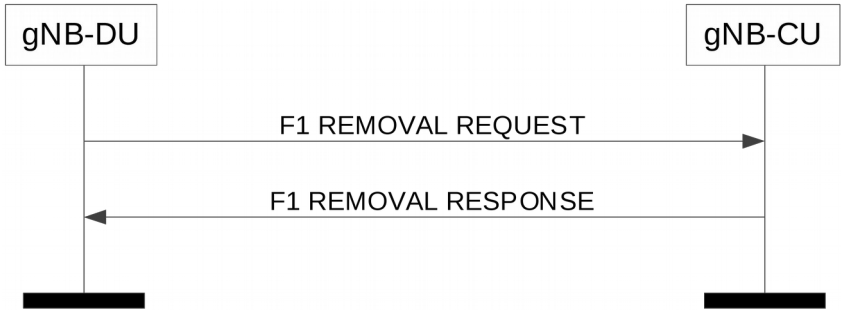

Figure 8.2.8-1: F1 Removal, gNB-DU initiated, successful operation

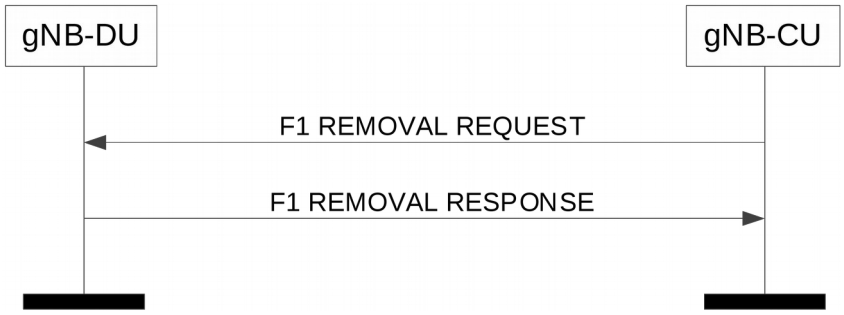

Figure 8.2.8.2-2: F1 Removal, gNB-CU initiated, successful operation

Successful F1 Removal, gNB-DU initiated

The gNB-DU initiates the procedure by sending the F1 REMOVAL REQUEST message to the gNB-CU. Upon reception of the F1 REMOVAL REQUEST message the gNB-CU shall reply with the F1 REMOVAL RESPONSE message. After receiving the F1 REMOVAL RESPONSE message, the gNB-DU may initiate removal of the TNL association towards the gNB-CU, if applicable, and may remove all resources associated with that signaling connection. The gNB-CU may then remove all resources associated with that interface instance.

Successful F1 Removal, gNB-CU initiated

The gNB-CU initiates the procedure by sending the F1 REMOVAL REQUEST message to the gNB-DU. Upon reception of the F1 REMOVAL REQUEST message the gNB-DU shall reply with the F1 REMOVAL RESPONSE message. After receiving the F1 REMOVAL RESPONSE message, the gNB-CU may initiate removal of the TNL association towards the gNB-DU, if applicable, and may remove all resources associated with that signaling connection. The gNB-DU may then remove all resources associated with that interface instance.

8.2.8.3 Unsuccessful Operation

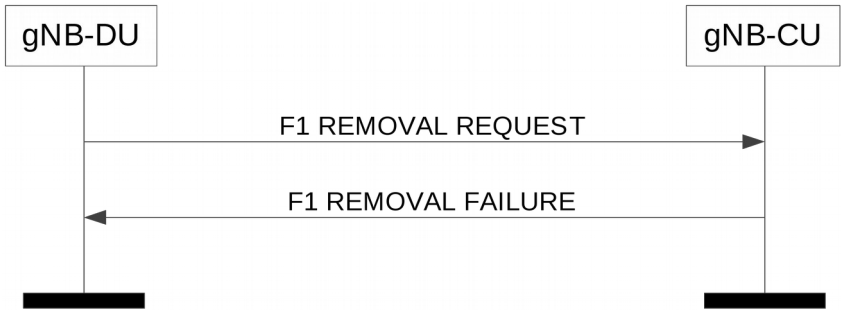

Figure 8.2.8.3-1: F1 Removal, gNB-DU initiated, unsuccessful operation

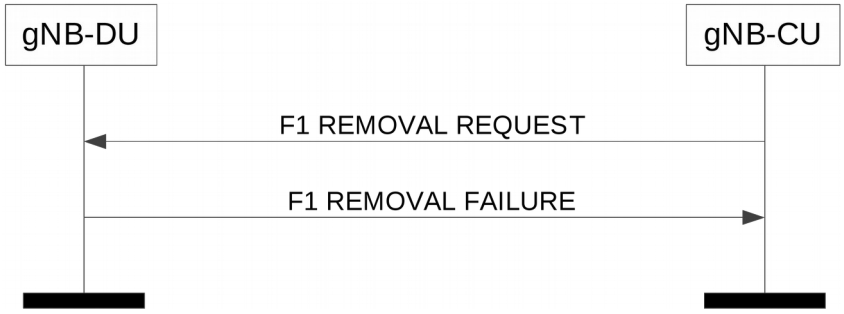

Figure 8.2.8.3-2: F1 Removal, gNB-CU initiated, unsuccessful operation

Unsuccessful F1 Removal, gNB-DU initiated

If the gNB-CU cannot accept to remove the signaling connection with the gNB-DU it shall respond with an F1 REMOVAL FAILURE message with an appropriate cause value.

Unsuccessful F1 Removal, gNB-CU initiated

If the gNB-DU cannot accept to remove the signaling connection with the gNB-CU it shall respond with an F1 REMOVAL FAILURE message with an appropriate cause value.

8.2.8.4 Abnormal Conditions

Not applicable.

8.2.9 Network Access Rate Reduction

8.2.9.1 General

The purpose of the Network Access Rate Reduction procedure is to indicate to the gNB-DU that the rate at which UEs are accessing the network need to be reduced from its current level.

The procedure uses non-UE associated signalling.

8.2.9.2 Successful operation

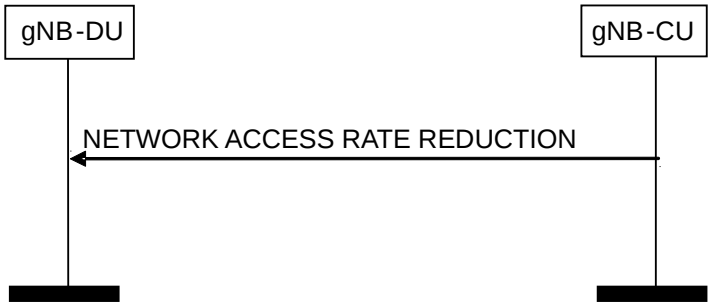

Figure 8.2.9.2-1: Network Access Rate Reduction, Successful operation

The gNB-CU initiates the procedure by sending a NETWORK ACCESS RATE REDUCTION message to the gNB-DU. When receiving the NETWORK ACCESS RATE REDUCTION message the gNB-DU should take into account the information contained in the *UAC assistance information* to set the parameters for Unified Access Barring.

8.2.9.3 Abnormal Conditions

Not applicable

8.3 UE Context Management procedures

8.3.1 UE Context Setup

8.3.1.1 General

The purpose of the UE Context Setup procedure is to establish the UE Context including, among others, SRB, and DRB configuration. The procedure uses UE-associated signalling.

8.3.1.2 Successful Operation

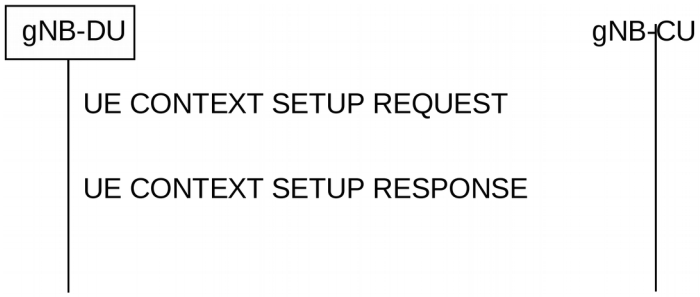

Figure 8.3.1.2-1: UE Context Setup Request procedure: Successful Operation

The gNB-CU initiates the procedure by sending UE CONTEXT SETUP REQUEST message to the gNB-DU. If the gNB-DU succeeds to establish the UE context, it replies to the gNB-CU with UE CONTEXT SETUP RESPONSE. If no UE-associated logical F1-connection exists, the UE-associated logical F1-connection shall be established as part of the procedure.

If the *UE-CapabilityRAT-ContainerList* IE is included in the UE CONTEXT SETUP REQUEST, the gNB-DU shall take this information into account for UE specific configurations.

If the *servingCellMO* IE is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall configure servingCellMO for the indicated SpCell accordingly.

If the *SpCell UL Configured* IE is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall configure UL for the indicated SpCell accordingly.

If the *SCell To Be Setup List* IE is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall consider it as a list of candidate SCells to be set up. If the *SCell UL Configured* IE is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall configure UL for the indicated SCell accordingly. If the *servingCellMO* IE is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall configure servingCellMO for the indicated SCell accordingly.

If the *DRX Cycle* IE is contained in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall use the provided value from the gNB-CU.

If the *UL Configuration* IE in *DRB to Be Setup Item* IE is contained in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall take it into account for UL scheduling.

If the *SRB To Be Setup List* IE is contained in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall act as specified in TS 38.401 [4]. If *Duplication Indication* IE is contained in the *SRB To Be Setup List* IE, the gNB-DU shall, if supported, setup two RLC entities for the indicated SRB.

If the *DRB To Be Setup List* IE is contained in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall act as specified in TS 38.401 [4]. If the *QoS Flow Mapping Indication* IE is included in the *DRB To Be Setup List* IE for a QoS flow, the gNB-DU may take it into account that only the uplink or downlink QoS flow is mapped to the indicated DRB.

If two *UL UP TNL Information* IEs are included in UE CONTEXT SETUP REQUEST message for a DRB, gNB-DU shall include two *DL UP TNL Information* IEs in UE CONTEXT SETUP RESPONSE message and setup two RLC entities for the indicated DRB. gNB-CU and gNB-DU use the *UL UP TNL Information* IEs and *DL UP TNL Information* IEs to support packet duplication for intra-gNB-DU CA as defined in TS 38.470 [2]. The first *UP TNL Information* IE of the two *UP TNL Information* IEs is for the primary path.

If *Duplication Activation IE* is included in the UE CONTEXT SETUP REQUEST message for a DRB, gNB-DU should take it into account when activing/deactiving CA based PDCP duplication for the DRB.

If *DC Based Duplication Configured* IE is included in the UE CONTEXT SETUP REQUEST message for a DRB, gNB-DU shall regard that DC based PDCP duplication is configured for this DRB if the value is set to be "true" and it should take the responsibility of PDCP duplication activation/deactivation. If *DC Based Duplication Activation* IE is included in the UE CONTEXT SETUP REQUEST message for a DRB, gNB-DU should take it into account when activing/deactiving DC based PDCP duplication for this DRB.

If *UL PDCP SN length* IE is included in the UE CONTEXT SETUP REQUEST message for a DRB, gNB-DU shall, if supported, store this information and use it for lower layer configuration.

For EN-DC operation, and if the *Subscriber Profile ID for RAT/Frequency priority* IE is received from an MeNB, the UE CONTEXT SETUP REQUEST message shall contain the *Subscriber Profile ID for RAT/Frequency priority* IE. If the *Additional RRM Policy Index* IE is received from an MeNB, the UE CONTEXT SETUP REQUEST message shall, if supported, contain the *Additional RRM Policy Index* IE. The gNB-DU shall store the received Subscriber Profile ID for RAT/Frequency priority in the UE context and use it as defined in TS 36.300 [20]. The gNB-DU shall, if supported, store the received Additional RRM Policy Index in the UE context and use it as defined in TS 36.300 [20].

If the *Index to RAT/Frequency Selection Priority* IE is available at the gNB-CU, the *Index to RAT/Frequency Selection Priority* IE shall be included in the UE CONTEXT SETUP REQUEST. The gNB-DU may use it for RRM purposes.

The gNB-DU shall report to the gNB-CU, in the UE CONTEXT SETUP RESPONSE message, the result for all the requested DRBs and SRBs in the following way:

- A list of DRBs which are successfully established shall be included in the *DRB Setup List* IE;
- A list of DRBs which failed to be established shall be included in the *DRB Failed to Setup List* IE;
- A list of SRBs which failed to be established shall be included in the *SRB Failed to Setup List* IE.
- A list of successfully established SRBs with logical channel identities for primary path shall be included in the *SRB Setup List* IE only if CA based PDCP duplication is initiated for the concerned SRBs.

When the gNB-DU reports the unsuccessful establishment of a DRB or SRB, the cause value should be precise enough to enable the gNB-CU to know the reason for the unsuccessful establishment.

For EN-DC operation, the gNB-CU shall include in the UE CONTEXT SETUP REQUEST the *E-UTRAN QoS* IE. The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *E-UTRAN QoS* IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [15].

For NG-RAN operation, the gNB-CU shall include in the UE CONTEXT SETUP REQUEST the *DRB Information* IE.

For DC operation, the CG-ConfigInfo IE shall be included in the CU to DU RRC Information IE at the gNB acting as secondary node. If the CG-ConfigInfo IE is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall regard it as a reconfiguration with sync as defined in TS 38.331 [8].

If the *HandoverPreparationInformation* IE is included in the *CU to DU RRC Information* IE in the UE CONTEXT SETUP REQUEST message, the gNB-DU of the gNB acting as master node shall regard it as a reconfiguration with sync as defined in TS 38.331 [8]. The gNB-CU of the gNB acting as master node shall only initiate the UE Context Setup procedure for handover or secondary node addition when at least one DRB is setup for the UE. If the received *CU to DU RRC Information* IE does not include source cell group configuration, the gNB-DU shall generate the cell group configuration using full configuration. Otherwise, delta configuration is allowed.

If the gNB-CU includes the SMTC information of the measured frequency(ies) in the *MeasurementTimingConfiguration* IE of the *CU to DU RRC Information* IE that is included in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall generate the measurement gaps based on the received SMTC information. Then the gNB-DU shall send the measurement gaps information to the gNB-CU in the *MeasGapConfig* IE of the *DU to CU RRC Information* IE that is included in the UE CONTEXT SETUP RESPONSE message.

For EN-DC operation, if the gNB-CU includes the *Resource Coordination Transfer Information* IE in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall, if supported, use it for the purpose of resource coordination. If the *Ignore PRACH Configuration* IE is present and set to "true" the *E-UTRA PRACH Configuration* IE in the UE CONTEXT SETUP REQUEST message shall be ignored. If the gNB-CU received the MeNB Resource Coordination Information as defined in TS 36.423 [9], it shall transparently transfer it to the gNB-DU via the *Resource Coordination Transfer Container* IE in the UE CONTEXT SETUP REQUEST message. The gNB-DU shall use the information received in the *Resource Coordination Transfer Container* IE for reception of MeNB Resource Coordination Information at the gNB acting as secondary node as described in TS 36.423 [9]. If the *Resource Coordination E-UTRA Cell Information* IE is included in the *Resource Coordination Information* IE, the gNB-DU shall store the information replacing previously received information for the same E-UTRA cell, and use the stored information for the purpose of resource coordination.

For NGEN-DC or NE-DC operation, if the gNB-CU includes the *Resource Coordination Transfer Information* IE in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall, if supported, use it for the purpose of resource

coordination. If the gNB-CU received the MR-DC Resource Coordination Information as defined in TS 38.423 [28], it shall transparently transfer it to the gNB-DU via the *Resource Coordination Transfer Container* IE in the UE CONTEXT SETUP REQUEST message. The gNB-DU shall use the information received in the *Resource Coordination Transfer Container* IE for reception of MR-DC Resource Coordination Information at the gNB as described in TS 38.423 [28].

The *UEAssistanceInformation* IE shall be included in *CU to DU RRC Information* IE in the UE CONTEXT SETUP REQUEST message if the gNB-CU received this IE from the UE; if the *UEAssistanceInformation* IE is included in the *CU to DU RRC Information* IE in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall, if supported, take it into account when configuring resources for the UE.

If the *Resource Coordination Transfer Container* IE is included in the UE CONTEXT SETUP RESPONSE, the gNB-CU shall transparently transfer this information for the purpose of resource coordination as described in TS 36.423 [9], TS 38.423 [28].

If the *Masked IMEISV* IE is contained in the UE CONTEXT SETUP REQUEST message the gNB-DU shall, if supported, use it to determine the characteristics of the UE for subsequent handling.

If the *SCell Failed To Setup List* IE is contained in the UE CONTEXT SETUP RESPONSE message, the gNB-CU shall regard the corresponding SCell(s) failed to be set up with an appropriate cause value for each SCell failed to setup.

If the *Inactivity Monitoring Request* IE is contained in the UE CONTEXT SETUP REQUEST message, gNB-DU may consider that the gNB-CU has requested the gNB-DU to perform UE inactivity monitoring. If the *Inactivity Monitoring Response* IE is contained in the UE CONTEXT SETUP RESPONSE message and set to "Not-supported", the gNB-CU shall consider that the gNB-DU does not support UE inactivity monitoring for the UE.

If the *CellGroupConfig* IE is included in the *DU to CU RRC Information* IE contained in the UE CONTEXT SETUP RESPONSE message, the gNB-CU shall perform RRC Reconfiguration or RRC connection resume as described in TS 38.331 [8]. The *CellGroupConfig* IE shall transparently be signaled to the UE as specified in TS 38.331 [8].

If the *Full Configuration* IE is contained in the UE CONTEXT SETUP RESPONSE message, the gNB-CU shall consider that the gNB-DU has generated the *CellGroupConfig* IE using full configuration.

If the *C-RNTI* IE is included in the UE CONTEXT SETUP RESPONSE, the gNB-CU shall consider that the C-RNTI has been allocated by the gNB-DU for this UE context.

The UE Context Setup Procedure is not used to configure SRB0.

If the UE CONTEXT SETUP REQUEST message contains the *RRC-Container* IE, the gNB-DU shall send the corresponding RRC message to the UE via SRB1.

If the *Notification Control* IE is included in the *DRB to Be Setup List* IE and it is set to active, the gNB-DU shall, if supported, monitor the QoS of the DRB and notify the gNB-CU if the QoS cannot be fulfilled any longer or if the QoS can be fulfilled again. The *Notification Control* IE can only be applied to GBR bearers.

If the *UL PDU Session Aggregate Maximum Bit Rate* IE is included in the *QoS Flow Level QoS Parameters* IE containded in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall store the received UL PDU Session Aggregate Maximum Bit Rate and use it when enforcing uplink traffic policing for non-GBR Bearers for the concerned UE as specified in TS 23.501 [21].

The gNB-DU shall store the received gNB-DU UE Aggregate Maximum Bit Rate Uplink and use it for non-GBR Bearers for the concerned UE.

If the UE CONTEXT SETUP REQUEST message contains the *QoS Flow Mapping Indication* IE, the gNB-DU may take it into account that only the uplink or downlink QoS flow is mapped to the DRB.

If the UE CONTEXT SETUP REQUEST message contains the *New gNB-CU UE F1AP ID* IE, the gNB-DU shall, if supported, replace the value received in the *gNB-CU UE F1AP ID* IE by the value of the *New gNB-CU UE F1AP ID* and use it for further signalling.

If the *RAN UE ID* IE is contained in the UE CONTEXT SETUP REQUEST message, the gNB-DU shall store and replace any previous information received.

If the Trace Activation IE is included in the UE CONTEXT SETUP REQUEST message the gNB-DU shall, if supported, initiate the requested trace function as described in TS 32.422 [29].

8.3.1.3 Unsuccessful Operation

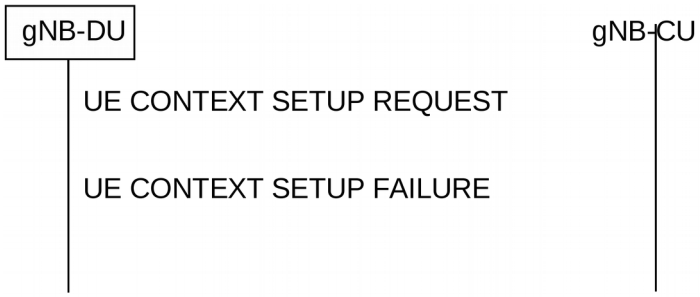

Figure 8.3.1.3-1: UE Context Setup Request procedure: unsuccessful Operation

If the gNB-DU is not able to establish an F1 UE context, or cannot even establish one bearer it shall consider the procedure as failed and reply with the UE CONTEXT SETUP FAILURE message.

If the gNB-DU is not able to accept the *SpCell ID* IE in UE CONTEXT SETUP REQUEST message, it shall reply with the UE CONTEXT SETUP FAILURE message with an appropriate cause value. Further, if the *Candidate SpCell List* IE is included in the UE CONTEXT SETUP REQUEST message and the gNB-DU is not able to accept the *SpCell ID* IE, the gNB-DU shall, if supported, include the *Potential SpCell List* IE in the UE CONTEXT SETUP FAILURE message and the gNB-CU should take this into account for selection of an opportune SpCell. The gNB-DU shall include the cells in the *Potential SpCell List* IE in a priority order, where the first cell in the list is the one most desired and the last one is the one least desired (e.g., based on load conditions). If the *Potential SpCell List* IE is present but no *Potential SpCell Item* IE is present, the gNB-CU should assume that none of the cells in the *Candidate SpCell List* IE are acceptable for the gNB-DU.

8.3.1.4 Abnormal Conditions

If the gNB-DU receives a UE CONTEXT SETUP REQUEST message containing a *E-UTRAN QoS* IE for a GBR QoS DRB but where the *GBR QoS Information* IE is not present, the gNB-DU shall report the establishment of the corresponding DRB as failed in the *DRB Failed to Setup List* IE of the UE CONTEXT SETUP RESPONSE message with an appropriate cause value. If the gNB-DU receives a UE CONTEXT SETUP REQUEST message containing a *DRB QoS* IE for a GBR QoS DRB but where the *GBR QoS Flow Information* IE is not present, the gNB-DU shall report the establishment of the corresponding DRBs as failed in the *DRB Failed to Setup List* IE of the UE CONTEXT SETUP RESPONSE message with an appropriate cause value.

If the *Delay Critical* IE is included in the *Dynamic 5QI Descriptor* IE within the *DRB QoS* IE in the UE CONTEXT SETUP REQUEST message and is set to the value “delay critical” but the *Maximum Data Burst Volume* IE is not present, the gNB-DU shall report the establishment of the corresponding DRB as failed in the *DRB Failed to Setup List* IE of the of the UE CONTEXT SETUP RESPONSE message with an appropriate cause value.

8.3.2 UE Context Release Request (gNB-DU initiated)

8.3.2.1 General

The purpose of the UE Context Release Request procedure is to enable the gNB-DU to request the gNB-CU to release the UE-associated logical F1-connection. The procedure uses UE-associated signalling.

8.3.2.2 Successful Operation

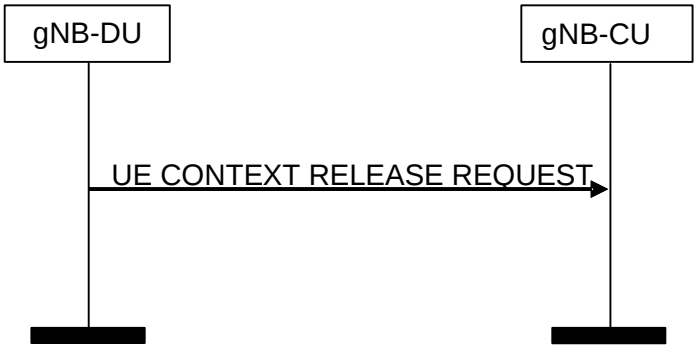

Figure 8.3.2.2-1: UE Context Release (gNB-DU initiated) procedure. Successful operation

The gNB-DU controlling a UE-associated logical F1-connection initiates the procedure by generating a UE CONTEXT RELEASE REQUEST message towards the affected gNB-CU node.

The UE CONTEXT RELEASE REQUEST message shall indicate the appropriate cause value.

Interactions with UE Context Release procedure:

The UE Context Release procedure may be initiated upon reception of a UE CONTEXT RELEASE REQUEST message.

Interactions with UE Context Setup procedure:

The UE Context Release Request procedure may be performed before the UE Context Setup procedure to request the release of an existing UE-associated logical F1-connection and related resources in the gNB-DU.

8.3.2.3 Abnormal Conditions

Not applicable.

8.3.3 UE Context Release (gNB-CU initiated)

8.3.3.1 General

The purpose of the UE Context Release procedure is to enable the gNB-CU to order the release of the UE-associated logical connection. The procedure uses UE-associated signalling.

8.3.3.2 Successful Operation

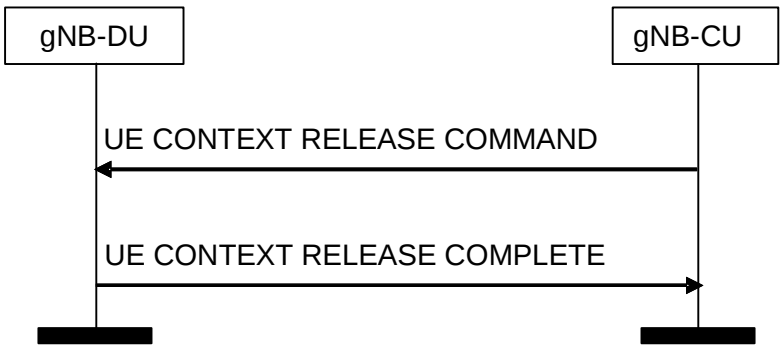

Figure 8.3.3.2-1: UE Context Release (gNB-CU initiated) procedure. Successful operation

The gNB-CU initiates the procedure by sending the UE CONTEXT RELEASE COMMAND message to the gNB-DU.

Upon reception of the UE CONTEXT RELEASE COMMAND message, the gNB-DU shall release all related signalling and user data transport resources and reply with the UE CONTEXT RELEASE COMPLETE message.

If the *old gNB-DU UE F1AP ID* IE is included in the UE CONTEXT RELEASE COMMAND message, the gNB-DU shall additionally release the UE context associated with the old gNB-DU UE F1AP ID.

If the UE CONTEXT RELEASE COMMAND message contains the *RRC-Container IE*, the gNB-DU shall send the RRC container to the UE via the SRB indicated by the *SRB ID* IE.

If the UE CONTEXT RELEASE COMMAND message includes the *Execute Duplication* IE, the gNB-DU shall perform CA based duplication, if configured, for the SRB for the included *RRC-Container* IE.

Interactions with UE Context Setup procedure:

The UE Context Release procedure may be performed before the UE Context Setup procedure to release an existing UE-associated logical F1-connection and related resources in the gNB-DU, e.g. when gNB-CU rejects UE access it shall trigger UE Context Release procedure with the cause value of UE rejection.

8.3.3.4 Abnormal Conditions

Not applicable.

8.3.4 UE Context Modification (gNB-CU initiated)

8.3.4.1 General

The purpose of the UE Context Modification procedure is to modify the established UE Context, e.g., establishing, modifying and releasing radio resources. This procedure is also used to command the gNB-DU to stop data transmission for the UE for mobility (see TS 38.401 [4]). The procedure uses UE-associated signalling.

8.3.4.2 Successful Operation

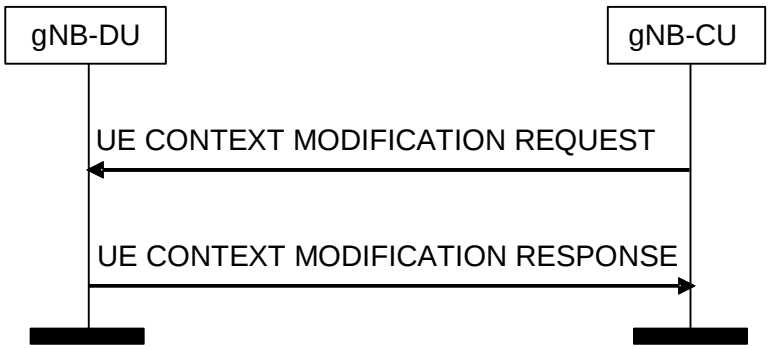

Figure 8.3.4.2-1: UE Context Modification procedure. Successful operation

The UE CONTEXT MODIFICATION REQUEST message is initiated by the gNB-CU.

Upon reception of the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall perform the modifications, and if successful reports the update in the UE CONTEXT MODIFICATION RESPONSE message.

If the *SpCell ID* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall replace any previously received value and regard it as a reconfiguration with sync as defined in TS 38.331 [8]. If the *ServCellIndex* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall take this into account for the indicated SpCell. If the *SpCell UL Configured* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall configure UL for the indicated SpCell accordingly. If the *servingCellMO* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall configure servingCellMO for the indicated SpCell accordingly.

If the *SCell To Be Setup List* IE or *SCell To Be Removed List* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall consider it as a list of candidate SCells to be set up. If the *SCell To Be Setup List* IE is included in the UE CONTEXT MODIFICATION REQUEST message and the indicated SCell(s) are already

setup, the gNB-DU shall replace any previously received value. If the *SCell UL Configured* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall configure UL for the indicated SCell accordingly. If the *servingCellMO* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall configure servingCellMO for the indicated SCell accordingly.

If the *DRX Cycle* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall use the provided value from the gNB-CU. If the *DRX configuration indicator* IE is contained in the UE CONTEXT MODIFICATION REQUEST message and set to "release", the gNB-DU shall release DRX configuration.

If the *SRB To Be Setup List* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall act as specified in the TS 38.401 [4], and replace any previously received value. If *Duplication Indication* IE is contained in the *SRB To Be Setup List* IE, the gNB-DU shall, if supported, setup two RLC entities for the indicated SRB if the value is set to be "true", or delete the RLC entity of secondary path if the value is set to be "false".

If the *DRB To Be Setup List* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall act as specified in the TS 38.401 [4].

If two *UL UP TNL Information* IEs are included in UE CONTEXT MODIFICATION REQUEST message for a DRB, the gNB-DU shall include two *DL UP TNL Information* IEs in UE CONTEXT MODIFICATION RESPONSE message and setup two RLC entities for the indicated DRB. gNB-CU and gNB-DU use the *UL UP TNL Information* IEs and *DL UP TNL Information* IEs to support packet duplication for intra-gNB-DU CA as defined in TS 38.470 [2]. The first *UP TNL Information* IE of the two *UP TNL Information* IEs is for the primary path.

If *Duplication Activation* IE is included in the UE CONTEXT MODIFICATION REQUEST message for a DRB, the gNB-DU should take it into account when activing/deactiving CA based PDCP duplication for the DRB.

If *DC Based Duplication Configured* IE is included in the UE CONTEXT MODIFICATION REQUEST message for a DRB, the gNB-DU shall regard that DC based PDCP duplication is configured for this DRB if the value is set to be "true" and it should take the responsibility of PDCP duplication activation/deactivation. Otherwise, the gNB-DU shall regard that DC based PDCP duplication is de-configured for this DRB id the value is set to be "false", and it should stop PDCP duplication activation/deactivation by MAC CE. If *DC Based Duplication Activation* IE is included in the UE CONTEXT MODIFICATION REQUEST message for a DRB, the gNB-DU should take it into account when activing/deactiving DC based PDCP duplication for this DRB.

For a certain DRB which was allocated with two GTP-U tunnels, if such DRB is modified and given one GTP-U tunnel via the UE Context Modification procedure, the gNB-DU shall consider that the CA based PDCP duplication for the concerned DRB is de-configured. If such UE Context Modification procedure occurs, the *Duplication Activation* IE shall not be included for the concerned DRB.

If the *UL Configuration* IE in *DRB to Be Setup Item* IE or *DRB to Be Modified Item* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall take it into account for UL scheduling.

If the ongoing reconfiguration procedure involves changes of the L1/L2 configuration at the gNB-DU signalled to the gNB-CU via the *CellGroupConfig* IE, the gNB-CU shall include the *RRC Reconfiguration Complete Indicator* IE in the UE CONTEXT MODIFICATION REQUEST message to inform the gNB-DU that the ongoing reconfiguration procedure, including *CellGroupConfig* IE, has been successfully or unsuccesfully performed. In the case that the ongoing reconfiguration procedure has failed, the gNB-DU shall continue to use the old UE configuration.

If *DL PDCP SN length* IE is included in the UE CONTEXT MODIFICATION REQUEST message for a DRB, gNB-DU shall, if supported, store this information and use it for lower layer configuration.

If *UL PDCP SN length* IE is included in the UE CONTEXT MODIFICATION REQUEST message for a DRB, gNB-DU shall, if supported, store this information and use it for lower layer configuration.

If the *RLC Failure Indication* IE is included in UE CONTEXT MODIFICATION REQUEST message, the gNB-DU should consider that the RLC entity indicated by such IE needs to be re-established when the CA-based packet duplication is active, and the gNB-DU may include the *Associated SCell List* IE in UE CONTEXT MODIFICATION RESPONSE by containing a list of SCell(s) associated with the RLC entity indicated by the *RLC Failure Indication* IE.

If the UE CONTEXT MODIFICATION REQUEST message contains the *RRC-Container* IE, the gNB-DU shall send the corresponding RRC message to the UE. If the UE CONTEXT MODIFICATION REQUEST message includes the *Execute Duplication* IE, the gNB-DU shall perform CA based duplication, if configured, for the SRB for the included *RRC-Container* IE.

If the UE CONTEXT MODIFICATION REQUEST message contains the *Transmission Action Indicator* IE, the gNB-DU shall stop or restart (if already stopped) data transmission for the UE, according to the value of this IE. It is up to gNB-DU implementation when to stop or restart the UE scheduling.

For EN-DC operation, if the *DRB to Be Setup List* IE is present in the UE CONTEXT MODIFICATION REQUEST message the gNB-CU shall include the *E-UTRAN QoS* IE. The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *E-UTRAN QoS* IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [15]. For NG-RAN operation, the gNB-CU shall include the *DRB Information* IE in the UE CONTEXT MODIFICATION REQUEST message.

If the gNB-CU includes the SMTC information of the measured frequency(ies) in the *MeasurementTimingConfiguration* IE of the *CU to DU RRC Information* IE that is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall generate the measurement gaps based on the received SMTC information. Then the gNB-DU shall send the measurement gaps information to the gNB-CU in the *MeasGapConfig* IE of the *DU to CU RRC Information* IE that is included in the UE CONTEXT MODIFICATION RESPONSE message.

For DC operation, if the gNB-CU includes the *CG-Config* IE in the *CU to DU RRC Information* IE that is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU may initiate low layer parameters coordination taking this information into account.

For EN-DC operation, if the gNB-CU includes the *Resource Coordination Transfer Information* IE in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall, if supported, use it for the purpose of resource coordination. If the gNB-CU received the MeNB Resource Coordination Information as defined in TS 36.423 [9], after completion of UE Context Setup procedures, the gNB-CU shall transparently transfer it to the gNB-DU via the *Resource Coordination Transfer Container* IE in the UE CONTEXT MODIFICATION REQUEST message. The gNB-DU shall use the information received in the *Resource Coordination Transfer Container* IE for reception of MeNB Resource Coordination Information at the gNB acting as secondary node as described in TS 36.423 [9]. If the *Resource Coordination E-UTRA Cell Information* IE is included in the *Resource Coordination Transfer Information* IE, the gNB-DU shall store the information replacing previously received information for the same E-UTRA cell, and use the stored information for the purpose of resource coordination. If the *Ignore PRACH Configuration* IE is present and set to "true" the *E-UTRA PRACH Configuration* IE in the UE CONTEXT MODIFICATION REQUEST message shall be ignored.

For NGEN-DC or NE-DC operation, if the gNB-CU includes the *Resource Coordination Transfer Information* IE in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall, if supported, use it for the purpose of resource coordination. If the gNB-CU received the MR-DC Resource Coordination Information as defined in TS 38.423 [28], after completion of UE Context Setup procedures, the gNB-CU shall transparently transfer it to the gNB-DU via the *Resource Coordination Transfer Container* IE in the UE CONTEXT MODIFICATION REQUEST message. The gNB-DU shall use the information received in the *Resource Coordination Transfer Container* IE for reception of MR-DC Resource Coordination Information at the gNB as described in TS 38.423 [28].

For EN-DC operation, and if the *Subscriber Profile ID for RAT/Frequency priority* IE is received from an MeNB, the UE CONTEXT MODIFICTION REQUEST message shall contain the *Subscriber Profile ID for RAT/Frequency priority* IE. If the *Additional RRM Policy Index* IE is received from an MeNB, the UE CONTEXT MODIFICATION REQUEST message shall , if supported, contain the *Additional RRM Policy Index* IE. The gNB-DU shall store the received Subscriber Profile ID for RAT/Frequency priority in the UE context and use it as defined in TS 36.300 [20]. The gNB-DU shall, if supported, store the received Additional RRM Policy Index in the UE context and use it as defined in TS 36.300 [20].

If the *Index to RAT/Frequency Selection Priority* IE is modified at the gNB-CU, the *Index to RAT/Frequency Selection Priority* IE shall be included in the UE CONTEXT MODIFICATION REQUEST. The gNB-DU may use it for RRM purposes.

If the UE CONTEXT MODIFICATION REQUEST message contains the *Uplink TxDirectCurrentList Information* IE, the gNB-DU may take that into account when selecting L1 configuration.

The *UEAssistanceInformation* IE shall be included in *CU to DU RRC Information* IE in the UE CONTEXT MODIFICATION REQUEST message if the gNB-CU received this IE from the UE; if the *UEAssistanceInformation* IE is included in the *CU to DU RRC Information* IE in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall, if supported, take it into account when configuring resources for the UE.

The gNB-DU shall report to the gNB-CU, in the UE CONTEXT MODIFICATION RESPONSE message, the result for all the requested or modified DRBs and SRBs in the following way:

- A list of DRBs which are successfully established shall be included in the *DRB Setup List* IE;

- A list of DRBs which failed to be established shall be included in the *DRB Failed to be Setup List* IE;
- A list of DRBs which are successfully modified shall be included in the *DRB Modified List* IE;
- A list of DRBs which failed to be modified shall be included in the *DRB Failed to be Modified List* IE;
- A list of SRBs which failed to be established shall be included in the *SRB Failed to be Setup List* IE.
- A list of successfully established SRBs with logical channel identities for primary path shall be included in the *SRB Setup List* IE only if CA based PDCP duplication is initiated for the concerned SRBs.
- A list of successfully modified SRBs with logical channel identities for primary path shall be included in the *SRB Modified List* IE only if CA based PDCP duplication is initiated for the concerned SRBs.

When the gNB-DU reports the unsuccessful establishment of a DRB or SRB, the cause value should be precise enough to enable the gNB-CU to know the reason for the unsuccessful establishment.

If the *Resource Coordination Transfer Container* IE is included in the UE CONTEXT MODIFICATION RESPONSE, the gNB-CU shall transparently transfer this information for the purpose of resource coordination as described in TS 36.423 [9], TS 38.423 [28].

If the *CellGroupConfig* IE is included in the *DU to CU RRC Information* IE contained in the UE CONTEXT MODIFICATION RESPONSE message, the gNB-CU shall perform RRC Reconfiguration as described in TS 38.331 [8]. The *CellGroupConfig* IE shall transparently be signaled to the UE as specified in TS 38.331 [8].

If the *UE-CapabilityRAT-ContainerList* IE is included in the UE CONTEXT SETUP MODOFOCATION REQUEST, the gNB-DU shall take this information into account for UE specific configurations.

If the *SCell Failed To Setup List* IE is contained in the UE CONTEXT MODIFICATION RESPONSE message, the gNB-CU shall regard the corresponding SCell(s) failed to be set up with an appropriate cause value for each SCell failed to setup.

If the *C-RNTI* IE is included in the UE CONTEXT MODIFICATION RESPONSE, the gNB-CU shall consider that the C-RNTI has been allocated by the gNB-DU for this UE context.

If the *Inactivity Monitoring Request* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, gNB-DU may consider that the gNB-CU has requested the gNB-DU to perform UE inactivity monitoring. If the *Inactivity Monitoring Response* IE is contained in the UE CONTEXT MODIFICATION RESPONSE message and set to "Not-supported", the gNB-CU shall consider that the gNB-DU does not support UE inactivity monitoring for the UE.

The UE Context Modify Procedure is not used to configure SRB0.

If the *Notification Control* IE is included in the *DRB to Be Setup List* IE or the *DRB to Be Modified List* IE and it is set to active, the gNB-DU shall, if supported, monitor the QoS of the DRB and notify the gNB-CU if the QoS cannot be fulfilled any longer or if the QoS can be fulfilled again. The *Notification Control* IE can only be applied to GBR bearers.

If the *UL PDU Session Aggregate Maximum Bit Rate* IE is included in the *QoS Flow Level QoS Parameters* IE containded in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall replace the received UL PDU Session Aggregate Maximum Bit Rate and use it as specified in TS 23.501 [21].

If the *gNB-DU UE Aggregate Maximum Bit Rate Uplink* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall:

- replace the previously provided gNB-DU UE Aggregate Maximum Bit Rate Uplink with the new received gNB-DU UE Aggregate Maximum Bit Rate Uplink;
- use the received gNB-DU UE Aggregate Maximum Bit Rate Uplink for non-GBR Bearers for the concerned UE.

The *UL PDU Session Aggregate Maximum Bit Rate* IE shall be sent if *DRB to Be Setup List* IE is included and the gNB-CU has not previously sent it. The gNB-DU shall store and use the received gNB-DU UE Aggregate Maximum Bit Rate Uplink.

If the *RLC Status IE* is included in the UE CONTEXT MODIFICATION RESPONSE message, the gNB-CU shall assume that RLC has been reestablished at the gNB-DU and may trigger PDCP data recovery.

If the GNB-*DU Configuration Query* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, gNB-DU shall include the *CellGroupConfig* IE in the *DU To CU RRC Information* IE in the UE CONTEXT MODIFICATION RESPONSE message.

If the *Bearer Type Change* IE is included in *DRB to Be Modified List* IE in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall either reset the lower layers or generate a new LCID for the affected bearer as specified in TS 37.340[7].

For NE-DC operation, if *NeedforGap* IE is included in the UE CONTEXT MODIFICATION REQUEST message,the gNB-DU shall generate measurement gap for the SeNB.

If the *QoS Flow Mapping Indication* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall, if supported, replace any previously received value and take it into account that only the uplink or downlink QoS flow is mapped to the DRB.

If the *Lower Layer presence status change* IE set to "suspend lower layers" is included in the UE Context Modification message, the gNB-DU shall keep all lower layer configuration for UEs, and not transmit or receive data from UE.

If the *Lower Layer presence status change* IE set to "resume lower layers" is included in the UE Context Modification message, the gNB-DU shall use the previously stored lower layer configuration for the UE.

If the *Full Configuration* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the gNB-DU shall generate a *CellGroupConfig* IE using full configuration and include it in the UE CONTEXT MODIFICATION RESPONSE.

If the *Full Configuration* IE is contained in the UE CONTEXT MODIFICATION RESPONSE message, the gNB-CU shall consider that the gNB-DU has generated the *CellGroupConfig* IE using full configuration.

8.3.4.3 Unsuccessful Operation

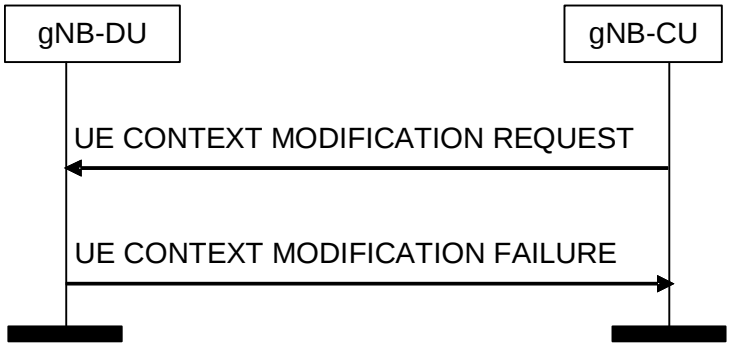

Figure 8.3.4.3-1: UE Context Modification procedure. Unsuccessful operation

In case none of the requested modifications of the UE context can be successfully performed, the gNB-DU shall respond with the UE CONTEXT MODIFICATION FAILURE message with an appropriate cause value.

If the gNB-DU is not able to accept the *SpCell ID* IE in UE CONTEXT MODIFICATION REQUEST message, it shall reply with the UE CONTEXT MODIFICATION FAILURE message.

8.3.4.4 Abnormal Conditions

If the gNB-DU receives a UE CONTEXT MODIFICATION REQUEST message containing a *E-UTRAN QoS* IE for a GBR QoS DRB but where the *GBR QoS Information* IE is not present, the gNB-DU shall report the establishment of the corresponding DRB as failed in the *DRB Failed to Setup List* IE of the UE CONTEXT MODIFICATION RESPONSE message with an appropriate cause value.

If the gNB-DU receives a UE CONTEXT MODIFICATION REQUEST message containing a *DRB QoS* IE for a GBR QoS DRB but where the *GBR QoS Flow Information* IE is not present, the gNB-DU shall report the establishment of the corresponding DRBs as failed in the *DRB Failed to Setup List* IE of the UE CONTEXT MODIFICATION RESPONSE message with an appropriate cause value.

If the *Delay Critical* IE is included in the *Dynamic 5QI Descriptor* IE within the *DRB QoS* IE in the UE CONTEXT MODIFICATION REQUESTmessage and is set to the value “delay critical” but the *Maximum Data Burst Volume* IE is not present, the gNB-DU shall report the establishment of the corresponding DRB as failed in the *DRB Failed to Setup List* IE of the of the UE CONTEXT MODIFICATION RESPONSE message with an appropriate cause value.

8.3.5 UE Context Modification Required (gNB-DU initiated)

8.3.5.1 General

The purpose of the UE Context Modification Required procedure is to modify the established UE Context, e.g., modifying and releasing radio bearer resources. The procedure uses UE-associated signalling.

8.3.5.2 Successful Operation

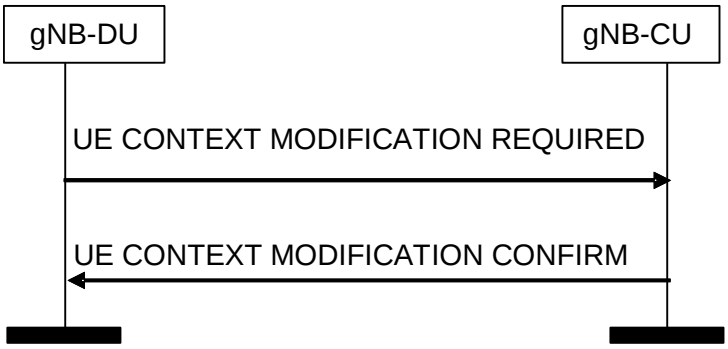

Figure 8.3.5.2-1: UE Context Modification Required procedure. Successful operation

The F1AP UE CONTEXT MODIFICATION REQUIRED message is initiated by the gNB-DU.

The gNB-CU reports the successful update of the UE context in the UE CONTEXT MODIFICATION CONFIRM message.

For a given bearer for which PDCP CA duplication was already configured, if two *DL UP TNL Information* IEs are included in UE CONTEXT MODIFICATION REQUIRED message for a DRB, the gNB-CU shall include two *UL UP TNL Information* IEs in UE CONTEXT MODIFICATION CONFIRM message. The gNB-CU and gNB-DU use the *UL UP TNL Information* IEs and *DL UP TNL Information* IEs to support packet duplication for intra-gNB-DU CA as defined in TS 38.470 [2], and the first *UP TNL Information* IE is still for the primary path.

If the *Resource Coordination Transfer Container* IE is included in the UE CONTEXT MODIFICATION REQUIRED, the gNB-CU shall transparently transfer this information for the purpose of resource coordination as described in TS 36.423 [9], TS 38.423 [28].

For EN-DC operation, if the gNB-CU includes the *Resource Coordination Transfer Information* IE in the UE CONTEXT MODIFICATION CONFIRM message, the gNB-DU shall, if supported, use it for the purpose of resource coordination. If the gNB-CU received the MeNB Resource Coordination Information as defined in TS 36.423 [9], after completion of UE Context Modification Required procedures, the gNB-CU shall transparently transfer it to the gNB-DU via the *Resource Coordination Transfer Container* IE in the UE CONTEXT MODIFICATION CONFIRM message. The gNB-DU shall use the information received in the *Resource Coordination Transfer Container* IE for reception of MeNB Resource Coordination Information at the gNB acting as secondary node as described in TS 36.423 [9]. If the *Resource Coordination E-UTRA Cell Information* IE is included in the *Resource Coordination Transfer Information* IE, the gNB-DU shall store the information replacing previously received information for the same E-UTRA cell, and use the stored information for the purpose of resource coordination. If the *Ignore PRACH Configuration* IE is present and set to "true" the *E-UTRA PRACH Configuration* IE in the UE CONTEXT MODIFICATION CONFIRM message shall be ignored.

For NGEN-DC or NE-DC operation, if the gNB-CU includes the *Resource Coordination Transfer Information* IE in the UE CONTEXT MODIFICATION CONFIRM message, the gNB-DU shall, if supported, use it for the purpose of resource coordination. If the gNB-CU received the MR-DC Resource Coordination Information as defined in TS 38.423 [28], after completion of UE Context Modification Required procedures, the gNB-CU shall transparently transfer it to the gNB-DU via the *Resource Coordination Transfer Container* IE in the UE CONTEXT MODIFICATION CONFIRM

message. The gNB-DU shall use the information received in the *Resource Coordination Transfer Container* IE for reception of MR-DC Resource Coordination Information at the gNB as described in TS 38.423 [28].

If the *CellGroupConfig* IE is included in the *DU to CU RRC Information* IE contained in the UE CONTEXT MODIFICATION REQUIRED message, the gNB-CU shall perform RRC Reconfiguration as described in TS 38.331 [8]. The *CellGroupConfig* IE shall transparently be signaled to the UE as specified in TS 38.331 [8].

If the UE CONTEXT MODIFICATION CONFIRM message includes the *Execute Duplication* IE, the gNB-DU shall perform CA based duplication, if configured, for the SRB for the included *RRC-Container* IE.

If the UE CONTEXT MODIFICATION REQUIRED message contains the *RLC Status* IE, the gNB-CU shall assume that RLC has been reestablished at the gNB-DU and may trigger PDCP data recovery.

8.3.5.2A Unsuccessful Operation

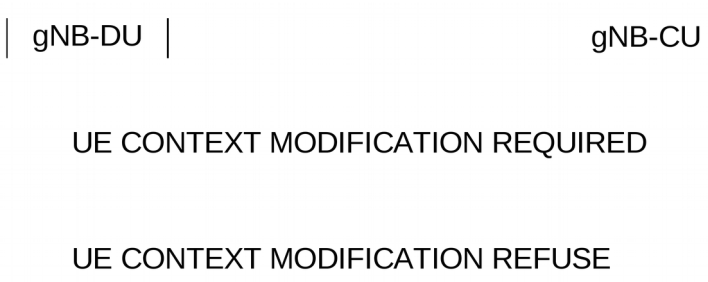

Figure 8.3.5.2A-1: UE Context Modification Required procedure. Unsuccessful operation.

In case none of the requested modifications of the UE context can be successfully performed, the gNB-CU shall respond with the UE CONTEXT MODIFICATION REFUSE message with an appropriate cause value.

8.3.5.3 Abnormal Conditions

Not applicable.

8.3.6 UE Inactivity Notification

8.3.6.1 General

This procedure is initiated by the gNB-DU to indicate the UE activity event.

The procedure uses UE-associated signalling.

8.3.6.2 Successful Operation

Figure 8.3.6.2-1: UE Inactivity Notification procedure.

The gNB-DU initiates the procedure by sending the UE INACTIVITY NOTIFICATION message to the gNB-CU.

If the *DRB ID* IE is included in the *DRB Activity Item* IE in the UE INACTIVITY NOTIFICATION message, the *DRB Activity* IE shall also be included

8.3.6.3 Abnormal Conditions

Not applicable.

8.3.7 Notify

8.3.7.1 General

The purpose of the Notify procedure is to enable the gNB-DU to inform the gNB-CU that the QoS of an already established GBR DRB cannot by fulfilled any longer or that it can be fulfilled again. The procedure uses UE-associated signalling.

8.3.7.2 Successful Operation

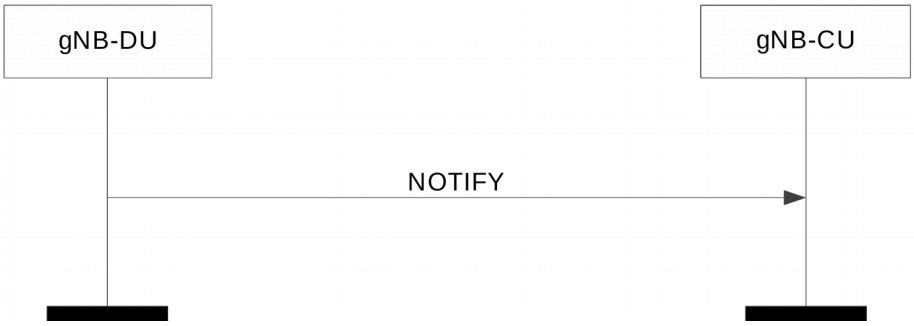

Figure 8.3.7.2-1: Notify procedure. Successful operation.

The gNB-DU initiates the procedure by sending a NOTIFY message.

The NOTIFY message shall contain the list of the GBR DRBs associated with notification control for which the QoS is not fulfilled anymore or for which the QoS is fulfilled again by the gNB-DU.

Upon reception of the NOTIFY message, the gNB-CU may identify which are the affected PDU sessions and QoS flows. The gNB-CU may inform the 5GC that the QoS for these PDU sessions or QoS flows is not fulfilled any longer or it is fulfilled again.

8.3.7.3 Abnormal Conditions

Not applicable.

8.4 RRC Message Transfer procedures

8.4.1 Initial UL RRC Message Transfer

8.4.1.1 General

The purpose of the Initial UL RRC Message Transfer procedure is to transfer the initial RRC message to the gNB-CU. The procedure uses non-UE-associated signaling.

8.4.1.2 Successful operation

Figure 8.4.1.2-1: Initial UL RRC Message Transfer procedure.

The establishment of the UE-associated logical F1-connection shall be initiated as part of the procedure.

If the *DU to CU RRC Container* IE is not included in the INITIAL UL RRC MESSAGE TRANSFER, the gNB-CU should reject the UE under the assumption that the gNB-DU is not able to serve such UE. If the gNB-DU is able to serve the UE, the gNB-DU shall include the *DU to CU RRC Container* IE and the gNB-CU shall configure the UE as specified in TS 38.331 [8]. The gNB-DU shall not include the *ReconfigurationWithSync* field in the *CellGroupConfig* IE as defined in TS 38.331 [8] of the *DU to CU RRC Container* IE.

If the *SUL Access Indication* IE is included in the INITIAL UL RRC MESSAGE TRANSFER, the gNB-CU shall consider that the UE has performed access on SUL carrier.

If the *RRC-Container-Networksharing list* IE is included in the INITIAL UL RRC MESSAGE TRANSFER, the gNB-CU shall take it into account as specified in TS 38.401 [4].

8.4.1.3 Abnormal Conditions

Not applicable.

8.4.2 DL RRC Message Transfer

8.4.2.1 General

The purpose of the DL RRC Message Transfer procedure is to transfer an RRC message The procedure uses UE-associated signalling.

8.4.2.2 Successful operation

Figure 8.4.2.2-1: DL RRC Message Transfer procedure

If a UE-associated logical F1-connection exists, the DL RRC MESSAGE TRANSFER message shall contain the *gNB-DU UE F1AP ID* IE, which should be used by gNB-DU to lookup the stored UE context.If no UE-associated logical F1-connection exists, the UE-associated logical F1-connection shall be established at reception of the DL RRC MESSAGE TRANSFER message.

If the *Index to RAT/Frequency Selection Priority* IE is included in the DL RRC MESSAGE TRANSFER, the gNB-DU may use it for RRM purposes. If the *Additional RRM Policy Index* IE is included in the DL RRC MESSAGE TRANSFER, the gNB-DU may use it for RRM purposes.

The DL RRC MESSAGE TRANSFER message shall include, if available, the *old gNB-DU UE F1AP ID* IE so that the gNB-DU can retrieve the existing UE context in RRC connection reestablishment procedure, as defined in TS 38.401 [4].

The DL RRC MESSAGE TRANSFER message shall include, if SRB duplication is activated, the *Execute Duplication* IE, so that the gNB-DU can perform CA based duplication for the SRB.

If the gNB-DU identifies the UE-associated logical F1-connection by the *gNB-DU UE F1AP ID* IE in the DL RRC MESSAGE TRANSFER message and the *old gNB-DU UE F1AP ID* IE is included, it shall release the old gNB-DU UE F1AP ID and the related configurations associated with the old gNB-DU UE F1AP ID.

If the *UE Context not retrievable* IE set to "true" is included in the DL RRC MESSAGE TRANSFER, the DL RRC MESSAGE TRANSFER may contain the *Redirected RRC message* IE and use it as specified in TS 38.401 [4].

If the *UE Context not retrievable* IE set to "true" is included in the DL RRC MESSAGE TRANSFER, the DL RRC MESSAGE TRANSFER may contain the *PLMN Assistance Info for Network Sharing* IE, if available at the gNB-CU and may use it as specified in TS 38.401 [4].

If the DL RRC MESSAGE TRANSFER message contains the *New gNB-CU UE F1AP ID* IE, the gNB-DU shall, if supported, replace the value received in the *gNB-CU UE F1AP ID* IE by the value of the *New gNB-CU UE F1AP ID* and use it for further signalling.

Interactions with UE Context Release Request procedure:

If the *UE Context not retrievable* IE set to "true" is included in the DL RRC MESSAGE TRANSFER, the gNB-DU may trigger the UE Context Release Request procedure, as specified in TS 38.401 [4].

8.4.2.3 Abnormal Conditions

Not applicable.

8.4.3 UL RRC Message Transfer

8.4.3.1 General

The purpose of the UL RRC Message Transfer procedure is to transfer an RRC message as an UL PDCP-PDU to the gNB-CU. The procedure uses UE-associated signalling.

8.4.3.2 Successful operation

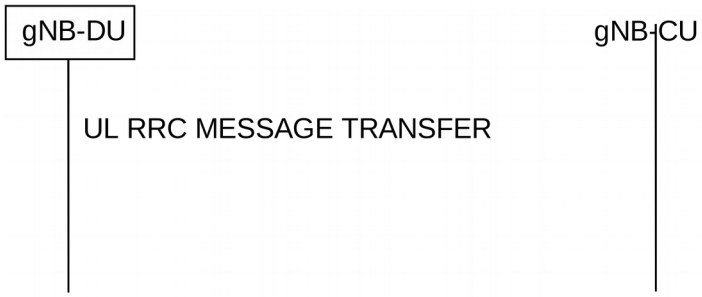

Figure 8.4.3.2-1: UL RRC Message Transfer procedure

When the gNB-DU has received from the radio interface an RRC message to which a UE-associated logical F1-connection for the UE exists, the gNB-DU shall send the UPLINK RRC TRANSFER message to the gNB-CU including the RRC message as a *RRC-Container* IE.

If the *Selected PLMN ID* IE is contained in the UL RRC MESSAGE TRANSFER message, the gNB-CU may use it as specified in TS 38.401 [4].

If the UL RRC MESSAGE TRANSFER message contains the *New gNB-DU UE F1AP ID* IE, the gNB-CU shall, if supported, replace the value received in the *gNB-DU UE F1AP ID* IE by the value of the *New gNB-DU UE F1AP ID* and use it for further signalling.

8.4.3.3 Abnormal Conditions

Not applicable.

8.4.4 RRC Delivery Report

8.4.4.1 General

The purpose of the RRC Delivery Report procedure is to transfer to the gNB-CU information about successful delivery of DL PDCP-PDUs including RRC messages. The procedure uses UE-associated signalling.

8.4.4.2 Successful operation

Figure 8.4.4.2-1: RRC Delivery Report procedure.

When the gNB-DU has successfully delivered an RRC message to the UE for which the gNB-CU has requested a delivery report, the gNB-DU shall send the RRC DELIVERY REPORT message to the gNB-CU containng the *RRC Delivery Status* IE and the *SRB ID* IE.

8.4.4.3 Abnormal Conditions

Not applicable.

8.5 Warning Message Transmission Procedures

8.5.1 Write-Replace Warning

8.5.1.1 General

The purpose of Write-Replace Warning procedure is to start or overwrite the broadcasting of warning messages. The procedure uses non UE-associated signalling.

8.5.1.2 Successful Operation

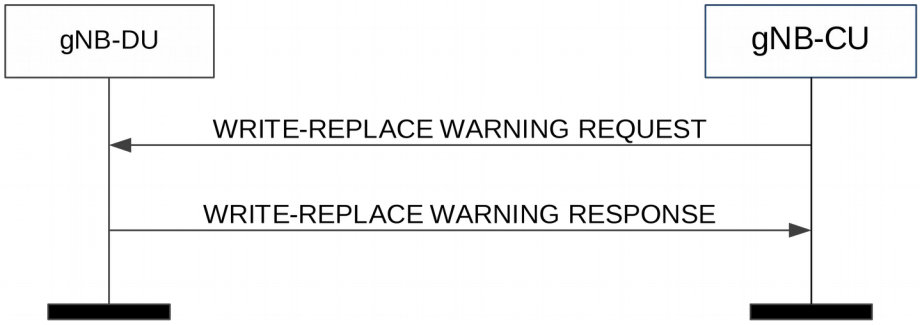

Figure 8.5.1.2-1: Write-Replace Warning procedure: successful operation

The gNB-CU initiates the procedure by sending a WRITE-REPLACE WARNING REQUEST message to the gNB-DU.

Upon receipt of the WRITE-REPLACE WARNING REQUEST message, the gNB-DU shall prioritise its resources to process the warning message.

The gNB-DU acknowledges the WRITE-REPLACE WARNING REQUEST message by sending a WRITE-REPLACE WARNING RESPONSE message to the gNB-CU.

Upon receipt of the WRITE-REPLACE WARNING REQUEST message, the gNB-DU shall include the *Dedicated SI Delivery Needed UE List* IE in the WRITE-REPLACE WARNING RESPONSE message for UEs that are unable to receive system information from broadcast.

If *Dedicated SI Delivery Needed UE List* IE is contained in the WRITE-REPLACE WARNING RESPONSE message, the gNB-CU should take it into account when informing the UE of the updated system information via the dedicated RRC message.

If the *Notification Information* IE is included in the *PWS System Information* IE in the WRITE-REPLACE WARNING REQUEST message, the gNB-DU shall use this information to avoid that duplications trigger new broadcast or replace existing broadcast.

If *Additional SIB Message List* IE is included in *PWS System Information* IE, the gNB-DU shall store all SIB message(s) in *PWS System Information* IE, and consider that the first segment of public warning message is included in *SIB message* IE, and the remaining segments are listed in *Additional SIB Message List* IE in segmentation sequence order.

8.5.1.3 Unsuccessful Operation

Not applicable.

8.5.1.4 Abnormal Conditions

Not applicable.

8.5.2 PWS Cancel

8.5.2.1 General

The purpose of the PWS Cancel procedure is to cancel an already ongoing broadcast of a warning message. The procedure uses non UE-associated signalling.

8.5.2.2 Successful Operation

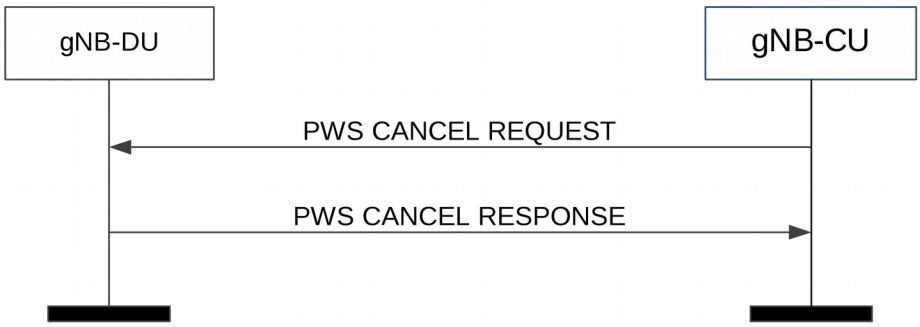

Figure 8.5.2.2-1: PWS Cancel procedure: successful operation

The gNB-CU initiates the procedure by sending a PWS CANCEL REQUEST message to the gNB-DU.

The gNB-DU shall acknowledge the PWS CANCEL REQUEST message by sending the PWS CANCEL RESPONSE message.

If the *Cancel-All Warning Messages Indicator* IE is present in the PWS CANCEL REQUEST message, then the gNB-DU shall stop broadcasting and discard all warning messages for the area as indicated in the *Cell Broadcast To Be Cancelled List* IE or in all the cells of the gNB-DU if the *Cell Broadcast To Be Cancelled List* IE is not included. The gNB-DU shall acknowledge the PWS CANCEL REQUEST message by sending the PWS CANCEL RESPONSE message, and shall, if there is area to report where an ongoing broadcast was stopped successfully, include the *Cell Broadcast Cancelled List* IE with the *Number of Broadcasts* IE set to 0.

If the *Cell Broadcast To Be Cancelled List* IE is not included in the PWS CANCEL REQUEST message, the gNB-DU shall stop broadcasting and discard the warning message identified by the *Message Identifier* IE and the *Serial Number* IE in the *Notification Information* IE in all of the cells in the gNB-DU.

If the *Notification Information* IE is included in the PWS CANCEL REQUEST, the gNB-DU shall cancel broadcast of the public warning message identified by the *Notification Information* IE.

8.5.1.3 Unsuccessful Operation

Not applicable.

8.5.1.4 Abnormal Conditions

Not applicable.

8.5.3 PWS Restart Indication

8.5.3.1 General

The purpose of PWS Restart Indication procedure is to inform the gNB-CU that PWS information for some or all cells of the gNB-DU are available for reloading from the CBC if needed. The procedure uses non UE-associated signalling.

8.5.3.2 Successful Operation

Figure 8.5.3.2-1: PWS restart indication

The gNB-DU initiates the procedure by sending a PWS RESTART INDICATION message to the gNB-CU.

8.5.3.3 Abnormal Conditions

Not applicable.

8.5.4 PWS Failure Indication

8.5.4.1 General

The purpose of the PWS Failure Indication procedure is to inform the gNB-CU that ongoing PWS operation for one or more cells of the gNB-DU has failed. The procedure uses non UE-associated signalling.

8.5.4.2 Successful Operation

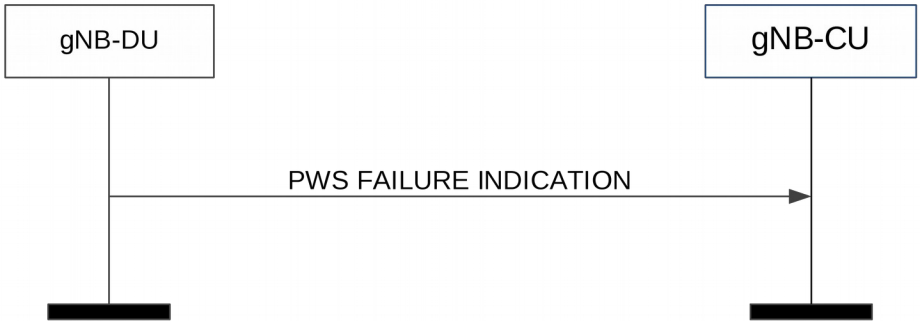

Figure 8.5.4.2-1: PWS failure indication

The gNB-DU initiates the procedure by sending a PWS FAILURE INDICATION message to the gNB-CU.

8.5.4.3 Abnormal Conditions

Not applicable.

8.6 System Information Procedures

8.6.1 System Information Delivery

8.6.1.1 General

The purpose of the System Information Delivery procedure is to command the gNB-DU to broadcast the requested Other SI. The procedure uses non-UE associated signalling.

8.6.1.2 Successful Operation

Figure 8.6.1.2-1: System Information Delivery procedure. Successful operation.

The gNB-CU initiates the procedure by sending a SYSTEM INFORMATION DELIVERY COMMAND message to the gNB-DU.

Upon reception of the SYSTEM INFORMATION DELIVERY COMMAND message, the gNB-DU shall broadcast the requested Other SI, and delete the UE context corresponding to the *Confirmed UE ID* IE, if any.

Interactions with gNB-DU Configuration Update procedure:

Upon reception of SYSTEM INFORMATION DELIVERY COMMAND message, the gNB-DU Configuration Update procedure may be performed , and as part of such procedure the gNB-DU shall include the *Dedicated SI Delivery Needed UE List* IE in GNB-DU CONFIGURATION UPDATE message for UEs that are unable to receive system information from broadcast.

8.6.1.3 Abnormal Conditions

Not applicable.

8.7 Paging procedures

8.7.1 Paging

8.7.1.1 General

The purpose of the Paging procedure is used to provide the paging information to enable the gNB-DU to page a UE. The procedure uses non-UE associated signalling.

8.7.1.2 Successful Operation

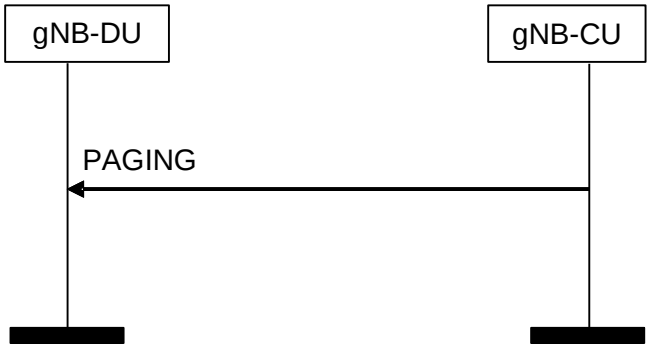

Figure 8.7.1.2-1: Paging procedure. Successful operation.

The gNB-CU initiates the procedure by sending a PAGING message.

The *Paging DRX* IE may be included in the PAGING message, and if present the gNB-DU may use it to determine the final paging cycle for the UE.

The *Paging Priority* IE may be included in the PAGING message, and if present the gNB-DU may use it according to TS 23.501 [21].

At the reception of the PAGING message, the gNB-DU shall perform paging of the UE in cells which belong to cells as indicated in the *Paging Cell List* IE.

The *Paging Origin* IE may be included in the PAGING message, and if present the gNB-DU shall transfer it to the UE.

8.7.1.3 Abnormal Conditions

Not applicable.

8.8 Trace Procedures

8.8.1 Trace Start

8.8.1.1 General

The purpose of the Trace Start procedure is to allow the gNB-CU to request the gNB-DU to initiate a trace session for a UE. The procedure uses UE-associated signalling.

8.8.1.2 Successful Operation

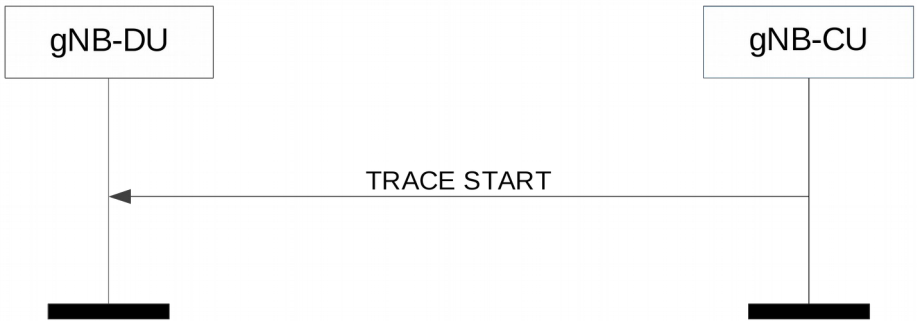

Figure 8.8.1.2-1: Trace start procedure: Successful Operation.

Upon reception of the TRACE START message, the gNB-DU shall initiate the requested trace session for the requested UE, as described in TS 32.422 [29].

8.8.1.3 Abnormal Conditions

Void.

8.8.2 Deactivate Trace

8.8.2.1 General

The purpose of the Deactivate Trace procedure is to allow the gNB-CU to request the gNB-DU to stop the trace session for the indicated trace reference. The procedure uses UE-associated signalling.

8.8.2.2 Successful Operation

Figure 8.8.2.2-1: Deactivate trace procedure: Successful Operation

Upon reception of the DEACTIVATE TRACE message, the gNB-DU shall stop the trace session for the indicated trace reference contained in the *Trace ID* IE, as described in TS 32.422 [29].

8.8.2.3 Abnormal Conditions

Void.

8.9 Radio Information Transfer procedures

8.9.1 DU-CU Radio Information Transfer

8.9.1.1 General

The purpose of the DU-CU Radio Information Transfer procedure is to transfer radio-related information from the gNB-DU to the gNB-CU. The procedure uses non-UE-associated signalling.

8.9.1.2 Successful operation

Figure 8.9.1.2-1: DU-CU Radio Information Transfer procedure.

The gNB-DU initiates the procedure by sending the DU-CU RADIO INFORMATION TRANSFER message to the gNB-CU.

The gNB-CU considers that the *RIM-RS Detection Status* IE indicates the RIM-RS detection status of the cell identified by *Aggressor Cell ID* IE.

8.9.1.3 Abnormal Conditions

Not applicable.

8.9.2 CU-DU Radio Information Transfer

8.9.2.1 General

The purpose of the CU-DU Radio Information Transfer procedure is to transfer radio-related information from the gNB-CU to the gNB-DU. The procedure uses non-UE-associated signalling.

8.9.2.2 Successful operation

Figure 8.9.2.2-1: CU-DU Radio Information Transfer procedure.

The gNB-CU initiates the procedure by sending the CU-DU RADIO INFORMATION TRANSFER message to the gNB-DU. The gNB-DU considers that the *RIM-RS Detection Status* IE indicates the detection status of RIM-RS associated with *Victim gNB Set ID* IE.

8.9.2.3 Abnormal Conditions

Not applicable.

9 Elements for F1AP Communication

9.1 General

Subclauses 9.2 and 9.3 present the F1AP message and IE definitions in tabular format. The corresponding ASN.1 definition is presented in subclause 9.4. In case there is contradiction between the tabular format and the ASN.1 definition, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional IEs, where the tabular format shall take precedence.

The messages have been defined in accordance to the guidelines specified in TR 25.921 [14].

When specifying IEs which are to be represented by bitstrings, if not otherwise specifically stated in the semantics description of the concerned IE or elsewhere, the following principle applies with regards to the ordering of bits:

- The first bit (leftmost bit) contains the most significant bit (MSB);
- The last bit (rightmost bit) contains the least significant bit (LSB);

- When importing bitstrings from other specifications, the first bit of the bitstring contains the first bit of the concerned information;

The following attributes are used for the tabular description of the messages and information elements: Presence, Range Criticality and Assigned Criticality. Their definition and use can be found in TS 38.413 [3].

9.2 Message Functional Definition and Content

9.2.1 Interface Management messages

9.2.1.1 RESET

This message is sent by both the gNB-CU and the gNB-DU and is used to request that the F1 interface, or parts of the F1 interface, to be reset.

Direction: gNB-CU → gNB-DU and gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cause	M		9.3.1.2		YES	ignore
CHOICE *Reset Type*	M				YES	reject
>F1 interface						
>>Reset All	M		ENUMERATED (Reset all,...)		-	
>Part of F1 interface						
>>UE-associated logical F1-connection list		*1*			-	
>>>UE-associated logical F1-connection Item		*1 .. <maxnoofIndividualF1ConnectionsToReset>*			EACH	reject
>>>> gNB-CU UE F1AP ID	O		9.3.1.4		-	
>>>> gNB-DU UE F1AP ID	O		9.3.1.5		-	

Range bound	Explanation
maxnoofIndividualF1ConnectionsToReset	Maximum no. of UE-associated logical F1-connections allowed to reset in one message. Value is 65536.

9.2.1.2 RESET ACKNOWLEDGE

This message is sent by both the gNB-CU and the gNB-DU as a response to a RESET message.

Direction: gNB-DU → gNB-CU and gNB-CU → gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
UE-associated logical F1-connection list		*0..1*			YES	ignore
>UE-associated logical F1-connection Item		*1 .. <maxnoofIndividualF1ConnectionsToReset>*			EACH	ignore
>>gNB-CU UE F1AP ID	O		9.3.1.4		-	
>>gNB-DU UE F1AP ID	O		9.3.1.5		-	
Criticality Diagnostics	O		9.3.1.3		YES	ignore

Range bound	Explanation
maxnoofIndividualF1ConnectionsToReset	Maximum no. of UE-associated logical F1-connections allowed to reset in one message. Value is 65536.

9.2.1.3 ERROR INDICATION

This message is sent by both the gNB-CU and the gNB-DU and is used to indicate that some error has been detected in the node.

Direction: gNB-CU → gNB-DU and gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23	This IE is ignored if received in UE associated signalling message.	YES	reject
gNB-CU UE F1AP ID	O		9.3.1.4		YES	ignore
gNB-DU UE F1AP ID	O		9.3.1.5		YES	ignore
Cause	O		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.4 F1 SETUP REQUEST

This message is sent by the gNB-DU to transfer information associated to an F1-C interface instance.

NOTE: If a TNL association is shared among several F1-C interface instances, several F1 Setup procedures are issued via the same TNL association after that TNL association has become operational.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
gNB-DU ID	M		9.3.1.9		YES	reject
gNB-DU Name	O		PrintableString(SIZE(1..150,...))		YES	ignore
gNB-DU Served Cells List		*0.. 1*		List of cells configured in the gNB-DU	YES	reject
>gNB-DU Served Cells Item		*1.. <maxCellingNBDU>*			EACH	reject
>>Served Cell Information	M		9.3.1.10	Information about the cells configured in the gNB-DU	-	
>>gNB-DU System Information	O		9.3.1.18	RRC container with system information owned by gNB-DU	-	
gNB-DU RRC version	M		RRC version 9.3.1.70		YES	reject
Transport Layer Addresses Info	O		Transport Layer Addresses Info 9.3.2.5		YES	ignore

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.

9.2.1.5 F1 SETUP RESPONSE

This message is sent by the gNB-CU to transfer information associated to an F1-C interface instance.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
gNB-CU Name	O		PrintableString (SIZE(1..150,...))	Human readable name of the gNB-CU.	YES	ignore
Cells to be Activated List		*0.. 1*			YES	reject
>Cells to be Activated List Item		*1.. <maxCellingNBDU>*		List of cells to be activated	EACH	reject
>> NR CGI	M		9.3.1.12		-	
>> NR PCI	O		INTEGER (0..1007)	Physical Cell ID	-	
>>gNB-CU System Information	O		9.3.1.42	RRC container with system information owned by gNB-CU	YES	reject
>>Available PLMN List	O		9.3.1.65		YES	ignore
>>Extended Available PLMN List	O		9.3.1.76	This is included if *Available PLMN List* IE is included and if more than 6 Available PLMNs is to be signalled.	YES	ignore
gNB-CU RRC version	M		RRC version 9.3.1.70		YES	reject
Transport Layer Addresses Info	O		Transport Layer Addresses Info 9.3.2.5		YES	ignore

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.

9.2.1.6 F1 SETUP FAILURE

This message is sent by the gNB-CU to indicate F1 Setup failure.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time to wait	O		9.3.1.13		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.7 GNB-DU CONFIGURATION UPDATE

This message is sent by the gNB-DU to transfer updated information associated to an F1-C interface instance.

NOTE: If F1-C signalling transport is shared among several F1-C interface instance, this message may transfer updated information associated to several F1-C interface instances.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Served Cells To Add List		*0..1*		Complete list of added cells served by the gNB-DU	YES	reject
>Served Cells To Add Item		*1 .. <maxCellingNBDU>*			EACH	reject
>>Served Cell Information	M		9.3.1.10	Information about the cells configured in the gNB-DU	-	
>>gNB-DU System Information	O		9.3.1.18	RRC container with system information owned by gNB-DU	-	
Served Cells To Modify List		*0..1*		Complete list of modified cells served by the gNB-DU	YES	reject
>Served Cells To Modify Item		*1 .. <maxCellingNBDU>*			EACH	reject
>>Old NR CGI	M		NR CGI 9.3.1.12		-	
>>Served Cell Information	M		9.3.1.10	Information about the cells configured in the gNB-DU	-	
>>gNB-DU System Information	O		9.3.1.18	RRC container with system information owned by gNB-DU	-	
Served Cells To Delete List		*0..1*		Complete list of deleted cells served by the gNB-DU	YES	reject
>Served Cells To Delete Item		*1.. <maxCellingNBDU>*			EACH	reject
>>Old NR CGI	M		NR CGI 9.3.1.12		-	
Cells Status List		*0..1*		Complete list of active cells	YES	reject
> Cells Status Item		*0 .. <maxCellingNBDU>*			EACH	reject
>> NR CGI	M		9.3.1.12		-	
>>Service Status	M		9.3.1.68		-	
Dedicated SI Delivery Needed UE List		*0..1*		List of UEs unable to receive	YES	ignore

				system information from broadcast		
> Dedicated SI Delivery Needed UE Item		*1 .. <maxnoofUEIDs>*			EACH	ignore
>>gNB-CU UE F1AP ID	M		9.3.1.4		-	
>>NR CGI	M		9.3.1.12		-	
gNB-DU ID	O		9.3.1.9		YES	reject
gNB-DU TNL Association To Remove List		*0..1*			YES	reject
>gNB-DU TNL Association To Remove Item IEs		*1..<maxnoofTNLAssociation>*			EACH	reject
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-DU.	-	-
>>TNL Association Transport Layer Address gNB-CU	O		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU	-	-
Transport Layer Addresses Info	O		Transport Layer Addresses Info 9.3.2.5		YES	ignore

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.
maxnoofUEIDs	Maximum no. of UEs that can be served by a gNB-DU. Value is 65536.
maxnoofTNLAssociations	Maximum numbers of TNL Associations between the gNB-CU and the gNB-DU. Value is 32.

9.2.1.8 GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a gNB-CU to a gNB-DU to acknowledge update of information associated to an F1-C interface instance.

NOTE: If F1-C signalling transport is shared among several F1-C interface instances, this message may transfer updated information associated to several F1-C interface instances.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cells to be Activated List		*0.. 1*		List of cells to be activated	YES	reject
>Cells to be Activated List Item		*1.. <maxCellingNBDU>*			EACH	reject
>> NR CGI	M		9.3.1.12		-	
>> NR PCI	O		INTEGER (0..1007)	Physical Cell ID	-	

>> gNB-CU System Information	O		9.3.1.42	RRC container with system information owned by gNB-CU	YES	reject
>>Available PLMN List	O		9.3.1.65		YES	ignore
>>Extended Available PLMN List	O		9.3.1.76	This is included if *Available PLMN List* IE is included and if more than 6 Available PLMNs is to be signalled.	YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore
Cells to be Deactivated List		*0.. 1*		List of cells to be deactivated	YES	reject
>Cells to be Deactivated List Item		*1.. <maxCellingNBDU>*			EACH	reject
>> NR CGI	M		9.3.1.12		-	-
Transport Layer Addresses Info	O		Transport Layer Addresses Info 9.3.2.5		YES	ignore

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.

9.2.1.9 GNB-DU CONFIGURATION UPDATE FAILURE

This message is sent by the gNB-CU to indicate gNB-DU Configuration Update failure.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time to wait	O		9.3.1.13		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.10 GNB-CU CONFIGURATION UPDATE

This message is sent by the gNB-CU to transfer updated information associated to an F1-C interface instance.

NOTE: If F1-C signalling transport is shared among several F1-C interface instances, this message may transfer updated information associated to several F1-C interface instances.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cells to be Activated List		*0..1*		List of cells to be activated or modified	YES	reject
>Cells to be Activated List Item		*1.. <maxCellingNBDU>*			EACH	reject
>> NR CGI	M		9.3.1.12		-	
>> NR PCI	O		INTEGER (0..1007)	Physical Cell ID	-	
>> gNB-CU System Information	O		9.3.1.42	RRC container with system information owned by gNB-CU	YES	reject
>>Available PLMN List	O		9.3.1.65		YES	ignore
>>Extended Available PLMN List	O		9.3.1.76	This is included if *Available PLMN List* IE is included and if more than 6 Available PLMNs is to be signalled.	YES	ignore
Cells to be Deactivated List		*0..1*		List of cells to be deactivated	YES	reject
>Cells to be Deactivated List Item		*1.. <maxCellingNBDU>*			EACH	reject
>> NR CGI	M		9.3.1.12		-	
gNB-CU TNL Association To Add List		*0..1*			YES	ignore
>gNB-CU TNL Association To Add Item IEs		*1..<maxnoofTNLAssociations>*			EACH	ignore
>>TNL Association Transport Layer Information	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU.	-	
>>TNL Association Usage	M		ENUMERATED (ue, non-ue, both, ...)	Indicates whether the TNL association is only used for UE-associated signalling, or non-UE-associated signalling, or both. For usage of this IE, refer to TS 38.472	-	

				[22].		
gNB-CU TNL Association To Remove List		*0..1*			YES	ignore
>gNB-CU TNL Association To Remove Item IEs		*1..<maxnoofTNLAssociation>*			EACH	ignore
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU.	-	
>>TNL Association Transport Layer Address gNB-DU	O		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-DU.	YES	reject
gNB-CU TNL Association To Update List		*0..1*			YES	ignore
>gNB-CU TNL Association To Update Item IEs		*1..<maxnoofTNLAssociations>*			EACH	ignore
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU.	-	
>>TNL Association Usage	O		ENUMERATED (ue, non-ue, both, ...)	Indicates whether the TNL association is only used for UE-associated signalling, or non-UE-associated signalling, or both. For usage of this IE, refer to TS 38.472 [22].	-	
Cells to be barred List		*0..1*		List of cells to be barred.	YES	ignore
>Cells to be barred List Item		*1.. <maxCellingNBDU>*			EACH	ignore
>>NR CGI	M		9.3.1.12		-	
>> Cell Barred	M		ENUMERATED (barred, not-barred, ...)		-	
Protected E-UTRA Resources List		*0..1*		List of Protected E-UTRA Resources.	YES	reject
>Protected E-UTRA Resources List Item		*1.. <maxCellineNB>*			EACH	reject
>>Spectrum Sharing Group ID	M		INTEGER (1.. maxCellineNB)	Indicates the E-UTRA cells involved in resource coordination	-	

				with the NR cells affiliated with the same Spectrum Sharing Group ID.		
>> E-UTRA Cells List		*1*		List of applicable E-UTRA cells.	-	
>>> E-UTRA Cells List Item		*1 .. <maxCellineNB>*			-	
>>>>EUTRA Cell ID	M		BIT STRING (SIZE(28))	Indicates the E-UTRAN Cell Global Identifier as defined in subclause 9.2.14 in TS 36.423 [9].	-	
>>>>Served E-UTRA Cell Information	M		9.3.1.64		-	
Neighbour Cell Information List		*0..1*			YES	ignore
>**Neighbour Cell Information List Item**		*1 .. <maxCellingNBDU>*			EACH	ignore
>>NR CGI	M		9.3.1.12		-	
>>Intended TDD DL-UL Configuration	O		9.3.1.89		YES	ignore
Transport Layer Addresses Info	O		Transport Layer Addresses Info 9.3.2.5		YES	ignore

Range bound	Explanation
maxCellingNBDU	Maximum nunmerbs of cells that can be served by a gNB-DU. Value is 512.
maxnoofTNLAssociations	Maximum numbers of TNL Associations between the gNB-CU and the gNB-DU. Value is 32.
maxCellineNB	Maximum no. cells that can be served by an eNB. Value is 256.

9.2.1.11 GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a gNB-DU to a gNB-CU to acknowledge update of information associated to an F1-C interface instance.

NOTE: If F1-C signalling transport is shared among several F1-C interface instance, this message may transfer updated information associated to several F1-C interface instances.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cells Failed to be Activated List		*0..1*		List of cells which are failed to be activated	YES	reject
>Cells Failed to be		*1..*			EACH	reject

Activated Item		*<maxCellingNBDU>*				
>> NR CGI	M		9.3.1.12		-	
>>Cause	M		9.3.1.2		-	
Criticality Diagnostics	O		9.3.1.3		YES	ignore
gNB-CU TNL Association Setup List		0..1			YES	ignore
>gNB-CU TNL Association Setup Item IEs		1..<maxnoofTNLAssociations>			EACH	ignore
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU	-	
gNB-CU TNL Association Failed to Setup List		0..1			YES	ignore
>gNB-CU TNL Association Failed To Setup Item IEs		1..<maxnoofTNLAssociations>			EACH	ignore
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU	-	
>>Cause	M		9.3.1.2		-	
Dedicated SI Delivery Needed UE List		*0..1*		List of UEs unable to receive system information from broadcast	YES	ignore
>Dedicated SI Delivery Needed UE List		*1 .. <maxnoofUEIDs>*			EACH	ignore
>>gNB-CU UE F1AP ID	M		9.3.1.4		-	-
>>NR CGI	M		9.3.1.12		-	-
Transport Layer Addresses Info	O		Transport Layer Addresses Info 9.3.2.5		YES	ignore

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.
maxnoofTNLAssociations	Maximum no. of TNL Associations between the gNB-CU and the gNB-DU. Value is 32.
maxnoofUEIDs	Maximum no. of UEs that can be served by a gNB-DU. Value is 65536.

9.2.1.12 GNB-CU CONFIGURATION UPDATE FAILURE

This message is sent by the gNB-DU to indicate gNB-CU Configuration Update failure.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time to wait	O		9.3.1.13		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.13 GNB-DU RESOURCE COORDINATION REQUEST

This message is sent by a gNB-CU to a gNB-DU, to express the desired resource allocation for data traffic, for the sake of resource coordination. The message triggers gNB-DU resource coordination (for NR-initiated resource coordination), to indicate an initial resource offer by the E-UTRA node (for E-UTRA-initiated gNB-DU Resource Coordination), or to indicate the agreed resource allocation that is to be executed.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Request type	M		ENUMERATED (offer, execution, ...)		YES	reject
E-UTRA – NR Cell Resource Coordination Request Container	M		OCTET STRING	Includes the X2AP E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message as defined in subclause 9.1.4.24 in TS 36.423 [9].	YES	reject
Ignore Coordination Request Container	O		ENUMERATED (yes, ...)		YES	reject

9.2.1.14 GNB-DU RESOURCE COORDINATION RESPONSE

This message is sent by a gNB-DU to a gNB-CU, to express the desired resource allocation for data traffic, as a response to the GNB-DU RESOURCE COORDINATION REQUEST.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
E-UTRA – NR Cell Resource Coordination Response Container	M		OCTET STRING	Includes the X2AP E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE message as defined in subclause 9.1.4.25 in TS 36.423 [9].	YES	reject

9.2.1.15 GNB-DU STATUS INDICATION

This message is sent by the gNB-DU to indicate to the gNB-CU its status of overload.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23		YES	reject
gNB-DU Overload Information	M		ENUMERATED (overloaded, not-overloaded)		YES	reject

9.2.1.16 F1 REMOVAL REQUEST

This message is sent by either the gNB-DU or the gNB-CU to intiate the removal of the interface instance and the related resources.

Direction: gNB-DU → gNB-CU, gNB-CU → gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject

9.2.1.17 F1 REMOVAL RESPONSE

This message is sent by either the gNB-DU or the gNB-CU to acknowledge the initiation of removal of the interface instance and the related resources.

Direction: gNB-CU → gNB-DU, gNB-DU → gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.18 F1 REMOVAL FAILURE

This message is sent by either the gNB-DU or the gNB-CU to indicate that removing the interface instance and the related resources cannot be accepted.

Direction: gNB-CU → gNB-DU, gNB-DU → gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.3.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cause	M		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.19 NETWORK ACCESS RATE REDUCTION

This message is sent by the gNB-CU to indicate to the gNB-DU a need to reduce the rate at which UEs access the network.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23		YES	reject
UAC Assistance Information	M		9.3.1.83		YES	reject

9.2.2 UE Context Management messages

9.2.2.1 UE CONTEXT SETUP REQUEST

This message is sent by the gNB-CU to request the setup of a UE context.

Direction: gNB-CU → gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	O		9.3.1.5		YES	ignore
SpCell ID	M		NR CGI 9.3.1.12	Special Cell as defined in TS 38.321 [16]. For handover case, this IE is considered as target cell.	YES	reject
ServCellIndex	M		INTEGER (0..31,...)		YES	reject
SpCell UL Configured	O		Cell UL Configured 9.3.1.33		YES	ignore
CU to DU RRC Information	M		9.3.1.25		YES	reject
Candidate SpCell List		*0..1*			YES	ignore
>Candidate SpCell Item IEs		*1 .. <maxnoofCandidateSpCells>*			EACH	ignore
>>Candidate SpCell ID	M		NR CGI 9.3.1.12	Special Cell as defined in TS 38.321 [16]	-	
DRX Cycle	O		DRX Cycle 9.3.1.24		YES	ignore
Resource Coordination Transfer Container	O		OCTET STRING	Includes the *MeNB Resource Coordination Information* IE as defined in subclause 9.2.116 of TS 36.423 [9] for EN-DC case or *MR-DC Resource Coordination Information* IE as defined in TS 38.423 [28] for NGEN-DC and NE-DC cases.	YES	ignore
SCell To Be Setup List		*0..1*			YES	ignore
>SCell to Be Setup Item IEs		*1.. <maxnoofSCells>*			EACH	ignore
>>SCell ID	M		NR CGI 9.3.1.12	SCell Identifier in gNB	-	
>>SCellIndex	M		INTEGER (1..31)		-	
>>SCell UL Configured	O		Cell UL Configured 9.3.1.33		-	
>>servingCellMO	O		INTEGER (1..64)		YES	ignore
SRB to Be Setup List		*0..1*			YES	reject
>SRB to Be Setup Item IEs		*1 .. <maxnoofSRBs>*			EACH	reject
>>SRB ID	M		9.3.1.7		-	
>>Duplication Indication	O		ENUMERATED (true, ..., false)	If included, it should be set to true.	-	
DRB to Be Setup List		*0..1*			YES	reject
>DRB to Be Setup Item IEs		*1 .. <maxnoofD*			EACH	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
		RBs>				

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>DRB ID	M		9.3.1.8		-	
>>CHOICE QoS Information	M				-	
>>>E-UTRAN QoS	M		9.3.1.19	Shall be used for EN-DC case to convey E-RAB Level QoS Parameters	-	
>>>DRB Information		*1*		Shall be used for NG-RAN cases	YES	ignore
>>>>DRB QoS	M		9.3.1.45		-	
>>>>S-NSSAI	M		9.3.1.38		-	
>>>>Notification Control	O		9.3.1.56		-	
>>>>Flows Mapped to DRB Item		*1 .. <maxnoofQoSFlows>*			-	
>>>>>QoS Flow Identifier	M		9.3.1.63		-	
>>>>>QoS Flow Level QoS Parameters	M		9.3.1.45		-	
>>>>>QoS Flow Mapping Indication	O		9.3.1.72		YES	ignore
>>UL UP TNL Information to be setup List		*1*			-	
>>> UL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofULUPTNLInformation>*			-	
>>>>UL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-CU endpoint of the F1 transport bearer. For delivery of UL PDUs.	-	
>> RLC Mode	M		9.3.1.27		-	
>> UL Configuration	O		UL Configuraiton 9.3.1.31	Information about UL usage in gNB-DU.	-	
>>Duplication Activation	O		9.3.1.36	Information on the initial state of CA based UL PDCP duplication	-	
>> DC Based Duplication Configured	O		ENUMERATED (true, ..., false)	Indication on whether DC based PDCP duplication is configured or not. If included, it should be set to true.	YES	reject
>>DC Based Duplication Activation	O		Duplication Activation 9.3.1.36	Information on the initial state of DC basedUL PDCP duplication	YES	reject
>>DL PDCP SN length	M		ENUMERATED (12bits, 18bits, ...)		YES	ignore
>>UL PDCP SN length	O		ENUMERATED (12bits, 18bits, ...)		YES	ignore
Inactivity Monitoring Request	O		ENUMERATED (true, ...)		YES	reject
RAT-Frequency Priority Information	O		9.3.1.34		YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
RRC-Container	O		9.3.1.6	Includes the *DL-DCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8], encapsulated in a PDCP PDU.	YES	ignore
Masked IMEISV	O		9.3.1.55		YES	ignore
Serving PLMN	O		PLMN ID 9.3.1.14	Indicates the PLMN serving the UE.	YES	ignore
gNB-DU UE Aggregate Maximum Bit Rate Uplink	C-ifDRBSetup		Bit Rate 9.3.1.22	The gNB-DU UE Aggregate Maximum Bit Rate Uplink is to be enforced by the gNB-DU.	YES	ignore
RRC Delivery Status Request	O		ENUMERATED (true, …)	Indicates whether RRC DELIVERY REPORT procedure is requested for the RRC message.	YES	ignore
Resource Coordination Transfer Information	O		9.3.1.73		YES	ignore
servingCellMO	O		INTEGER (1..64, ...)		YES	ignore
New gNB-CU UE F1AP ID	O		gNB-CU UE F1AP ID 9.3.1.4		YES	reject
RAN UE ID	O		OCTET STRING (SIZE (8))		YES	ignore
Trace Activation	O		9.3.1.88		YES	ignore
Additional RRM Policy Index	O		9.3.1.90		YES	ignore

Range bound	Explanation
maxnoofSCells	Maximum no. of SCells allowed towards one UE, the maximum value is 32.
maxnoofSRBs	Maximum no. of SRB allowed towards one UE, the maximum value is 8.
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.
maxnoofULUPTNLInformation	Maximum no. of ULUP TNL Information allowed towards one DRB, the maximum value is 2.
maxnoofCandidateSpCells	Maximum no. of SpCells allowed towards one UE, the maximum value is 64.
maxnoofQoSFlows	Maximum no. of flows allowed to be mapped to one DRB, the maximum value is 64.

Condition	Explanation
ifDRBSetup	This IE shall be present only if the *DRB to Be Setup List* IE is present.

9.2.2.2 UE CONTEXT SETUP RESPONSE

This message is sent by the gNB-DU to confirm the setup of a UE context.

Direction: gNB-DU → gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
DU To CU RRC Information	M		9.3.1.26		YES	reject
C-RNTI	O		9.3.1.32	C-RNTI allocated at the gNB-DU	YES	ignore
Resource Coordination Transfer Container	O		OCTET STRING	Includes the *SgNB Resource Coordination Information* IE as defined in subclause 9.2.117 of TS 36.423 [9] for EN-DC case or *MR-DC Resource Coordination Information* IE as defined in TS 38.423 [28] for NGEN-DC and NE-DC cases.	YES	ignore
Full Configuration	O		ENUMERATED (full, ...)		YES	reject
DRB Setup List		*0..1*		The List of DRBs which are successfully established.	YES	ignore
>DRB Setup Item list		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	
>>LCID	O		9.3.1.35	LCID for the primary path if PDCP duplication is applied	-	
>>DL UP TNL Information to be setup List		*1*			-	
>>> DL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofDLUPTNLInformation>*			-	
>>>>DL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-DU endpoint of the F1 transport bearer. For delivery of DL PDUs.	-	
SRB Failed to Setup List		*0..1*			YES	ignore
>SRB Failed to Setup Item		*1 .. <maxnoofSRBs>*			EACH	ignore
>>SRB ID	M		9.3.1.7		-	
>>Cause	O		9.3.1.2		-	
DRB Failed to Setup List		*0..1*			YES	ignore
>DRB Failed to Setup Item		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>Cause	O		9.3.1.2		-	
SCell Failed To Setup List		*0..1*			YES	ignore
>SCell Failed to Setup Item		*1 .. <maxnoofSCells>*			EACH	ignore
>>SCell ID	M		NR CGI 9.3.1.12	SCell Identifier in gNB	-	
>>Cause	O		9.3.1.2		-	
Inactivity Monitoring Response	O		ENUMERATED (not-supported, ...)		YES	reject
Criticality Diagnostics	O		9.3.1.3		YES	ignore
SRB Setup List		*0..1*			YES	ignore
>SRB Setup Item		*1 .. <maxnoofSRBs>*			EACH	ignore
>>SRB ID	M		9.3.1.7		-	
>>LCID	M		9.3.1.35	LCID for the primary path if PDCP duplication is applied	-	

Range bound	Explanation
maxnoofSCells	Maximum no. of SCells allowed towards one UE, the maximum value is 32.
maxnoofSRBs	Maximum no. of SRB allowed towards one UE, the maximum value is 8.
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.
maxnoofDLUPTNLInformation	Maximum no. of DL UP TNL Information allowed towards one DRB, the maximum value is 2.

9.2.2.3 UE CONTEXT SETUP FAILURE

This message is sent by the gNB-DU to indicate that the setup of the UE context was unsuccessful.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	O		9.3.1.5		YES	ignore
Cause	M		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore
Potential SpCell List		*0..1*			YES	ignore
>Potential SpCell Item IEs		*0 .. <maxnoofPotentialSpCells>*			EACH	ignore
>>Potential SpCell ID	M		NR CGI 9.3.1.12	Special Cell as defined in TS 38.321 [16]	-	

Range bound	Explanation
maxnoofPotentialSpCells	Maximum no. of SpCells allowed towards one UE, the maximum value is 64.

9.2.2.4 UE CONTEXT RELEASE REQUEST

This message is sent by the gNB-DU to request the gNB-CU to release the UE-associated logical F1.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Cause	M		9.3.1.2		YES	ignore

9.2.2.5 UE CONTEXT RELEASE COMMAND

This message is sent by the gNB-CU to request the gNB-DU to release the UE-associated logical F1 connection.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Cause	M		9.3.1.2		YES	ignore
RRC-Container	O		9.3.1.6	Includes the *DL-DCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8] encapsulated in a PDCP PDU, or the *DL-CCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8].	YES	ignore
SRB ID	C-ifRRCContainer		9.3.1.7	The gNB-DU sends the RRC message on the indicated SRB.	YES	ignore
old gNB-DU UE F1AP ID	O		9.3.1.5	Include it if RRCReestablishmentRequest is not accepted	YES	ignore
Execute Duplication	O		ENUMERATED (true, ...)	This IE may be sent only if duplication has been configured for the UE.	YES	ignore
RRC Delivery Status Request	O		ENUMERATED (true, …)	Indicates whether RRC DELIVERY REPORT procedure is requested for the RRC message.	YES	ignore

Condition	Explanation
ifRRCContainer	This IE shall be present if the *RRC container* IE is present.

9.2.2.6 UE CONTEXT RELEASE COMPLETE

This message is sent by the gNB-DU to confirm the release of the UE-associated logical F1 connection.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.2.7 UE CONTEXT MODIFICATION REQUEST

This message is sent by the gNB-CU to provide UE Context information changes to the gNB-DU.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
SpCell ID	O		NR CGI 9.3.1.12	Special Cell as defined in TS 38.321 [16]. For handover case, this IE is considered as target cell.	YES	ignore
ServCellIndex	O		INTEGER (0..31, ...)		YES	reject
SpCell UL Configured	O		Cell UL Configured 9.3.1.33		YES	ignore
DRX Cycle	O		DRX Cycle 9.3.1.24		YES	ignore
CU to DU RRC Information	O		9.3.1.25		YES	reject
Transmission Action Indicator	O		9.3.1.11		YES	ignore
Resource Coordination Transfer Container	O		OCTET STRING	Includes the *MeNB Resource Coordination Information* IE as defined in subclause 9.2.116 of TS 36.423 [9] for EN-DC case or *MR-DC Resource Coordination Information* IE as defined in TS 38.423 [28] for NGEN-DC and NE-DC cases.	YES	ignore
RRC Reconfiguration Complete Indicator	O		9.3.1.30		YES	ignore
RRC-Container	O		9.3.1.6	Includes the *DL-DCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8], encapsulated in a PDCP PDU.	YES	reject
SCell To Be Setup List		*0..1*			YES	ignore
>SCell to Be Setup Item IEs		*1.. <maxnoofSCells>*			EACH	ignore
>>SCell ID	M		NR CGI 9.3.1.12	SCell Identifier in gNB	-	
>>SCellIndex	M		INTEGER (1..31)		-	
>>SCell UL Configured	O		Cell UL Configured 9.3.1.33		-	
>>servingCellMO	O		INTEGER (1..64)		YES	ignore
SCell To Be Removed List		*0..1*			YES	ignore
>SCell to Be Removed Item IEs		*1 .. <maxnoofSCells>*			EACH	ignore
>>SCell ID	M		NR CGI 9.3.1.12	SCell Identifier in gNB	-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
SRB to Be Setup List		*0..1*			YES	reject
>SRB to Be Setup Item IEs		*1..<maxnoofSRBs>*			EACH	reject
>>SRB ID	M		9.3.1.7		-	
>>Duplication Indication	O		ENUMERATED (true, ..., false)		-	
DRB to Be Setup List		*0..1*			YES	reject
>DRB to Be Setup Item IEs		*1 .. <maxnoofDRBs>*			EACH	reject
>>DRB ID	M		9.3.1.8		-	
>>CHOICE QoS Information	M				-	
>>>E-UTRAN QoS	M		9.3.1.19	Shall be used for EN-DC case to convey E-RAB Level QoS Parameters		
>>>DRB Information		*1*		Shall be used for NG-RAN cases	YES	ignore
>>>>DRB QoS	M		9.3.1.45		-	
>>>>S-NSSAI	M		9.3.1.38		-	
>>>>Notification Control	O		9.3.1.56		-	
>>>>Flows Mapped to DRB Item		*1 .. <maxnoofQoSFlows>*			-	
>>>>>QoS Flow Identifier	M		9.3.1.63		-	
>>>>>QoS Flow Level QoS Parameters	M		9.3.1.45		-	
>>>>>QoS Flow Mapping Indication	O		9.3.1.72		YES	ignore
>>UL UP TNL Information to be setup List		*1*			-	
>>>UL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofULUPTNLInformation>*			-	
>>>>UL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-CU endpoint of the F1 transport bearer. For delivery of UL PDUs.	-	
>> RLC Mode	M		9.3.1.27		-	
>>UL Configuration	O		UL Configuration 9.3.1.31	Information about UL usage in gNB-DU.	-	
>>Duplication Activation	O		9.3.1.36	Information on the initial state of CA based UL PDCP duplication	-	
>> DC Based Duplication Configured	O		ENUMERATED (true, ..., false)	Indication on whether DC based PDCP duplication is configured or not. If included, it should be set to true.	YES	reject
>>DC Based Duplication Activation	O		Duplication Activation	Information on the initial state of DC	YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
			9.3.1.36	based UL PDCP duplication		

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>DL PDCP SN length	O		ENUMERATED (12bits, 18bits, ...)		YES	ignore
>>UL PDCP SN length	O		ENUMERATED (12bits, 18bits, ...)		YES	ignore
DRB to Be Modified List		*0..1*			YES	reject
>DRB to Be Modified Item IEs		*1 .. <maxnoofDRBs>*			EACH	reject
>>DRB ID	M		9.3.1.8		-	
>>CHOICE QoS Information	O				-	
>>>E-UTRAN QoS	M		9.3.1.19	Used for EN-DC case to convey E-RAB Level QoS Parameters	-	
>>>DRB Information		*1*		Used for NG-RAN cases	YES	ignore
>>>>DRB QoS	M		9.3.1.45		-	
>>>>S-NSSAI	M		9.3.1.38		-	
>>>>Notification Control	O		9.3.1.56		-	
>>>>Flows Mapped to DRB Item		*1 .. <maxnoofQoSFlows>*			-	
>>>>>QoS Flow Identifier	M		9.3.1.63		-	
>>>>>QoS Flow Level QoS Parameters	M		9.3.1.45		-	
>>>>>QoS Flow Mapping Indication	O		9.3.1.72		YES	ignore
>> UL UP TNL Information to be setup List		*0..1*			-	
>>> UL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofULUPTNLInformation>*			-	
>>>>UL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-CU endpoint of the F1 transport bearer. For delivery of UL PDUs.	-	
>>UL Configuration	O		UL Configuration 9.3.1.31	Information about UL usage in gNB-DU.	-	
>>DL PDCP SN length	O		ENUMERATED(12bits,18 bits , ...)		YES	ignore
>>UL PDCP SN length	O		ENUMERATED (12bits, 18bits, ...)		YES	ignore
>>Bearer Type Change	O		ENUMERATED (true, …)		YES	ignore
>> RLC Mode	O		9.3.1.27		YES	ignore
>>Duplication Activation	O		9.3.1.36	Information on the initial state of CA based UL PDCP duplication	YES	reject
>> DC Based Duplication Configured	O		ENUMERATED (true, …,	Indication on whether DC based	YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
			false)	PDCP duplication is configured or not.		

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>DC Based Duplication Activation	O		9.3.1.36	Information on the initial state of DC based UL PDCP duplication	YES	reject
SRB To Be Released List		*0..1*			YES	reject
>SRB To Be Released Item IEs		*1.. <maxnoofSRBs>*			EACH	reject
>>SRB ID	M		9.3.1.7			
DRB to Be Released List		*0..1*			YES	reject
>DRB to Be Released Item IEs		*1 .. <maxnoofDRBs>*			EACH	reject
>>DRB ID	M		9.3.1.8		-	
Inactivity Monitoring Request	O		ENUMERATED (true, ...)		YES	reject
RAT-Frequency Priority Information	O		9.3.1.34		YES	reject
DRX configuration indicator	O		ENUMERATED(release,...)		YES	ignore
RLC Failure Indication	O		9.3.1.66		YES	ignore
Uplink TxDirectCurrentList Information	O		9.3.1.67		YES	ignore
GNB-DU Configuration Query	O		ENUMERATED (true, ...)	Used to request the gNB-DU to provide its configuration.	YES	reject
gNB-DU UE Aggregate Maximum Bit Rate Uplink	O		Bit Rate 9.3.1.22	The gNB-DU UE Aggregate Maximum Bit Rate Uplink is to be enforced by the gNB-DU.	YES	ignore
Execute Duplication	O		ENUMERATED (true, ...)	This IE may be sent only if duplication has been configured for the UE.	YES	ignore
RRC Delivery Status Request	O		ENUMERATED (true, …)	Indicates whether RRC DELIVERY REPORT procedure is requested for the RRC message.	YES	ignore
Resource Coordination Transfer Information	O		9.3.1.73		YES	ignore
servingCellMO	O		INTEGER (1..64, ...)		YES	ignore
Need for Gap	O		ENUMERATED (true, …)	Indicate gap for SeNB configured measurement is requested.It only applied to NE DC scenario.	Yes	ignore
Full Configuration	O		ENUMERATED (full, ...)		YES	reject
Additional RRM Policy Index	O		9.3.1.90		YES	ignore
Lower Layer Presence Status Change	O		9.3.1.94		Yes	ignore

Range bound	Explanation
maxnoofSCells	Maximum no. of SCells allowed towards one UE, the maximum value is 32.
maxnoofSRBs	Maximum no. of SRB allowed towards one UE, the maximum value is 8.
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.
maxnoofULUPTNLInformation	Maximum no. of UL UP TNL Information allowed towards one DRB, the maximum value is 2.
maxnoofQoSFlows	Maximum no. of flows allowed to be mapped to one DRB, the maximum value is 64.

9.2.2.8 UE CONTEXT MODIFICATION RESPONSE

This message is sent by the gNB-DU to confirm the modification of a UE context.

Direction: gNB-DU → gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Resource Coordination Transfer Container	O		OCTET STRING	Includes the *SgNB Resource Coordination Information* IE as defined in subclause 9.2.117 of TS 36.423 [9] for EN-DC case or *MR-DC Resource Coordination Information* IE as defined in TS 38.423 [28] for NGEN-DC and NE-DC cases.	YES	ignore
DU To CU RRC Information	O		9.3.1.26		YES	reject
DRB Setup List		*0..1*		The List of DRBs which are successfully established.	YES	ignore
>DRB Setup Item IEs		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	
>>LCID	O		9.3.1.35	LCID for primary path if PDCP duplication is applied	-	
>>DL UP TNL Information to be setup List		*1*			-	
>>>DL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofDLUPTNLInformation>*			-	
>>>>DL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-DU endpoint of the F1 transport bearer. For delivery of DL PDUs.	-	
DRB Modified List		*0..1*		The List of DRBs which are successfully modified.	YES	ignore
>DRB Modified Item IEs		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	
>>LCID	O		9.3.1.35	LCID for primary path if PDCP duplication is applied	-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>DL UP TNL Information to be setup List		*1*			-	
>>>DL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofDLUPTNLInformation>*			-	
>>>>DL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-DU endpoint of the F1 transport bearer. For delivery of DL PDUs.	-	
>>RLC Status	O		9.3.1.69	Indicates the RLC has been re-established at the gNB-DU.	YES	ignore
SRB Failed to be Setup List		*0..1*		The List of SRBs which are failed to be established.	YES	ignore
>SRB Failed to be Setup Item IEs		*1 .. <maxnoofSRBs>*			EACH	ignore
>>SRB ID	M		9.3.1.7		-	
>>Cause	O		9.3.1.2		-	
DRB Failed to be Setup List		*0..1*		The List of DRBs which are failed to be setup.	YES	ignore
>DRB Failed to be Setup Item IEs		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	
>>Cause	O		9.3.1.2		-	
SCell Failed To Setup List		*0..1*			YES	ignore
>SCell Failed to Setup Item		*1 .. <maxnoofSCells>*			EACH	ignore
>>SCell ID	M		NR CGI 9.3.1.12	SCell Identifier in gNB	-	
>>Cause	O		9.3.1.2		-	
DRB Failed to be Modified List		0..1		The List of DRBs which are failed to be modified.	YES	ignore
>DRB Failed to be Modified Item IEs		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	
>>Cause	O		9.3.1.2		-	
Inactivity Monitoring Response	O		ENUMERATED (Not-supported, ...)		YES	reject
Criticality Diagnostics	O		9.3.1.3		YES	ignore
C-RNTI	O		9.3.1.32	C-RNTI allocated at the gNB-DU	YES	ignore
Associated SCell List	O		9.3.1.77		YES	ignore
SRB Setup List		*0..1*			YES	ignore
>SRB Setup Item		*1 .. <maxnoofSRBs>*			EACH	ignore

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>SRB ID	M		9.3.1.7		-	
>>LCID	M		9.3.1.35	LCID for the primary path if PDCP duplication is applied	-	
SRB Modified List		*0..1*			YES	ignore
>SRB Modified Item		*1 .. <maxnoofSRBs>*			EACH	ignore
>>SRB ID	M		9.3.1.7		-	
>>LCID	M		9.3.1.35	LCID for the primary path if PDCP duplication is applied	-	
Full Configuration	O		ENUMERATED (full, ...)		YES	reject

Range bound	Explanation
maxnoofSRBs	Maximum no. of SRB allowed towards one UE, the maximum value is 8.
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.
maxnoofDLUPTNLInformation	Maximum no. of DL UP TNL Information allowed towards one DRB, the maximum value is 2.
maxnoofSCells	Maximum no. of SCells allowed towards one UE, the maximum value is 32.

9.2.2.9 UE CONTEXT MODIFICATION FAILURE

This message is sent by the gNB-DU to indicate a context modification failure.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Cause	M		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.2.10 UE CONTEXT MODIFICATION REQUIRED

This message is sent by the gNB-DU to request the modification of a UE context.

Direction: gNB-DU → gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Resource Coordination Transfer Container	O		OCTET STRING	Includes the *SgNB Resource Coordination Information* IE as defined in subclause 9.2.117 of TS 36.423 [9] for EN-DC case or *MR-DC Resource Coordination Information* IE as defined in TS 38.423 [28] for NGEN-DC and NE-DC cases.	YES	ignore
DU To CU RRC Information	O		9.3.1.26		YES	reject
DRB Required to Be Modified List		*0..1*			YES	reject
>DRB Required to Be Modified Item IEs		*1 .. <maxnoofDRBs>*			EACH	reject
>>DRB ID	M		9.3.1.8		-	
>>DL UP TNL Information to be setup List		*0..1*			-	
>>>DL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofDLUPTNLInformation>*			-	
>>>>DL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-CU endpoint of the F1 transport bearer. For delivery of DL PDUs.	-	
>>RLC Status	O		9.3.1.69	Indicates the RLC has been re-established at the gNB-DU.	YES	ignore
SRB Required to be Released List		*0..1*			YES	reject
>SRB Required to be Released List Item IEs		*1 .. <maxnoofSRBs>*			EACH	reject
>>SRB ID	M		9.3.1.7		-	
DRB Required to be Released List		*0..1*			YES	reject
>DRB Required to be Released List Item IEs		*1 .. <maxnoofDRBs>*			EACH	reject
>>DRB ID	M		9.3.1.8		-	
Cause	M		9.3.1.2		YES	ignore

Range bound	Explanation
maxnoofSRBs	Maximum no. of SRB allowed towards one UE, the maximum value is 8.
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.
maxnoofDLUPTNLInformation	Maximum no. of DL UP TNL Information allowed towards one DRB, the maximum value is 2.

9.2.2.11 UE CONTEXT MODIFICATION CONFIRM

This message is sent by the gNB-CU to inform the gNB-DU the successful modification.

Direction: gNB-CU → gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Resource Coordination Transfer Container	O		OCTET STRING	Includes the *MeNB Resource Coordination Information* IE as defined in subclause 9.2.116 of TS 36.423 [9] for EN-DC case or *MR-DC Resource Coordination Information* IE as defined in TS 38.423 [28] for NGEN-DC and NE-DC cases.	YES	ignore
DRB Modified List		*0..1*		The List of DRBs which are successfully modified.	YES	ignore
>DRB Modified Item IEs		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	
>>UL UP TNL Information to be setup List		*1*			-	
>>>UL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofULUPTNLInformation>*			-	
>>>>UL UP TNL Information	M		UP Transport Layer Information 9.3.2.1	gNB-DU endpoint of the F1 transport bearer. For delivery of UL PDUs.	-	
RRC-Container	O		9.3.1.6	Includes the DL-DCCH-Message IE as defined in subclause 6.2 of TS 38.331 [8], encapsulated in a PDCP PDU.	YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore
Execute Duplication	O		ENUMERATED (true, ...)	This IE may be sent only if duplication has been configured for the UE.	YES	Ignore
Resource Coordination Transfer Information	O		9.3.1.73		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.
maxnoofULUPTNLInformation	Maximum no. of UL UP TNL Information allowed towards one DRB, the maximum value is 2.

9.2.2.11A UE CONTEXT MODIFICATION REFUSE

This message is sent by the gNB-CU to indicate the UE context modification was unsuccessful.

Direction: gNB-CU → gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Cause	M		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.2.12 UE INACTIVITY NOTIFICATION

This message is sent by the gNB-DU to provide information about the UE activity to the gNB-CU.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
DRB Activity List		*1*			YES	reject
>DRB Activity Item		*1 .. <maxnoof DRBs>*			EACH	reject
>>DRB ID	M		9.3.1.8		-	
>>DRB Activity	O		ENUMERATED (Active, Not active)		-	

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.

9.2.2.13 NOTIFY

This message is sent by the gNB-DU to notify the gNB-CU that the QoS for already established DRBs associated with notification control is not fulfilled any longer or it is fulfilled again.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
DRB Notify List		*1*			YES	reject
>DRB Notify Item IEs		*<1 .. maxnoofDRBs>*			EACH	reject
>>DRB ID	M		9.3.1.8		-	
>>Notification Cause	M		ENUMERATED (Fulfilled, Not-Fulfilled, ...)		-	

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.

9.2.3 RRC Message Transfer messages

9.2.3.1 INITIAL UL RRC MESSAGE TRANSFER

This message is sent by the gNB-DU to transfer the initial layer 3 message to the gNB-CU over the F1 interface.

Direction: gNB-DU →gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
NR CGI	M		9.3.1.12	NG-RAN Cell Global Identifier (NR CGI)	YES	reject
C-RNTI	M		9.3.1.32	C-RNTI allocated at the gNB-DU	YES	reject
RRC-Container	M		9.3.1.6	Includes the *UL-CCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8].	YES	reject
DU to CU RRC Container	O		OCTET STRING	*CellGroupConfig* IE as defined in subclause 6.3.2 in TS 38.331 [8]. Required at least to carry SRB1 configuration. The ReconfigurationWithSync field is not included in the *CellGroupConfig* IE.	YES	reject
SUL Access Indication	O		ENUMERATED (true, ...)		YES	ignore
Transaction ID	M		9.3.1.23		YES	Ignore
RAN UE ID	O		OCTET STRING (SIZE (8))		YES	ignore
RRC-Container-RRCSetupComplete	O		9.3.1.6	Includes the *UL-DCCH-Message* IE including the RRCSetupComplete message, as defined in subclause 6.2 of TS 38.331 [8].	YES	ignore

9.2.3.2 DL RRC MESSAGE TRANSFER

This message is sent by the gNB-CU to transfer the layer 3 message to the gNB-DU over the F1 interface.

Direction: gNB-CU →gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
old gNB-DU UE F1AP ID	O		9.3.1.5	Include it if RRCConnectionReestablishment is included in RRC-Container	YES	reject
SRB ID	M		9.3.1.7		YES	reject
Execute Duplication	O		ENUMERATED (true, ...)		YES	ignore
RRC-Container	M		9.3.1.6	Includes the *DL-DCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8] encapsulated in a PDCP PDU, or the *DL-CCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8].	YES	reject
RAT-Frequency Priority Information	O		9.3.1.34		YES	reject
RRC Delivery Status Request	O		ENUMERATED (true, …)	Indicates whether RRC DELIVERY REPORT procedure is requested for the RRC message.	YES	ignore
UE Context not retrievable	O		ENUMERATED (true, ...)		YES	reject
Redirected RRC message	O		RRC Container 9.3.1.6	Includes the *UL-DCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8], encapsulated in a PDCP PDU.	YES	reject
PLMN Assistance Info for Network Sharing	O		PLMN Identity 9.3.1.14		YES	ignore
New gNB-CU UE F1AP ID	O		gNB-CU UE F1AP ID 9.3.1.4		YES	reject
Additional RRM Policy Index	O		9.3.1.90		YES	ignore

9.2.3.3 UL RRC MESSAGE TRANSFER

This message is sent by the gNB-DU to transfer the layer 3 message to the gNB-CU over the F1 interface.

Direction: gNB-DU →gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
SRB ID	M		9.3.1.7		YES	reject
RRC-Container	M		9.3.1.6	Includes the *UL-DCCH-Message* IE as defined in subclause 6.2 of TS 38.331 [8], encapsulated in a PDCP PDU.	YES	reject
Selected PLMN ID	O		PLMN Identity 9.3.1.14		YES	reject
New gNB-DU UE F1AP ID	O		gNB-DU UE F1AP ID 9.3.1.5		YES	reject

9.2.3.4 RRC DELIVERY REPORT

This message is sent by the gNB-DU to inform the gNB-CU about the delivery status of DL RRC messages.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
RRC Delivery Status	M		9.3.1.71		YES	ignore
SRB ID	M		9.3.1.7		YES	ignore

9.2.4 Warning Message Transmission Messages

9.2.4.1 WRITE-REPLACE WARNING REQUEST

This message is sent by the gNB-CU to request the start or overwrite of the broadcast of a warning message.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
PWS System Information	M		9.3.1.58	This IE includes the system information for public warning, as defined in TS 38.331 [8].	YES	reject
Repetition Period	M		9.3.1.59		YES	reject
Number of Broadcasts Requested	M		9.3.1.60		YES	reject
Cell To Be Broadcast List		*0..1*			YES	reject
>Cell to Be Broadcast Item IEs		*1.. <maxCellingNBDU>*			EACH	reject
>>NR CGI	M		9.3.1.12		-	

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.

9.2.4.2 WRITE-REPLACE WARNING RESPONSE

This message is sent by the gNB-DU to acknowledge the gNB-CU on the start or overwrite request of a warning message.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cell Broadcast Completed List		*0..1*			YES	reject
>Cell Broadcast Completed Item IEs		*1.. <maxCellingNBDU>*			EACH	reject
>>NR CGI	M		9.3.1.12		-	
Criticality Diagnostics	O		9.3.1.3		YES	ignore
Dedicated SI Delivery Needed UE List		*0..1*		List of UEs unable to receive system information from broadcast	YES	ignore
>Dedicated SI Delivery Needed UE Item		*1 .. <maxnoofUEIDs>*			EACH	ignore
>>gNB-CU UE F1AP ID	M		9.3.1.4		-	
>>NR CGI	M		9.3.1.12		-	

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.
maxnoofUEIDs	Maximum no. of UEs that can be served by a gNB-DU. Value is 65536.

9.2.4.3 PWS CANCEL REQUEST

This message is forwarded by the gNB-CU to gNB-DU to cancel an already ongoing broadcast of a warning message

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Number of Broadcasts Requested	M		9.3.1.60	This IE is not used in this version of the specification	YES	reject
Cell Broadcast To Be Cancelled List		*0..1*			YES	reject
>Cell Broadcast to Be Cancelled Item IEs		*1.. <maxCellingNBDU>*			EACH	reject
>>NR CGI	M		9.3.1.12		-	
Cancel-all Warning Messages Indicator	O			ENUMERATED (true, ...)	YES	reject
Notification Information	O				YES	reject
>Message Identifier	M		9.3.1.81			
>Serial Number	M		9.3.1.82			

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.

9.2.4.4 PWS CANCEL RESPONSE

This message is sent by the gNB-DU to indicate the list of warning areas where cancellation of the broadcast of the identified message was successful and unsuccessful.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
Cell Broadcast Cancelled List		*0..1*			YES	reject
>Cell Broadcast Cancelled Item IEs		*1.. <maxCellingNBDU>*			EACH	reject
>>NR CGI	M		9.3.1.12		-	
>>Number of Broadcasts	M		INTEGER (0..65535)	This IE is set to '0' if valid results are not known or not available. It is set to 65535 if the counter results have overflowed.	-	
Criticality Diagnostics	O		9.3.1.3		YES	ignore

Range bound	Explanation
maxCellingNBDU	Maximum no. of cells that can be served by a gNB-DU. Value is 512.

9.2.4.5 PWS RESTART INDICATION

This message is sent by the gNB-DU to inform the gNB-CU that PWS information for some or all cells of the gNB-DU are available if needed.

Direction: gNB-DU →gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23		YES	reject
NR CGI List for Restart List		*1*			YES	reject
>NR CGI List for Restart Item IEs		*1..<maxCellingNBDU>*			EACH	reject
>>NR CGI	M		9.3.1.12		-	

Range bound	Explanation
maxCellingNBDU	Maximum no. of cells that can be served by a gNB-DU. Value is 512.

9.2.4.6 PWS FAILURE INDICATION

This message is sent by the gNB-DU to inform the gNB-CU that ongoing PWS operation for one or more cells of the gNB-DU has failed.

Direction: gNB-DU → gNB-CU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23		YES	reject
PWS failed NR CGI List		*0..1*			YES	reject
>PWS failed NR CGI Item IEs		*1..<maxCellingNBDU>*			EACH	reject
>>NR CGI	M		9.3.1.12		-	
>>Number of Broadcasts	M		INTEGER (0..65535)	This IE is set to '0' if valid results are not known or not available. It is set to 65535 if the counter results have overflowed.	-	

Range bound	Explanation
maxCellingNBDU	Maximum no. of cells that can be served by a gNB-DU. Value is 512.

9.2.5 System Information messages

9.2.5.1 SYSTEM INFORMATION DELIVERY COMMAND

This message is sent by the gNB-CU and is used to enable the gNB-DU to broadcast the requested other SI.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23		YES	reject
NR CGI	M		9.3.1.12	NR cell identifier	YES	reject
SIType List	M		9.3.1.62		YES	reject
Confirmed UE ID	M		gNB-DU UE F1AP ID 9.3.1.5		YES	reject

9.2.6 Paging messages

9.2.6.1 PAGING

This message is sent by the gNB-CU and is used to request the gNB-DU to page UEs.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
UE Identity Index value	M		9.3.1.39		YES	reject
CHOICE Paging Identity	M				YES	reject
>RAN UE Paging identity	M		9.3.1.43		-	
>CN UE paging identity	M		9.3.1.44		-	
Paging DRX	O		9.3.1.40	It is defined as the minimum between the RAN UE Paging DRX and CN UE Paging DRX	YES	ignore
Paging Priority	O		9.3.1.41		YES	ignore
Paging Cell List		*1*			YES	ignore
>Paging Cell Item IEs		*1 .. <maxnoof PagingCells>*			EACH	ignore
>>NR CGI	M		9.3.1.12		-	
Paging Origin	O		9.3.1.79		YES	ignore

Range bound	Explanation
maxnoofPagingCells	Maximum no. of paging cells, the maximum value is 512.

9.2.7 Trace Messages

9.2.7.1 TRACE START

This message is sent by the gNB-CU to initiate a trace session for a UE.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Trace Activation	M		9.3.1.88		YES	ignore

9.2.7.2 DEACTIVATE TRACE

This message is sent by the gNB-CU to deactivate a trace session.

Direction: gNB-CU → gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU UE F1AP ID	M		9.3.1.4		YES	reject
gNB-DU UE F1AP ID	M		9.3.1.5		YES	reject
Trace ID	M		OCTET STRING (SIZE(8))	As per Trace ID in *Trace Activation* IE	YES	ignore

9.2.8 Radio Information Transfer messages

9.2.8.1 DU-CU RADIO INFORMATION TRANSFER

This message is sent by a gNB-DU to a gNB-CU, to convey radio-related information.

Direction: gNB-DU → gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23		YES	reject
CHOICE *DU-CU Radio Information Type*	M				YES	ignore
>RIM						
>>DU-CU RIM Information	M		9.3.1.91		-	-

9.2.8.2 CU-DU RADIO INFORMATION TRANSFER

This message is sent by a gNB-CU to a gNB-DU, to convey radio-related information.

Direction: gNB-CU → gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.23		YES	reject
CHOICE *CU-DU Radio Information Type*	M				YES	ignore
>RIM						
>>CU-DU RIM Information	M		9.3.1.92		-	-

9.3 Information Element Definitions

9.3.1 Radio Network Layer Related IEs

9.3.1.1 Message Type

The *Message Type* IE uniquely identifies the message being sent. It is mandatory for all messages.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Message Type				
>Procedure Code	M		INTEGER (0..255)	
>Type of Message	M		CHOICE (Initiating Message, Successful Outcome, Unsuccessful Outcome, ...)	

9.3.1.2 Cause

The purpose of the *Cause* IE is to indicate the reason for a particular event for the F1AP protocol.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
CHOICE *Cause Group*	M			
>Radio Network Layer				
>>Radio Network Layer Cause	M		ENUMERATED (Unspecified, RL failure-RLC, Unknown or already allocated gNB-CU UE F1AP ID, Unknown or already allocated gNB-DU UE F1AP ID, Unknown or inconsistent pair of UE F1AP ID, Interaction with other procedure, Not supported QCI Value, Action Desirable for Radio Reasons, No Radio Resources Available, Procedure cancelled, Normal Release, ..., Cell not available, RL failure-others, UE rejection, Resources not available for the slice, AMF initiated abnormal release, Release due to Pre-Emption, PLMN not served by the gNB-CU, Multiple DRB ID Instances, Unknown DRB ID)	
>Transport Layer				
>>Transport Layer Cause	M		ENUMERATED (Unspecified, Transport Resource Unavailable, ...)	
>Protocol				
>>Protocol Cause	M		ENUMERATED (Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State, Semantic Error, Abstract Syntax Error (Falsely Constructed Message), Unspecified, ...)	
>Misc				
>>Miscellaneous Cause	M		ENUMERATED (Control Processing Overload, Not enough User Plane Processing Resources, Hardware Failure, O&M Intervention, Unspecified, ...)	

The meaning of the different cause values is described in the following table. In general, "not supported" cause values indicate that the related capability is missing. On the other hand, "not available" cause values indicate that the related capability is present, but insufficient resources were available to perform the requested action.

Radio Network Layer cause	Meaning
Unspecified	Sent for radio network layer cause when none of the specified cause values applies.
RL Failure-RLC	The action is due to an RL failure caused by exceeding the maximum number of ARQ retransmissions.
Unknown or already allocated gNB-CU UE F1AP ID	The action failed because the gNB-CU UE F1AP ID is either unknown, or (for a first message received at the gNB-CU) is known and already allocated to an existing context.
Unknown or already allocated gNB-DU UE F1AP ID	The action failed because the gNB-DU UE F1AP ID is either unknown, or (for a first message received at the gNB-DU) is known and already allocated to an existing context.
Unknown or inconsistent pair of UE F1AP ID	The action failed because both UE F1AP IDs are unknown, or are known but do not define a single UE context.
Interaction with other procedure	The action is due to an ongoing interaction with another procedure.
Not supported QCI Value	The action failed because the requested QCI is not supported.
Action Desirable for Radio Reasons	The reason for requesting the action is radio related.
No Radio Resources Available	The cell(s) in the requested node don't have sufficient radio resources available.
Procedure cancelled	The sending node cancelled the procedure due to other urgent actions to be performed.
Normal Release	The action is due to a normal release of the UE (e.g. because of mobility) and does not indicate an error.
Cell Not Available	The action failed due to no cell available in the requested node.
RL Failure-others	The action is due to an RL failure caused by other radio link failures than exceeding the maximum number of ARQ retransmissions.
UE rejection	The action is due to gNB-CU's rejection of a UE access request.
Resources not available for the slice	The requested resources are not available for the slice.
AMF initiated abnormal release	The release is triggered by an error in the AMF or in the NAS layer.
Release due to Pre-Emption	Release is initiated due to pre-emption.
PLMN not served by the gNB-CU	The PLMN indicated by the UE is not served by the gNB-CU.
Multiple DRB ID Instances	The action failed because multiple instances of the same DRB had been provided.
Unknown DRB ID	The action failed because the DRB ID is unknow.

Transport Layer cause	Meaning
Unspecified	Sent when none of the above cause values applies but still the cause is Transport Network Layer related.
Transport Resource Unavailable	The required transport resources are not available.

Protocol cause	Meaning
Transfer Syntax Error	The received message included a transfer syntax error.
Abstract Syntax Error (Reject)	The received message included an abstract syntax error and the concerning criticality indicated "reject".
Abstract Syntax Error (Ignore And Notify)	The received message included an abstract syntax error and the concerning criticality indicated "ignore and notify".
Message Not Compatible With Receiver State	The received message was not compatible with the receiver state.
Semantic Error	The received message included a semantic error.
Abstract Syntax Error (Falsely Constructed Message)	The received message contained IEs or IE groups in wrong order or with too many occurrences.
Unspecified	Sent when none of the above cause values applies but still the cause is Protocol related.

Miscellaneous cause	Meaning
Control Processing Overload	Control processing overload.
Not Enough User Plane Processing Resources Available	No enough resources are available related to user plane processing.
Hardware Failure	Action related to hardware failure.
O&M Intervention	The action is due to O&M intervention.

Miscellaneous cause	Meaning
Unspecified Failure	Sent when none of the above cause values applies and the cause is not related to any of the categories Radio Network Layer, Transport Network Layer or Protocol.

9.3.1.3 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the gNB-DU or the gNB-CU when parts of a received message have not been comprehended or were missing, or if the message contained logical errors. When applicable, it contains information about which IEs were not comprehended or were missing.

For further details on how to use the *Criticality Diagnostics* IE, (see clause 10). The conditions for inclusion of the *Transaction ID* IE are described in clause 10.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Procedure Code	O		INTEGER (0..255)	Procedure Code is to be used if Criticality Diagnostics is part of Error Indication procedure, and not within the response message of the same procedure that caused the error.
Triggering Message	O		ENUMERATED(initiating message, successful outcome, unsuccessful outcome)	The Triggering Message is used only if the Criticality Diagnostics is part of Error Indication procedure.
Procedure Criticality	O		ENUMERATED(reject, ignore, notify)	This Procedure Criticality is used for reporting the Criticality of the Triggering message (Procedure).
Transaction ID	O		9.3.1.23	
Information Element Criticality Diagnostics		*0 .. <maxnoof Errors>*		
>IE Criticality	M		ENUMERATED(reject, ignore, notify)	The IE Criticality is used for reporting the criticality of the triggering IE. The value 'ignore' is not applicable.
>IE ID	M		INTEGER (0..65535)	The IE ID of the not understood or missing IE.
>Type of Error	M		ENUMERATED(not understood, missing, ...)	

Range bound	Explanation
maxnoofErrors	Maximum no. of IE errors allowed to be reported with a single message. The value for maxnoofErrors is 256.

9.3.1.4 gNB-CU UE F1AP ID

The gNB-CU UE F1AP ID uniquely identifies the UE association over the F1 interface within the gNB-CU.

NOTE: If F1-C signalling transport is shared among multiple interface instances, the value of the gNB-CU UE F1AP ID is allocated so that it can be associated with the corresponding F1-C interface instance.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB-CU UE F1AP ID	M		INTEGER (0 .. 2^{32}-1)	

9.3.1.5 gNB-DU UE F1AP ID

The gNB-DU UE F1AP ID uniquely identifies the UE association over the F1 interface within the gNB-DU.

NOTE: If F1-C signalling transport is shared among multiple interface instances, the value of the gNB-CU UE F1AP ID is allocated so that it can be associated with the corresponding F1-C interface instance.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB-DU UE F1AP ID	M		INTEGER (0 .. 2^{32}-1)	

9.3.1.6 RRC-Container

This information element contains a gNB-CU→UE or a UE → gNB-CU message that is transferred without interpretation in the gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RRC-Container	M		OCTET STRING	

9.3.1.7 SRB ID

This IE uniquely identifies a SRB for a UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SRB ID	M		INTEGER (0..3, ...)	Corresponds to the *SRB-Identity* defined in TS 38.331 [8].

9.3.1.8 DRB ID

This IE uniquely identifies a DRB for a UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB ID	M		INTEGER (1.. 32, ...)	Corresponds to the *DRB-Identity* defined in TS 38.331 [8].

9.3.1.9 gNB-DU ID

The gNB-DU ID uniquely identifies the gNB-DU at least within a gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB-DU ID	M		INTEGER (0 .. 2^{36}-1)	The gNB-DU ID is independently configured from cell identifiers, i.e. no connection between gNB-DU ID and cell identifiers.

9.3.1.10 Served Cell Information

This IE contains cell configuration information of a cell in the gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
NR CGI	M		9.3.1.12		-	
NR PCI	M		INTEGER (0..1007)	Physical Cell ID	-	
5GS TAC	O		9.3.1.29	5GS Tracking Area Code	-	
Configured EPS TAC	O		9.3.1.29a		-	
Served PLMNs		*1..<maxnoofBPLMNs>*		Broadcast PLMNs	-	
>PLMN Identity	M		9.3.1.14		-	
>TAI Slice Support List	O		Slice Support List 9.3.1.37	Supported S-NSSAIs per TA.	YES	ignore
CHOICE *NR-Mode-Info*	M				-	
>*FDD*					-	
>>FDD Info		*1*			-	
>>>UL FreqInfo	M		NR Frequency Info 9.3.1.17		-	
>>>DL FreqInfo	M		NR Frequency Info 9.3.1.17		-	
>>>UL Transmission Bandwidth	M		Transmission Bandwidth 9.3.1.15		-	
>>>DL Transmission Bandwidth	M		Transmission Bandwidth 9.3.1.15		-	
>*TDD*					-	
>>TDD Info		*1*			-	
>>> NR FreqInfo	M		NR Frequency Info 9.3.1.17		-	
>>> Transmission Bandwidth	M		Transmission Bandwidth 9.3.1.15		-	
>>>Intended TDD DL-UL Configuration	O		9.3.1.89		-	
Measurement Timing Configuration	M		OCTET STRING	Contains the *MeasurementTimingConfiguration* inter-node message defined in TS 38.331 [8].	-	
RANAC	O		RAN Area Code 9.3.1.57		YES	ignore
Extended Served PLMNs List		*0..1*		This is included if more than 6 Served PLMNs is to be signalled.	YES	ignore
>Extended Served PLMNs Item		*1 ..<maxnoofExtendedBPLMNs>*			-	
>>PLMN Identity	M		9.3.1.14		-	
>>TAI Slice Support List	O		Slice Support List 9.3.1.37	Supported S-NSSAIs per TA.	-	
Cell Direction	O		9.3.1.78		YES	ignore
Cell Type	O		9.3.1.87		YES	ignore
Broadcast PLMN Identity Info List		*0..<maxnoofBPLMNsNR-1>*		This IE corresponds to the *PLMN-IdentityInfoList* IE in *SIB1* as specified in	YES	ignore

				TS 38.331 [8]. The PLMN Identities and associated information contained in this IE is provided in the same order as broadcast in SIB1.		
>PLMN Identity List	M		Available PLMN List 9.3.1.65		-	
>Extended PLMN Identity List	O		Extended Available PLMN List 9.3.1.76		-	
>5GS-TAC	O		OCTET STRING (3)		-	
>NR Cell Identity	M		BIT STRING (36)		-	
>RANAC	O		RAN Area Code 9.3.1.57		-	
Aggressor gNB Set ID	O		9.3.1.93	This IE indicates the associated aggressor gNB Set ID of the cell	YES	ignore
Victim gNB Set ID	O		9.3.1.93	This IE indicates the associated Victim gNB Set ID of the cell	YES	ignore

Range bound	Explanation
maxnoofBPLMNs	Maximum no. of Broadcast PLMN Ids. Value is 6.
maxnoofExtendedBPLMNs	Maximum no. of Extended Broadcast PLMN Ids. Value is 6.
maxnoofBPLMNsNR-1	Maximum no. of PLMN Ids.broadcast in an NR cell minus 1. Value is 11.

9.3.1.11 Transmission Action Indicator

This IE indicates actions for the gNB-DU for the data transmission to the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transmission Action Indicator	M		ENUMERATED (stop, ..., restart)	

9.3.1.12 NR CGI

The NR Cell Global Identifier (NR CGI) is used to globally identify a cell.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PLMN Identity	M		9.3.1.14	
NR Cell Identity	M		BIT STRING (SIZE(36))	

9.3.1.13 Time To wait

This IE defines the minimum allowed waiting times.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Time to wait	M		ENUMERATED(1s, 2s, 5s, 10s, 20s, 60s)	

9.3.1.14 PLMN Identity

This information element indicates the PLMN Identity.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PLMN Identity	M		OCTET STRING (SIZE(3))	- digits 0 to 9, encoded 0000 to 1001, - 1111 used as filler digit, two digits per octet, - bits 4 to 1 of octet n encoding digit 2n-1 - bits 8 to 5 of octet n encoding digit 2n -The PLMN identity consists of 3 digits from MCC followed by either -a filler digit plus 2 digits from MNC (in case of 2 digit MNC) or -3 digits from MNC (in case of a 3 digit MNC).

9.3.1.15 Transmission Bandwidth

The *Transmission Bandwidth* IE is used to indicate the UL or DL transmission bandwidth.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
NR SCS	M		ENUMERATED (scs15, scs30, scs60, scs120, ...)	The values scs15, scs30, scs60 and scs120 corresponds to the sub carrier spacing in TS 38.104 [17].
NRB	M		ENUMERATED (nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121, nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...)	This IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "N_{RB}" (TS 38.104 [17]). The values nrb11, nrb18, etc. correspond to the number of resource blocks "N_{RB}" 11, 18, etc.

9.3.1.16 Void

Reserved for future use.

9.3.1.17 NR Frequency Info

The NR Frequency Info defines the carrier frequency used in a cell for a given direction (UL or DL) in FDD or for both UL and DL directions in TDD or for an SUL carrier.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
NR ARFCN	M		INTEGER (0.. maxNRARFCN)	RF Reference Frequency as defined in TS 38.104 [17] section 5.4.2.1. The frequency provided in this IE identifies the absolute frequency position of the reference resource block (Common RB 0) of the carrier. Its lowest subcarrier is also known as Point A.
SUL Information	O		9.3.1.28	
Frequency Band List		*1*		
>Frequency Band Item		*1..<maxnoofNrCellBands>*		
>>NR Frequency Band	M		INTEGER (1.. 1024, ...)	Operating Band as defined in TS 38.104 [17] section 5.4.2.3. The value 1 corresponds to NR operating band n1, value 2 corresponds to NR operating band n2, etc.
>>Supported SUL band List		*0..<maxnoofNrCellBands>*		
>>>Supported SUL band Item	M		INTEGER (1.. 1024, ...)	Supplementary NR Operating Band as defined in TS 38.104 [17] section 5.4.2.3 that can be used for SUL duplex mode as per TS 38.101-1 [26] table 5.2.-1. The value 80 corresponds to NR operating band n80, value 81 corresponds to NR operating band n81, etc.

Range bound	Explanation
maxNRARFCN	Maximum value of NR ARFCNs. Value is 3279165.
maxnoofNrCellBands	Maximum no. of frequency bands supported for a NR cell. Value is 32.

9.3.1.18 gNB-DU System Information

This IE contains the system information generated by the gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
MIB message	M		OCTET STRING	MIB message, as defined in TS 38.331 [8].
SIB1 message	M		OCTET STRING	SIB1 message, as defined in TS 38.331 [8].

9.3.1.19 E-UTRAN QoS

This IE defines the QoS to be applied to a DRB for EN-DC case.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QCI	M		INTEGER (0..255)	QoS Class Identifier defined in TS 23.401 [10]. Logical range and coding specified in TS 23.203 [11].
Allocation and Retention Priority	M		9.3.1.20	
GBR QoS Information	O		9.3.1.21	This IE shall be present for GBR bearers only and is ignored otherwise.

9.3.1.20 Allocation and Retention Priority

This IE specifies the relative importance compared to other E-RABs for allocation and retention of the E-UTRAN Radio Access Bearer.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Priority Level	M		INTEGER (0..15)	**Desc.:** This IE should be understood as "priority of allocation and retention" (see TS 23.401 [10]). **Usage:** Value 15 means "no priority". Values between 1 and 14 are ordered in decreasing order of priority, i.e. 1 is the highest and 14 the lowest. Value 0 shall be treated as a logical error if received.
Pre-emption Capability	M		ENUMERATED(shall not trigger pre-emption, may trigger pre-emption)	**Desc.:** This IE indicates the pre-emption capability of the request on other E-RABs (see TS 23.401 [10]). **Usage:** The E-RAB shall not pre-empt other E-RABs or, the E-RAB may pre-empt other E-RABs The Pre-emption Capability indicator applies to the allocation of resources for an E-RAB and as such it provides the trigger to the pre-emption procedures/processes of the eNB.
Pre-emption Vulnerability	M		ENUMERATED(not pre-emptable, pre-emptable)	**Desc.:** This IE indicates the vulnerability of the E-RAB to pre-emption of other E-RABs (see TS 23.401 [10]). **Usage**: The E-RAB shall not be pre-empted by other E-RABs or the E-RAB may be pre-empted by other RABs. Pre-emption Vulnerability indicator applies for the entire duration of the E-RAB, unless modified, and as such indicates whether the E-RAB is a target of the pre-emption procedures/processes of the eNB.

9.3.1.21 GBR QoS Information

This IE indicates the maximum and guaranteed bit rates of a GBR E-RAB for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
E-RAB Maximum Bit Rate Downlink	M		Bit Rate 9.3.1.22	Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [10].
E-RAB Maximum Bit Rate Uplink	M		Bit Rate 9.3.1.22	Maximum Bit Rate in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [10].
E-RAB Guaranteed Bit Rate Downlink	M		Bit Rate 9.3.1.22	Guaranteed Bit Rate (provided that there is data to deliver) in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [10].
E-RAB Guaranteed Bit Rate Uplink	M		Bit Rate 9.3.1.22	Guaranteed Bit Rate (provided that there is data to deliver) in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [10].

9.3.1.22 Bit Rate

This IE indicates the number of bits delivered by NG-RAN in UL or to NG-RAN in DL within a period of time, divided by the duration of the period. It is used, for example, to indicate the maximum or guaranteed bit rate for a GBR QoS flow, or an aggregated maximum bit rate.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Bit Rate	M		INTEGER (0.. 4,000,000,000,000,...)	The unit is: bit/s

9.3.1.23 Transaction ID

The *Transaction ID* IE uniquely identifies a procedure among all ongoing parallel procedures of the same type initiated by the same protocol peer. Messages belonging to the same procedure use the same Transaction ID. The Transaction ID is determined by the initiating peer of a procedure.

NOTE: If F1-C signalling transport is shared among multiple interface instances, the Transaction ID is allocated so that it can be associated with an F1-C interface instance. The Transaction ID may identify more than one interface instance.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transaction ID	M		INTEGER (0..255, ...)	

9.3.1.24 DRX Cycle

The *DRX Cycle* IE is to indicate the desired DRX cycle.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Long DRX Cycle Length	M		ENUMERATED (ms10, ms20, ms32, ms40, ms60, ms64, ms70, ms80, ms128, ms160, ms256, ms320, ms512, ms640, ms1024, ms1280, ms2048, ms2560, ms5120, ms10240, ...)	This IE is defined in TS 38.331 [8]
Short DRX Cycle Length	O		ENUMERATED (ms2, ms3, ms4, ms5, ms6, ms7, ms8, ms10, ms14, ms16, ms20, ms30, ms32, ms35, ms40, ms64, ms80, ms128, ms160, ms256, ms320, ms512, ms640, ...)	This IE is defined in TS 38.331 [8]
Short DRX Cycle Timer	O		INTEGER (1..16)	This IE is defined in TS 38.331 [8]

9.3.1.25 CU to DU RRC Information

This IE contains the RRC Information that are sent from gNB-CU to gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
CG-ConfigInfo	O		OCTET STRING	CG-ConfigInfo, as defined in TS 38.331 [8].	-	
UE-CapabilityRAT-ContainerList	O		OCTET STRING	This IE is used in the NG-RAN and it consists of the UE-CapabilityRAT-ContainerList, as defined in TS 38.331 [8].	-	
MeasConfig	O		OCTET STRING	MeasConfig, as defined in TS 38.331 [8] (without MeasGapConfig). For EN-DC/NGEN-DC operation, includes the list of FR2 frequencies for which the gNB-CU requests the gNB-DU to generate gaps. For NG-RAN,NE-DC and MN for NR-NR DC, includes the list of FR1 and/or FR2 frequencies for which the gNB-CU requests the gNB-DU to generate gaps and the gap type (per-UE or per-FR).	-	
Handover Preparation Information	O		OCTET STRING	HandoverPreparationInformation, as defined in TS 38.331 [8].	YES	ignore
CellGroupConfig	O		OCTET STRING	CellGroupConfig, as defined in TS 38.331 [8].	YES	ignore
Measurement Timing Configuration	O		OCTET STRING	Contains the *MeasurementTimingConfiguration* inter-node message defined in TS 38.331 [8]. In EN-DC/NGEN-DC, it is included when the gaps for FR2 are requested to be configured by the MeNB. For MN in NR-NR DC,it is included when the gaps for FR2 and/or FR1 are requested by the SgNB	YES	ignore
UEAssistanceInformation	O		OCTET STRING	UEAssistanceInformation, as defined in TS 38.331 [8].	YES	ignore
CG-Config	O		OCTET STRING	CG-Config, as defined in TS 38.331 [8].	YES	ignore

9.3.1.26 DU to CU RRC Information

This IE contains the RRC Information that are sent from the gNB-DU to the gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
CellGroupConfig	M		OCTET STRING	CellGroupConfig, as defined in TS 38.331 [8].		
MeasGapConfig	O		OCTET STRING	MeasGapConfig as defined in TS 38.331 [8]. For EN-DC/NGEN-DC operation, includes the gap for FR2, as requested by the gNB-CU via MeasConfig IE. For NG-RAN,NE-DC and MN for NR-NR DC, includes the gap(s) for FR1 and/or FR2, as requested by the gNB-CU via MeasConfig IE and according to the requested gap type (per-UE or per-FR).		
Requested P-MaxFR1	O		OCTET STRING	requestedP-MaxFR1, as defined in TS 38.331 [8]. For EN-DC operation, this IE should be included.		
DRX Long Cycle Start Offset	O		INTEGER (0..10239)	Identical to the value of the drx-LongCycleStartOffset IE within the DRX-Config as defined in TS 38.331. This field is not used in NR-DC.		
Selected BandCombinationIndex	O		OCTET STRING	BandCombinationIndex, as defined in TS 38.331 [8]. For (NG)EN-DC and NR DC operation, this IE should be included so that gNB-CU is informed of the selected Band Combination.	YES	ignore
Selected FeatureSetEntryIndex	O		OCTET STRING	FeatureSetEntryIndex, as defined in TS 38.331 [8]. For (NG)EN-DC and NR DC operation, this IE should be included so that gNB-CU is informed of the selected FeatureSet.	YES	ignore
Ph-InfoSCG	O		OCTET STRING	PH-TypeListSCG, as defined in TS 38.331[8].For MR-DC, this IE should be included so that gNB-CU is informed of the Power Headroom type for each serving cell in SN.	Yes	ignore
Requested BandCombinationIndex	O		OCTET STRING	BandCombinationIndex, as defined in TS 38.331 [8]. This IE is used for the gNB-DU to request a new Band Combination.	YES	ignore
Requested FeatureSetEntryIndex	O		OCTET STRING	FeatureSetEntryIndex, as defined in TS 38.331 [8]. This IE is used for the gNB-DU to request a new Feature Set.	YES	ignore
DRX Config	O		OCTET STRING	DRX-Config, as defined in TS 38.331 [8]. This field is only used in NR-DC.	YES	ignore
PDCCH BlindDetectionSCG	O		OCTET STRING	pdcch-BlindDetectionSCG, as defined in TS 38.331[8]. This IE is used between the MgNB-DU and the MgNB-CU.	YES	ignore
Requested PDCCH BlindDetectionSCG	O		OCTET STRING	requestedPDCCH-BlindDetectionSCG, as defined in TS 38.331[8]. This	YES	ignore

				IE is used between the SgNB-DU and the SgNB-CU.		
Ph-InfoMCG	O		OCTET STRING	PH-TypeListMCG, as defined in TS 38.331[8]. For MR-DC, this IE should be included so that gNB-CU is informed of the Power Headroom type for each serving cell in MCG.	YES	ignore
MeasGapSharingConfig	O		OCTET STRING	MeasGapSharingConfig as defined in TS 38.331 [8].	YES	ignore

9.3.1.27 RLC Mode

The *RLC Mode* IE indicates the RLC Mode used for a DRB.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
RLC Mode			ENUMERATED (RLC-AM, RLC-UM-Bidirectional, RLC-UM-Unidirectional-UL, RLC-UM-Unidirectional-DL, ...)	

9.3.1.28 SUL Information

This IE provides information about the SUL carrier.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SUL ARFCN	M		INTEGER (0.. maxNRARFCN)	RF Reference Frequency as defined in TS 38.104 [17] section 5.4.2.1. The frequency provided in this IE identifies the absolute frequency position of the reference resource block (Common RB 0) of the SUL carrier. Its lowest subcarrier is also known as Point A.
SUL Transmission Bandwidth	M		Transmission Bandwidth 9.3.1.15	

Range bound	Explanation
maxNRARFCN	Maximum value of NR ARFCNs. Value is 3279165.

9.3.1.29 5GS TAC

This information element is used to identify Tracking Area Code.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
5GS TAC	M		OCTET STRING (SIZE (3))	

9.3.1.29a Configured EPS TAC

This information element is used to identify a configured EPS Tracking Area Code in order to enable application of Roaming and Access Restrictions for EN-DC as specified in TS 37.340 [7]. This IE is configured for the cell, but not broadcast.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Configured EPS TAC	M		OCTET STRING (SIZE (2))	

9.3.1.30 RRC Reconfiguration Complete Indicator

This IE indicates the result of the reconfiguration performed towards the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RRC Reconfiguration Complete Indicator	M		ENUMERATED (true, ... , failure)	

9.3.1.31 UL Configuration

This IE indicates how the UL scheduling is configured at gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UL UE Configuration	M		ENUMERATED (no-data, shared, only, ...)	Indicates how the UE uses the UL at gNB-DU, for which “no-data” indicates that the UL scheduling is not performed at gNB-DU, “shared” indicates that the UL scheduling is performed at both gNB-DU and another node, and “only” indicates that the UL scheduling is only performed at the gNB-DU.

9.3.1.32 C-RNTI

This IE contains the C-RNTI information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
C-RNTI	M		INTEGER (0..65535, ...)	C-RNTI as defined in TS 38.331 [8].

9.3.1.33 Cell UL Configured

This IE indicates whether the gNB-CU requests the gNB-DU to configure the uplink as no UL, UL, SUL or UL+SUL for the indicated cell for the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Cell UL Configured	M		ENUMERATED (none, UL, SUL, UL and SUL, ...)	Further details are defined in TS 38.331 [8]

9.3.1.34 RAT-Frequency Priority Information

The RAT-Frequency Priority Information contains either the *Subscriber Profile ID for RAT/Frequency priority* IE or the *Index to RAT/Frequency Selection Priority* IE. These parameters are used to define local configuration for RRM strategies.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE RAT-Frequency Priority Information	M			
>EN-DC				
>>Subscriber Profile ID for RAT/Frequency priority	M		INTEGER (1..256, ...)	
>NG-RAN				
>> *Index to RAT/Frequency Selection Priority*	M		INTEGER (1..256, ...)	

9.3.1.35 LCID

This IE uniquely identifies a LCID for the associated SRB or DRB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
LCID	M		INTEGER (1..32, ...)	Corresponds to the *LogicalChannelIdentity* defined in TS 38.331 [8].

9.3.1.36 Duplication activation

The *Duplication Activation* IE indicates whether UL PDCP Duplication is activated or not.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Duplication Activation	M		ENUMERATED (Active, Inactive, ...)	

9.3.1.37 Slice Support List

This IE indicates the list of supported slices.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Slice Support Item IEs		*1..<maxnoofSliceItems>*		
>S-NSSAI	M		9.3.1.38	

Range bound	Explanation
maxnoofSliceItems	Maximum no. of signalled slice support items. Value is 1024.

9.3.1.38 S-NSSAI

This IE indicates the S-NSSAI as defined in TS 23.003 [23].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SST	M		OCTET STRING (SIZE(1))	
SD	O		OCTET STRING (SIZE(3))	

9.3.1.39 UE Identity Index value

This IE is used by the gNB-DU to calculate the Paging Frame.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *UE Identity Index Value*	M			
>Length-10				
>>Index Length 10	M		BIT STRING (SIZE(10))	Coded as specified in TS 38.304 [24].

9.3.1.40 Paging DRX

This IE indicates the Paging DRX as defined in TS 38.304 [24].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Paging DRX	M		ENUMERATED(32, 64, 128, 256, ...)	Unit in radio frame.

9.3.1.41 Paging Priority

This IE indicates the paging priority for paging a UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Paging Priority	M		ENUMERATED (PrioLevel1, PrioLevel2, PrioLevel3, PrioLevel4, PrioLevel5, PrioLevel6, PrioLevel7, PrioLevel8, ...)	Lower value codepoint indicates higher priority.

9.3.1.42 gNB-CU System Information

This IE contains the system information encoded by the gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
SIB type to Be Updated List		*1*				
>SIB type to Be Updated Item IEs		*1... <maxnoof SIBTypes>*				
>>SIB type	M		INTEGER (2..32, ...)	Indicates a certain SIB block, e.g. 2 means sibType2, 3 for sibType3, etc. Values 6, 7, 8 and values 10 and higher are not applicable in this version of the specifications.		
>>SIB message	M		OCTET STRING	SIB message containing SIB as defined in TS 38.331 [8].		
>>Value Tag	M		INTEGER (0..31, ...)			
>>areaScope	O		ENUMERATED (true, …)	Indicates that a SIB is area specific. If the field is not present, the SIB is cell specific.	YES	ignore
SystemInformationAreaID	O		BIT STRING (SIZE (24))	Indicates the system information area that the cell belongs to, if any.	YES	ignore

Range bound	Explanation
maxnoofSIBTypes	Maximum no. of SIB types, the maximum value is 32.

9.3.1.43 RAN UE Paging identity

This IE indicates the RAN UE Paging identity.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
I-RNTI	M		BIT STRING (SIZE(40))	

9.3.1.44 CN UE Paging Identity

The 5G-S-TMSI is used as UE identifier for CN paging.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *CN UE paging identity*	M			
>5G-S-TMSI				
>>5G-S-TMSI	M		BIT STRING (SIZE(48))	Details defined in TS 38.413 [3]

9.3.1.45 QoS Flow Level QoS Parameters

This IE defines the QoS to be applied to a QoS flow or to a DRB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
CHOICE *QoS Characteristics*	M				-	
>Non-dynamic 5QI					-	
>>Non Dynamic 5QI Descriptor	M		9.3.1.49		-	
>Dynamic 5QI					-	
>>Dynamic 5QI Descriptor	M		9.3.1.47		-	
NG-RAN Allocation and Retention Priority	M		9.3.1.48		-	
GBR QoS Flow Information	O		9.3.1.46	This IE shall be present for GBR QoS Flows only and is ignored otherwise.	-	
Reflective QoS Attribute	O		ENUMERATED (subject to, ...)	Details in TS 23.501 [21]. This IE applies to non-GBR flows only and is ignored otherwise.	-	
PDU Session ID	O		INTEGER (0 ..255)	As specified in TS 23.501 [21].	YES	ignore
UL PDU Session Aggregate Maximum Bit Rate	O		Bit Rate 9.3.1.22	The PDU session Aggregate Maximum Bit Rate Uplink which is associated with the involved PDU session.	YES	ignore

9.3.1.46 GBR QoS Flow Information

This IE indicates QoS parameters for a GBR QoS flow or GBR bearer for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Maximum Flow Bit Rate Downlink	M		Bit Rate 9.3.1.22	Maximum Bit Rate in DL. Details in TS 23.501 [21].
Maximum Flow Bit Rate Uplink	M		Bit Rate 9.3.1.22	Maximum Bit Rate in UL. Details in TS 23.501 [21].
Guaranteed Flow Bit Rate Downlink	M		Bit Rate 9.3.1.22	Guaranteed Bit Rate (provided there is data to deliver) in DL. Details in TS 23.501 [21].
Guaranteed Flow Bit Rate Uplink	M		Bit Rate 9.3.1.22	Guaranteed Bit Rate (provided there is data to deliver). Details in TS 23.501 [21].
Maximum Packet Loss Rate Downlink	O		Maximum Packet Loss Rate 9.3.1.50	Indicates the maximum rate for lost packets that can be tolerated in the downlink direction. Details in TS 23.501 [21].
Maximum Packet Loss Rate Uplink	O		Maximum Packet Loss Rate 9.3.1.50	Indicates the maximum rate for lost packets that can be tolerated in the uplink direction. Details in TS 23.501 [21].

9.3.1.47 Dynamic 5QI Descriptor

This IE indicates the QoS Characteristics for a Non-standardised or not pre-configured 5QI for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QoS Priority Level	M		INTEGER (1..127)	For details see TS 23.501 [21].
Packet Delay Budget	M		9.3.1.51	For details see TS 23.501 [21].
Packet Error Rate	M		9.3.1.52	For details see TS 23.501 [21].
5QI	O		INTEGER (0..255,...)	This IE contains the dynamically assigned 5QI as specified in TS 23.501 [21].
Delay Critical	C-ifGBRflow		ENUMERATED (delay critical, non-delay critical)	For details see TS 23.501 [21].
Averaging Window	C-ifGBRflow		9.3.1.53	For details see TS 23.501 [21].
Maximum Data Burst Volume	O		9.3.1.54	For details see TS 23.501 [21]. This IE shall be included if the *Delay Critical* IE is set to “delay critical” and is ignored otherwise.

Condition	Explanation
ifGBRflow	This IE shall be present if the *GBR QoS Flow Information* IE is present in the *QoS Flow Level QoS Parameters* IE.

9.3.1.48 NG-RAN Allocation and Retention Priority

This IE specifies the relative importance of a QoS flow or a DRB compared to other QoS flows or DRBs for allocation and retention of NG-RAN resources.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Priority Level	M		INTEGER (0..15)	**Desc**.: This IE defines the relative importance of a resource request (see TS 23.501 [21]). **Usage**: Values are ordered in decreasing order of priority, i.e., with 1 as the highest priority and 15 as the lowest priority. Further usage is defined in TS 23.501 [21].
Pre-emption Capability	M		ENUMERATED (shall not trigger pre-emption, may trigger pre-emption)	**Desc.:** This IE indicates the pre-emption capability of the request on other QoS flows (see TS 23.501 [21]). **Usage**: The QoS flow shall not pre-empt other QoS flows or, the QoS flow may pre-empt other QoS flows. Note: The Pre-emption Capability indicator applies to the allocation of resources for a QoS flow and as such it provides the trigger to the pre-emption procedures/processes of the NG-RAN node.
Pre-emption Vulnerability	M		ENUMERATED (not pre-emptable, pre-emptable)	**Desc.**: This IE indicates the vulnerability of the QoS flow to pre-emption of other QoS flows (see TS 23.501 [21]). **Usage**: The QoS flow shall not be pre-empted by other QoS flows or the QoS flow may be pre-empted by other QoS flows. Note: The Pre-emption Vulnerability indicator applies for the entire duration of the QoS flow, unless modified and as such indicates whether the QoS flow is a target of the pre-emption procedures/processes of the NG-RAN node.

9.3.1.49 Non Dynamic 5QI Descriptor

This IE indicates the QoS Characteristics for a standardized or pre-configured 5QI for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
5QI	M		INTEGER (0..255,...)	This IE contains the standardized or pre-configured 5QI as specified in TS 23.501 [21]
Priority Level	O		INTEGER (1..127)	For details see TS 23.501 [21]. When included overrides standardized or pre-configured value.
Averaging Window	O		9.3.1.53	For details see TS 23.501 [21]. When included overrides standardized or pre-configured value.
Maximum Data Burst Volume	O		9.3.1.54	For details see TS 23.501 [21]. When included overrides standardized or pre-configured value.

9.3.1.50 Maximum Packet Loss Rate

This IE indicates the Maximum Packet Loss Rate.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Maximum Packet Loss Rate	M		INTEGER(0..1000)	Ratio of lost packets per number of packets sent, expressed in tenth of percent.

9.3.1.51 Packet Delay Budget

This IE indicates the Packet Delay Budget for a QoS flow.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Packet Delay Budget	M		INTEGER (0..1023, ...)	Upper bound value for the delay that a packet may experience expressed in unit of 0.5ms.

9.3.1.52 Packet Error Rate

This IE indicates the Packet Error Rate for a QoS flow.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Scalar	M		INTEGER (0..9, …)	The packet error rate is expressed as Scalar x 10-k where k is the Exponent.
Exponent	M		INTEGER (0..9, …)	

9.3.1.53 Averaging Window

This IE indicates the Averaging Window for a QoS flow, and applies to GBR QoS Flows only.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Averaging Window	M		INTEGER (0..4095, ...)	Unit: ms. The default value is 2000ms.

9.3.1.54 Maximum Data Burst Volume

This IE indicates the Maximum Data Burst Volume for a QoS flow, and applies to delay critical GBR QoS flows only.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Maximum Data Burst Volume	M		INTEGER (0..4095, ..., 4096..2000000)	Unit: byte.

9.3.1.55 Masked IMEISV

This information element contains the IMEISV value with a mask, to identify a terminal model without identifying an individual Mobile Equipment.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Masked IMEISV	M		BIT STRING (SIZE (64))	Coded as the International Mobile station Equipment Identity and Software Version Number (IMEISV) defined in TS 23.003 [23] with the last 4 digits of the SNR masked by setting the corresponding bits to 1. The first to fourth bits correspond to the first digit of the IMEISV, the fifth to eighth bits correspond to the second digit of the IMEISV, and so on.

9.3.1.56 Notification Control

The *Notification Control* IE indicates whether the notification control for a given DRB is active or not-active.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Notification Control	M		ENUMERATED(Active, Not-Active, ...)	

9.3.1.57 RAN Area Code

This information element is used to uniquely identify a RAN Area Code.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RANAC	M		INTEGER (0..255)	RAN Area Code

9.3.1.58 PWS System Information

This IE contains the system information used for public warning.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
SIB type	M		INTEGER (6..8, …)	Indicates a certain SIB block for public warning message, e.g. 6 means sibType6, 7 for sibType7, etc.	-	
SIB message	M		OCTET STRING	SIB message for public warning, as defined in TS 38.331 [8].	-	
Notification Information	O				YES	ignore
>Message Identifier	M		9.3.1.81		-	
>Serial Number	M		9.3.1.82		-	
Additional SIB Message List	O		9.3.1.86	Additional SIB messages containing different segments of a public warning message if segmentation is applied, as defined in TS38.331 [8].	Yes	reject

9.3.1.59 Repetition Period

This IE indicates the periodicity of the warning message to be broadcast.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Repetition Period	M		INTEGER (0..2^{17}-1)	The unit of value 1 to 2^{17}-1 is [second].

9.3.1.60 Number of Broadcasts Requested

This IE indicates the number of times a message is to be broadcast.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Number of Broadcasts Requested	M		INTEGER (0..65535)	

9.3.1.61 Void

9.3.1.62 SIType List

This IE is used by gNB-CU to provide SI list of other SI for gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SI type item IEs		*1.. <maxnoofSI Types>*		
>SI Type	M		INTEGER (1..32, ...)	Indicates a certain SI type required to be broadcasted by the gNB-DU.

Range bound	Explanation
maxnoofSITypes	Maximum no. of SI types, the maximum value is 32.

9.3.1.63 QoS Flow Identifier

This IE identifies a QoS Flow within a PDU Session. The definition and use of the QoS Flow Identifieris specified in TS 23.501 [21].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QoS Flow Identifier	M		INTEGER (0 ..63)	

9.3.1.64 Served E-UTRA Cell Information

This IE contains served cell information of an E-UTRA cell for spectrum sharing between E-UTRA and NR.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *EUTRA-Mode-Info*	M			
>FDD				
>>FDD Info		*1*		
>>>UL Offset to Point A	M		INTEGER (0..2199,...)	Indicates the offset to the center of the NR carrier for UL.
>>>DL Offset to Point A	M		INTEGER (0..2199,...)	Indicates the offset to the center of the NR carrier for DL.
>TDD				
>>TDD Info		*1*		
>>>Offset to Point A	M		INTEGER (0..2199,...)	Indicates the offset to the center of the NR carrier.
Protected E-UTRA Resource Indication	O		OCTET STRING	Indicates the Protected E-UTRA Resource Indication as defined in subclause 9.2.125 of TS 36.423 [9].

9.3.1.65 Available PLMN List

This IE indicates the list of available PLMN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Available PLMN Item IEs		*1..<* maxnoofBPLMNs >		
>PLMN Identity	M		9.3.1.14	

Range bound	Explanation
maxnoofBPLMNs	Maximum no. of Broadcast PLMN Ids. Value is 6.

9.3.1.66 RLC Failure Indication

This IE indicates the LCID associated with the RLC entity needing re-establishment.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Associated LCID	M		LCID 9.3.1.35	

9.3.1.67 Uplink TxDirectCurrentList Information

This IE contains the Uplink TxDirectCurrentList information that is configured by the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Uplink TxDirectCurrentList Information	M		OCTET STRING	*UplinkTxDirectCurrentList* as defined in TS 38.331 [8].

9.3.1.68 Service Status

This IE is used to indicate the service status of a cell by the gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Service State	M		ENUMERATED (In-Service, Out-Of-Service, ...)	Indicates the Service State of the cell. In-Service and Out-of-Service Service States are defined in TS 38.401 [4].
Switching Off Ongoing	O		ENUMERATED (True, ...)	This IE indicates that the gNB-DU will delete the cell after some time using a new gNB-DU Configuration Update procedure.

9.3.1.69 RLC Status

This IE indicates about the RLC configuration change included in the container towards the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Reestablishment Indication	O		ENUMERATED (reestablished, ...)	Indicates that following a change in the radio status, the RLC has been re-established.

9.3.1.70 RRC Version

This information element is used to identify RRC version corresponding to TS 38.331 [8].

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Latest RRC Version	M		BIT STRING (SIZE (3))	This IE is not used in this release.	-	
Latest RRC Version Enhanced	O		OCTET STRING (SIZE (3))	Latest supported RRC version in the release corresponding to TS 38.331 [8]. For a 3GPP specification version x.y.z, x is encoded by the leftmost byte, y by the middle byte, and z by the rightmost byte.	YES	ignore

9.3.1.71 RRC Delivery Status

This IE provides information about the delivery status of RRC messages to the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Delivery Status	M		INTEGER (0..2^{12}-1)	Highest NR PDCP SN successfully delivered in sequence to the UE.
Triggering Message	M		INTEGER (0..2^{12}-1)	NR PDCP SN for the RRC message that triggered the report.

9.3.1.72 QoS Flow Mapping Indication

This IE is used to indicate only the uplink or downlink QoS flow is mapped to the DRB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QoS Flow Mapping Indication	O		ENUMERATED(ul, dl,…)	Indicates that only the uplink or downlink QoS flow is mapped to the DRB

9.3.1.73 Resource Coordination Transfer Information

This IE contains information for UE-associated E-UTRA – NR resource coordination.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
MeNB Cell ID	M		BIT STRING (SIZE(28))	E-UTRAN Cell Global Identifier defined in TS 36.423 [9] clause 9.2.14
Resource Coordination E-UTRA Cell Information	O		9.3.1.75	

9.3.1.74 E-UTRA PRACH Configuration

This IE indicates the PRACH resources used in E-UTRA cell.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RootSequenceIndex	M		INTEGER (0..837)	See section 5.7.2. in TS 36.211 [27]
ZeroCorrelationZoneConfiguration	M		INTEGER (0..15)	See section 5.7.2. in TS 36.211 [27]
HighSpeedFlag	M		BOOLEAN	TRUE corresponds to Restricted set and FALSE to Unrestricted set. See section 5.7.2 in TS 36.211 [27]
PRACH-FrequencyOffset	M		INTEGER (0..94)	See section 5.7.1 of TS 36.211 [27]
PRACH-ConfigurationIndex	C-ifTDD		INTEGER (0..63)	See section 5.7.1. in TS 36.211 [27]

Condition	Explanation
ifTDD	This IE shall be present if the *EUTRA-Mode-Info* IE in the *Resource Coordination E-UTRA Cell Information* IE is set to the value "TDD".

9.3.1.75 Resource Coordination E-UTRA Cell Information

This IE contains E-UTRA cell information for UE-associated E-UTRA – NR resource coordination.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
CHOICE *EUTRA-Mode-Info*	M				-	
>FDD					-	
>>FDD Info		*1*			-	
>>>UL EARFCN	O		INTEGER (0 .. maxExtendedEARFCN, ...)	The relation between EARFCN and carrier frequency (in MHz) is defined in TS 36.104 [25].	-	
>>>DL EARFCN	M		INTEGER (0 .. maxExtendedEARFCN, ...)	The relation between EARFCN and carrier frequency (in MHz) is defined in TS 36.104 [25].	-	
>>>UL Transmission Bandwidth	O		E-UTRA Transmission Bandwidth 9.3.1.80	Present if *UL EARFCN* IE is present.	-	
>>>DL Transmission Bandwidth	M		E-UTRA Transmission Bandwidth 9.3.1.80		-	
>TDD					-	
>>TDD Info		*1*			-	
>>>EARFCN	M		INTEGER (0 .. maxExtendedEARFCN, ...)	The relation between EARFCN and carrier frequency (in MHz) is defined in TS 36.104 [25].	-	
>>>Transmission Bandwidth	M		E-UTRA Transmission Bandwidth 9.3.1.80		-	
>>>Subframe Assignment	M		ENUMERATED(sa0, sa1, sa2, sa3, sa4, sa5, sa6,…)	Uplink-downlink subframe configuration information defined in TS 36.211 [27]. In NB-IOT, sa0 and sa6 are not applicable.	-	
>>>Special Subframe Info		*1*		Special subframe configuration information defined in TS 36.211 [27]	-	
>>>>Special Subframe Patterns	M		ENUMERATED(ssp0, ssp1, ssp2, ssp3, ssp4, ssp5, ssp6, ssp7, ssp8, ssp9, ssp10, …)		-	
>>>>Cyclic Prefix DL	M		ENUMERATED(Normal, Extended,…)		-	
>>>>Cyclic Prefix UL	M		ENUMERATED(Normal, Extended,…)		-	
E-UTRA PRACH Configuration	M		9.3.1.74		-	
Ignore PRACH Configuration	O		ENUMERATED (true,...)		YES	reject

Range bound	Explanation
maxExtendedEARFCN	Maximum value of extended EARFCN. Value is 262143.

9.3.1.76 Extended Available PLMN List

This IE indicates the list of available PLMN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Extended Available PLMN Item IEs		*1..<* maxnoofExtendedBPLMNs >		
>PLMN Identity	M		9.3.1.14	

Range bound	Explanation
maxnoofExtendedBPLMNs	Maximum no. of Extended Broadcast PLMN Ids. Value is 6.

9.3.1.77 Associated SCell List

This IE indicates the list of SCells associated with the RLC entity indicated by the *RLC Failure Indication* IE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Associated SCell Item IEs		*1..< maxnoofSCells >*			-	-
>SCell ID	M		NR CGI 9.3.1.12		-	

Range bound	Explanation
maxnoofSCells	Maximum no. of SCells allowed towards one UE, the maximum value is 32.

9.3.1.78 Cell Direction

This IE indicates if the cell is either bidirectional or only DL or only UL.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Cell Direction	M		ENUMERATED (dl-only, ul-only)	

9.3.1.79 Paging Origin

This IE indicates whether Paging is originated due to the PDU sessions from the non-3GPP access.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Paging Origin	M		ENUMERATED (non-3GPP, …)	

9.3.1.80 E-UTRA Transmission Bandwidth

This IE is used to indicate the E-UTRA UL or DL transmission bandwidth expressed in units of resource blocks " N_{RB} " (TS 36.104 [25]). The values bw1, bw6, bw15, bw25, bw50, bw75, bw100 correspond to the number of resource blocks "N_{RB}" 6, 15, 25, 50, 75, 100.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
E-UTRA Transmission Bandwidth	**M**		ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100,...)	

9.3.1.81 Message Identifier

This IE identifies the warning message.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Message Identifier	M		BIT STRING (SIZE(16))	This IE is set by the 5GC, transferred to the UE by the NG-RAN node.

9.3.1.82 Serial Number

This IE identifies a particular message from the source and type indicated by the Message Identifier and is altered every time the message with a given Message Identifier is changed.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Serial Number	M		BIT STRING (SIZE(16))	

9.3.1.83 UAC Assistance Information

This information element contains assistance information helping the gNB-DU to set parameters for Unified Access Class barring.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UAC PLMN List		*1*		
>UAC PLMN Item		*1..<maxnoofUAC PLMNs>*		
>>PLMN Identity	M		9.3.1.14	
>>UAC Type List		*1*		
>>>UAC Type Item		*1..<maxnoofUAC perPLMN>*		
>>>>UAC Reduction Indication	M		9.3.1.85	
>>>>CHOICE UAC Category Type	M			
>>>>>UAC Standardized				
>>>>>> UAC Action	M		9.3.1.84	
>>>>>UAC Operator Defined				
>>>>>>Access Category	M		INTEGER (32..63, …)	Indicates the operator defined Access Category as defined in subclause 6.3.2 in TS 38.331 [8].
>>>>>>Access Identity	M		BIT STRING (SIZE(7))	Indicates whether access attempt is allowed for each Access Identity as defined in subclause 6.3.2 in TS 38.331 [8].

Range bound	Explanation
maxnoofUACPLMNs	Maximum no. of UAC PLMN Ids. Value is 12.
maxnoofUACperPLMN	Maximum no. of signalled categories per PLMN. Value is 64.

9.3.1.84 UAC Action

This IE indicates which signalling traffic is expected to be reduced by the gNB-CU, as defined in clause 8.7.7 of TS 38.413 [3]

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UAC Action	M		ENUMERATED (Reject RRC connection establishments for non-emergency MO DT, Reject RRC connection establishments for Signalling, Permit Emergency Sessions and mobile terminated services only, Permit High Priority Sessions and mobile terminated services only,…)	

9.3.1.85 UAC reduction Indication

This IE indicates the percentage of signalling traffic expected to be reduced by the gNB-CU, relative to the instantaneous incoming rate from the gNB-DU

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UAC reduction Indication	M		INTEGER (0..100)	Value 0 indicates that no access rate reduction is desired. Value 100 indicates that full access rate reduction is desired.

9.3.1.86 Additional SIB Message List

This IE indicates the list of additional SIB messages containing all the remaining segments of a public warning message if segmentation is applied to such message.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Additional SIB Message List Item IEs		*1..* <maxnoofAdditionalSIBs >		
>Additional SIB	M		OCTET STRING	SIB message containing one segment of a public warning message, as defined in TS 38.331 [8].

Range bound	Explanation
maxnoofAdditionalSIBs	Maximum no. of additional segments of a public warning message. Value is 63.

9.3.1.87 Cell Type

This IE provides the cell coverage area.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Cell Size	M		ENUMERATED (verysmall, small, medium, large, …)	

9.3.1.88 Trace Activation

This IE defines parameters related to a trace session activation.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Trace ID	M		OCTET STRING (SIZE(8))	This IE is composed of the following: Trace Reference defined in TS 32.422 [29] (leftmost 6 octets, with PLMN information encoded as in 9.3.1.14), and Trace Recording Session Reference defined in TS 32.422 [29] (last 2 octets).
Interfaces To Trace	M		BIT STRING (SIZE(8))	Each position in the bitmap represents an NG-RAN node interface: first bit = NG-C, second bit = Xn-C, third bit = Uu, fourth bit = F1-C, fifth bit = E1: other bits reserved for future use. Value '1' indicates 'should be traced'. Value '0' indicates 'should not be traced'.
Trace Depth	M		ENUMERATED (minimum, medium, maximum, minimumWithoutVendorSpecificExtension, mediumWithoutVendorSpecificExtension, maximumWithoutVendorSpecificExtension, …)	Defined in TS 32.422 [29].
Trace Collection Entity IP Address	M		Transport Layer Address 9.3.2.3	Defined in TS 32.422 [29]

9.3.1.89 Intended TDD DL-UL Configuration

This IE contains the subcarrier spacing, cyclic prefix and TDD DL-UL slot configuration of an NR cell that the receiving NG-RAN node needs to take into account for cross-link interference mitigation, when operating its own cells. The gNB-CU sending the list of *Intended TDD DL-UL Configuration* IEs includes into the list the configurations of NR cells that are neighbouring to the cells of the receiving gNB-DU.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
NR SCS	M		ENUMERATED (scs15, scs30, scs60, scs120, …)	The values scs15, scs30, scs60 and scs120 corresponds to the sub carrier spacing in TS 38.104 [17].
NR Cyclic Prefix	M		ENUMERATED (Normal, Extended, …)	The type of cyclic prefix, which determines the number of symbols in a slot.
NR DL-UL Transmission Periodicity	M		ENUMERATED (ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms3, ms4, ms5, ms10, ms20, ms40, ms60, ms80, ms100, ms120, ms140, ms160, …)	The periodicity is expressed in the format msXpYZ, and equals X.YZ milliseconds.
Slot Configuration List		1		
>Slot Configuration List Item		*1..<maxnoofslots>*		
>>Slot Index	M		INTEGER (0..319)	
>>CHOICE *Symbol Allocation in Slot*	M			
>>>*All DL*			NULL	This choice implies that all symbols in the slot are DL symbols.
>>>*All UL*			NULL	This choice implies that all symbols in the slot are UL symbols.
>>>*Both DL and UL*				
>>>>Number of DL Symbols	M		INTEGER (0..13)	Number of consecutive DL symbols at the beginning of the slot identified by Slot Index. If extended cyclic prefix is used, the maximum value is 11.
>>>>Number of UL Symbols	M		INTEGER (0..13)	Number of consecutive UL symbols in the end of the slot identified by Slot Index. If extended cyclic prefix is used, the maximum value is 11.

Range bound	Explanation
maxnoofslots	Maximum length of number of slots in a 10-ms period. Value is 320.

9.3.1.90 Additional RRM Policy Index

The *Additional RRM Policy Index* IE is used to provide additional information independent from the Subscriber Profile ID for RAT/Frequency priority as specified in TS 36.300 [20].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Additional RRM Policy Index	M		BIT STRING (32)	

9.3.1.91 DU-CU RIM Information

This IE conveys the Remote Interference Management message from the gNB-DU to the gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Victim gNB Set ID	M		9.3.1.93	
RIM-RS Detection Status	M		ENUMERATED(RS detected, RS disappeared)	This IE indicates detection status of RIM-RS in gNB-DU
Aggressor Cell List		*1*		
>**Aggressor Cell List Item**		*1..< maxCellingNBDU >*		
>>Aggressor Cell ID	M		NR CGI 9.3.1.12	

Range bound	Explanation
maxCellingNBDU	Maximum no. cells that can be served by a gNB-DU. Value is 512.

9.3.1.92 CU-DU RIM Information

This IE conveys the Remote Interference Management message from the gNB-CU to the gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Victim gNB Set ID	M		9.3.1.93	
RIM-RS Detection Status	M		ENUMERATED(RS detected, RS disappeared)	This IE indicates detection status of RIM-RS in remote gNB(s).

9.3.1.93 gNB Set ID

The gNB Set ID IE is used to identify a group of gNBs which transmit the same RIM-RS.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB Set ID	M		BIT STRING (SIZE(22))	

9.3.1.94 Lower Layer Presence Status Change

This IE indicates lower layer resources' presence status shall be changed.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Lower Layer Presence Status Change	M		ENUMERATED (suspend lower layers, resume lower layers ...)	"suspend lower layers" will store CellGroupConfig except ReconfigurationWithSync "resume lower layers" shall restore SCG and only set after "suspend lower layers" has been indicated Editor Note: The usage of this IE may need to be refined.

9.3.2 Transport Network Layer Related IEs

9.3.2.1 UP Transport Layer Information

The *UP Transport Layer Information* IE identifies an F1 transport bearer associated to a DRB. It contains a Transport Layer Address and a GTP Tunnel Endpoint Identifier. The Transport Layer Address is an IP address to be used for the F1 user plane transport. The GTP Tunnel Endpoint Identifier is to be used for the user plane transport between gNB-CU and gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *Transport Layer Information*	M			
>*GTP Tunnel*				
>>Transport Layer Address	M		9.3.2.3	
>>GTP-TEID	M		9.3.2.2	

9.3.2.2 GTP-TEID

The *GTP-TEID* IE is the GTP Tunnel Endpoint Identifier to be used for the user plane transport between the gNB-CU and gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
GTP-TEID	M		OCTET STRING (SIZE(4))	For details and range, see TS 29.281 [18].

9.3.2.3 Transport Layer Address

This *Transport Layer Address* IE is an IP address.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transport Layer Address	M		BIT STRING (SIZE(1..160, ...))	The Radio Network Layer is not supposed to interpret the address information. It should pass it to the Transport Layer for interpretation. For details, see TS 38.414 [19].

9.3.2.4 CP Transport Layer Information

This IE is used to provide the F1 control plane transport layer information associated with a gNB-CU – gNB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
CHOICE *CP Transport Layer Information*					-	
>*Endpoint-IP-address*					-	
>> Endpoint IP address	M		Transport Layer Address 9.3.2.3		-	
>*Endpoint-IP-address-and-port*					-	
>> Endpoint IP address	M		Transport Layer Address 9.3.2.3		-	
>> Port Number	M		BIT STRING (SIZE(16))		Yes	reject

9.3.2.5 Transport Layer Addresses Info

This IE is used for signalling TNL Configuration information for IPSec tunnel over which GTP traffic is transmitted.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transport UP Layer Addresses Info to Add List		*0..1*		
>Transport UP Layer Addresses Info to Add Item		*1..<maxnoofTLAs>*		
>>IP-Sec Transport Layer Address	M		Transport Layer Address 9.3.2.3	Transport Layer Addresses for IP-Sec endpoint.
>>GTP Transport Layer Addresses To Add List		*0..1*		
>>>GTP Transport Layer Addresses To Add Item		*1..<maxnoofGTPTLAs>*		
>>>>GTP Transport Layer Address Info	M		Transport Layer Address 9.3.2.3	GTP Transport Layer Addresses for GTP end-points.
Transport UP Layer Addresses Info to Remove List		*0..1*		
>Transport UP Layer Addresses Info to Remove Item		*1..<maxnoofTLAs>*		
>>IP-Sec Transport Layer Address	M		Transport Layer Address 9.3.2.3	Transport Layer Addresses for IP-Sec endpoint.
>>GTP Transport Layer Addresses To Remove List		*0..1*		
>>>GTP Transport Layer Addresses To Remove Item		*1..<maxnoofGTPTLAs>*		
>>>>GTP Transport Layer Address Info	M		Transport Layer Address 9.3.2.3	GTP Transport Layer Addresses for GTP end-points.

maxnoofTLAs	Maximum no. of F1 Transport Layer Addresses in the message. Value is 16.
maxnoofGTPTLAs	Maximum no. of F1 GTP Transport Layer Addresses for a GTP end-point in the message. Value is 16.

9.4 Message and Information Element Abstract Syntax (with ASN.1)

9.4.1 General

F1AP ASN.1 definition conforms to ITU-T Recommendation X.691 [5], ITU-T Recommendation X.680 [12] and ITU-T Recommendation X.681 [13].

The ASN.1 definition specifies the structure and content of F1AP messages. F1AP messages can contain any IEs specified in the object set definitions for that message without the order or number of occurrence being restricted by ASN.1. However, for this version of the standard, a sending entity shall construct an F1AP message according to the PDU definitions module and with the following additional rules:

- IEs shall be ordered (in an IE container) in the order they appear in object set definitions.

- Object set definitions specify how many times IEs may appear. An IE shall appear exactly once if the presence field in an object has value "mandatory". An IE may appear at most once if the presence field in an object has value "optional" or "conditional". If in a tabular format there is multiplicity specified for an IE (i.e., an IE list) then in the corresponding ASN.1 definition the list definition is separated into two parts. The first part defines an IE container list where the list elements reside. The second part defines list elements. The IE container list appears as an IE of its own. For this version of the standard an IE container list may contain only one kind of list elements.

NOTE: In the above "IE" means an IE in the object set with an explicit ID. If one IE needs to appear more than once in one object set, then the different occurrences will have different IE IDs.

If an F1AP message that is not constructed as defined above is received, this shall be considered as Abstract Syntax Error, and the message shall be handled as defined for Abstract Syntax Error in clause 10.

9.4.2 Usage of private message mechanism for non-standard use

The private message mechanism for non-standard use may be used:

- for special operator- (and/or vendor) specific features considered not to be part of the basic functionality, i.e., the functionality required for a complete and high-quality specification in order to guarantee multivendor interoperability;

- by vendors for research purposes, e.g., to implement and evaluate new algorithms/features before such features are proposed for standardisation.

The private message mechanism shall not be used for basic functionality. Such functionality shall be standardised.

9.4.3 Elementary Procedure Definitions

```
-- ASN1START
-- **************************************************************
--
-- Elementary Procedure definitions
--
-- **************************************************************

F1AP-PDU-Descriptions  {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-PDU-Descriptions (0)}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- IE parameter types from other modules.
--
-- **************************************************************

IMPORTS
    Criticality,
    ProcedureCode

FROM F1AP-CommonDataTypes
    Reset,
    ResetAcknowledge,
    F1SetupRequest,
    F1SetupResponse,
    F1SetupFailure,
    GNBDUConfigurationUpdate,
    GNBDUConfigurationUpdateAcknowledge,
    GNBDUConfigurationUpdateFailure,
    GNBCUConfigurationUpdate,
    GNBCUConfigurationUpdateAcknowledge,
    GNBCUConfigurationUpdateFailure,
    UEContextSetupRequest,
    UEContextSetupResponse,
    UEContextSetupFailure,
    UEContextReleaseCommand,
    UEContextReleaseComplete,
    UEContextModificationRequest,
    UEContextModificationResponse,
    UEContextModificationFailure,
    UEContextModificationRequired,
    UEContextModificationConfirm,
    ErrorIndication,
    UEContextReleaseRequest,
    DLRRCMessageTransfer,
    ULRRCMessageTransfer,
```

```
    GNBDUResourceCoordinationRequest,
    GNBDUResourceCoordinationResponse,
    PrivateMessage,
    UEInactivityNotification,
    InitialULRRCMessageTransfer,
    SystemInformationDeliveryCommand,
    Paging,
    Notify,
    WriteReplaceWarningRequest,
    WriteReplaceWarningResponse,
    PWSCancelRequest,
    PWSCancelResponse,
    PWSRestartIndication,
    PWSFailureIndication,
    GNBDUStatusIndication,
    RRCDeliveryReport,
    UEContextModificationRefuse,
    F1RemovalRequest,
    F1RemovalResponse,
    F1RemovalFailure,
    NetworkAccessRateReduction,
    TraceStart,
    DeactivateTrace,
    DUCURadioInformationTransfer,
    CUDURadioInformationTransfer


FROM F1AP-PDU-Contents
    id-Reset,
    id-F1Setup,
    id-gNBDUConfigurationUpdate,
    id-gNBCUConfigurationUpdate,
    id-UEContextSetup,
    id-UEContextRelease,
    id-UEContextModification,
    id-UEContextModificationRequired,
    id-ErrorIndication,
    id-UEContextReleaseRequest,
    id-DLRRCMessageTransfer,
    id-ULRRCMessageTransfer,
    id-GNBDUResourceCoordination,
    id-privateMessage,
    id-UEInactivityNotification,
    id-InitialULRRCMessageTransfer,
    id-SystemInformationDeliveryCommand,
    id-Paging,
    id-Notify,
    id-WriteReplaceWarning,
    id-PWSCancel,
    id-PWSRestartIndication,
    id-PWSFailureIndication,
    id-GNBDUStatusIndication,
    id-RRCDeliveryReport,
    id-F1Removal,
```

```
    id-NetworkAccessRateReduction,
    id-TraceStart,
    id-DeactivateTrace,
    id-DUCURadioInformationTransfer,
    id-CUDURadioInformationTransfer



FROM F1AP-Constants

    ProtocolIE-SingleContainer{},
    F1AP-PROTOCOL-IES

FROM F1AP-Containers;


-- **************************************************************
--
-- Interface Elementary Procedure Class
--
-- **************************************************************

F1AP-ELEMENTARY-PROCEDURE ::= CLASS {
    &InitiatingMessage              ,
    &SuccessfulOutcome                          OPTIONAL,
    &UnsuccessfulOutcome                        OPTIONAL,
    &procedureCode              ProcedureCode   UNIQUE,
    &criticality                Criticality     DEFAULT ignore
}
WITH SYNTAX {
    INITIATING MESSAGE          &InitiatingMessage
    [SUCCESSFUL OUTCOME         &SuccessfulOutcome]
    [UNSUCCESSFUL OUTCOME       &UnsuccessfulOutcome]
    PROCEDURE CODE              &procedureCode
    [CRITICALITY                &criticality]
}

-- **************************************************************
--
-- Interface PDU Definition
--
-- **************************************************************

F1AP-PDU ::= CHOICE {
    initiatingMessage   InitiatingMessage,
    successfulOutcome   SuccessfulOutcome,
    unsuccessfulOutcome UnsuccessfulOutcome,
    choice-extension    ProtocolIE-SingleContainer { { F1AP-PDU-ExtIEs} }
}

F1AP-PDU-ExtIEs F1AP-PROTOCOL-IES ::= { -- this extension is not used
    ...
}
```

```
InitiatingMessage ::= SEQUENCE {
    procedureCode   F1AP-ELEMENTARY-PROCEDURE.&procedureCode        ({F1AP-ELEMENTARY-PROCEDURES}),
    criticality     F1AP-ELEMENTARY-PROCEDURE.&criticality          ({F1AP-ELEMENTARY-PROCEDURES}{@procedureCode}),
    value           F1AP-ELEMENTARY-PROCEDURE.&InitiatingMessage    ({F1AP-ELEMENTARY-PROCEDURES}{@procedureCode})
}

SuccessfulOutcome ::= SEQUENCE {
    procedureCode   F1AP-ELEMENTARY-PROCEDURE.&procedureCode        ({F1AP-ELEMENTARY-PROCEDURES}),
    criticality     F1AP-ELEMENTARY-PROCEDURE.&criticality          ({F1AP-ELEMENTARY-PROCEDURES}{@procedureCode}),
    value           F1AP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome    ({F1AP-ELEMENTARY-PROCEDURES}{@procedureCode})
}

UnsuccessfulOutcome ::= SEQUENCE {
    procedureCode   F1AP-ELEMENTARY-PROCEDURE.&procedureCode        ({F1AP-ELEMENTARY-PROCEDURES}),
    criticality     F1AP-ELEMENTARY-PROCEDURE.&criticality          ({F1AP-ELEMENTARY-PROCEDURES}{@procedureCode}),
    value           F1AP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome  ({F1AP-ELEMENTARY-PROCEDURES}{@procedureCode})
}

-- ************************************************************
--
-- Interface Elementary Procedure List
--
-- ************************************************************

F1AP-ELEMENTARY-PROCEDURES F1AP-ELEMENTARY-PROCEDURE ::= {
    F1AP-ELEMENTARY-PROCEDURES-CLASS-1          |
    F1AP-ELEMENTARY-PROCEDURES-CLASS-2,
    ...
}


F1AP-ELEMENTARY-PROCEDURES-CLASS-1 F1AP-ELEMENTARY-PROCEDURE ::= {
    reset                           |
    f1Setup                         |
    gNBDUConfigurationUpdate        |
    gNBCUConfigurationUpdate        |
    uEContextSetup                  |
    uEContextRelease                |
    uEContextModification           |
    uEContextModificationRequired   |
    writeReplaceWarning             |
    pWSCancel                       |
    gNBDUResourceCoordination       |
    f1Removal                       ,
    ...
}

F1AP-ELEMENTARY-PROCEDURES-CLASS-2 F1AP-ELEMENTARY-PROCEDURE ::= {
    errorIndication                 |
    uEContextReleaseRequest         |
    dLRRCMessageTransfer            |
    uLRRCMessageTransfer            |
    uEInactivityNotification        |
    privateMessage                  |
```

```
    initialULRRCMessageTransfer     |
    systemInformationDelivery       |
    paging                          |
    notify                          |
    pWSRestartIndication            |
    pWSFailureIndication            |
    gNBDUStatusIndication           |
    rRCDeliveryReport               |
    networkAccessRateReduction      |
    traceStart                      |
    deactivateTrace                 |
    dUCURadioInformationTransfer            |
    cUDURadioInformationTransfer            ,
    ...
}
-- **************************************************************
--
-- Interface Elementary Procedures
--
-- **************************************************************

reset F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      Reset
    SUCCESSFUL OUTCOME      ResetAcknowledge
    PROCEDURE CODE          id-Reset
    CRITICALITY             reject
}

f1Setup F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      F1SetupRequest
    SUCCESSFUL OUTCOME      F1SetupResponse
    UNSUCCESSFUL OUTCOME    F1SetupFailure
    PROCEDURE CODE          id-F1Setup
    CRITICALITY             reject
}

gNBDUConfigurationUpdate F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNBDUConfigurationUpdate
    SUCCESSFUL OUTCOME      GNBDUConfigurationUpdateAcknowledge
    UNSUCCESSFUL OUTCOME    GNBDUConfigurationUpdateFailure
    PROCEDURE CODE          id-gNBDUConfigurationUpdate
    CRITICALITY             reject
}

gNBCUConfigurationUpdate F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNBCUConfigurationUpdate
    SUCCESSFUL OUTCOME      GNBCUConfigurationUpdateAcknowledge
    UNSUCCESSFUL OUTCOME    GNBCUConfigurationUpdateFailure
    PROCEDURE CODE          id-gNBCUConfigurationUpdate
    CRITICALITY             reject
}

uEContextSetup F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEContextSetupRequest
```

```
    SUCCESSFUL OUTCOME      UEContextSetupResponse
    UNSUCCESSFUL OUTCOME    UEContextSetupFailure
    PROCEDURE CODE          id-UEContextSetup
    CRITICALITY             reject
}

uEContextRelease F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEContextReleaseCommand
    SUCCESSFUL OUTCOME      UEContextReleaseComplete
    PROCEDURE CODE          id-UEContextRelease
    CRITICALITY             reject
}

uEContextModification F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEContextModificationRequest
    SUCCESSFUL OUTCOME      UEContextModificationResponse
    UNSUCCESSFUL OUTCOME    UEContextModificationFailure
    PROCEDURE CODE          id-UEContextModification
    CRITICALITY             reject
}

uEContextModificationRequired F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEContextModificationRequired
    SUCCESSFUL OUTCOME      UEContextModificationConfirm
    UNSUCCESSFUL OUTCOME    UEContextModificationRefuse
    PROCEDURE CODE          id-UEContextModificationRequired
    CRITICALITY             reject
}

writeReplaceWarning F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WriteReplaceWarningRequest
    SUCCESSFUL OUTCOME      WriteReplaceWarningResponse
    PROCEDURE CODE          id-WriteReplaceWarning
    CRITICALITY             reject
}

pWSCancel F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PWSCancelRequest
    SUCCESSFUL OUTCOME      PWSCancelResponse
    PROCEDURE CODE          id-PWSCancel
    CRITICALITY             reject
}

errorIndication F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ErrorIndication
    PROCEDURE CODE          id-ErrorIndication
    CRITICALITY             ignore
}

uEContextReleaseRequest F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEContextReleaseRequest
    PROCEDURE CODE          id-UEContextReleaseRequest
    CRITICALITY             ignore
}
```

```
initialULRRCMessageTransfer F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      InitialULRRCMessageTransfer
    PROCEDURE CODE          id-InitialULRRCMessageTransfer
    CRITICALITY             ignore
}

dLRRCMessageTransfer F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DLRRCMessageTransfer
    PROCEDURE CODE          id-DLRRCMessageTransfer
    CRITICALITY             ignore
}

uLRRCMessageTransfer F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ULRRCMessageTransfer
    PROCEDURE CODE          id-ULRRCMessageTransfer
    CRITICALITY             ignore
}


uEInactivityNotification  F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEInactivityNotification
    PROCEDURE CODE          id-UEInactivityNotification
    CRITICALITY             ignore
}

gNBDUResourceCoordination F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNBDUResourceCoordinationRequest
    SUCCESSFUL OUTCOME      GNBDUResourceCoordinationResponse
    PROCEDURE CODE          id-GNBDUResourceCoordination
    CRITICALITY             reject
}

privateMessage F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PrivateMessage
    PROCEDURE CODE          id-privateMessage
    CRITICALITY             ignore
}

systemInformationDelivery F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      SystemInformationDeliveryCommand
    PROCEDURE CODE          id-SystemInformationDeliveryCommand
    CRITICALITY             ignore
}


paging F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      Paging
    PROCEDURE CODE          id-Paging
    CRITICALITY             ignore
}

notify F1AP-ELEMENTARY-PROCEDURE ::= {
```

```
    INITIATING MESSAGE      Notify
    PROCEDURE CODE          id-Notify
    CRITICALITY             ignore
}

networkAccessRateReduction F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      NetworkAccessRateReduction
    PROCEDURE CODE          id-NetworkAccessRateReduction
    CRITICALITY             ignore
}


pWSRestartIndication F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PWSRestartIndication
    PROCEDURE CODE          id-PWSRestartIndication
    CRITICALITY             ignore
}

pWSFailureIndication F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PWSFailureIndication
    PROCEDURE CODE          id-PWSFailureIndication
    CRITICALITY             ignore
}

gNBDUStatusIndication   F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNBDUStatusIndication
    PROCEDURE CODE          id-GNBDUStatusIndication
    CRITICALITY             ignore
}


rRCDeliveryReport F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      RRCDeliveryReport
    PROCEDURE CODE          id-RRCDeliveryReport
    CRITICALITY             ignore
}

f1Removal F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      F1RemovalRequest
    SUCCESSFUL OUTCOME      F1RemovalResponse
    UNSUCCESSFUL OUTCOME    F1RemovalFailure
    PROCEDURE CODE          id-F1Removal
    CRITICALITY             reject
}

traceStart F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      TraceStart
    PROCEDURE CODE          id-TraceStart
    CRITICALITY             ignore
}

deactivateTrace F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DeactivateTrace
    PROCEDURE CODE          id-DeactivateTrace
```

```
    CRITICALITY             ignore
}

dUCURadioInformationTransfer F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DUCURadioInformationTransfer
    PROCEDURE CODE          id-DUCURadioInformationTransfer
    CRITICALITY             ignore
}

cUDURadioInformationTransfer F1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      CUDURadioInformationTransfer
    PROCEDURE CODE          id-CUDURadioInformationTransfer
    CRITICALITY             ignore
}

END
-- ASN1STOP
```

9.4.4 PDU Definitions

```
-- ASN1START
-- **************************************************************
--
-- PDU definitions for F1AP.
--
-- **************************************************************

F1AP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- IE parameter types from other modules.
--
-- **************************************************************

IMPORTS
    Candidate-SpCell-Item,
    Cause,
    Cells-Failed-to-be-Activated-List-Item,
    Cells-Status-Item,
    Cells-to-be-Activated-List-Item,
    Cells-to-be-Deactivated-List-Item,
    CellULConfigured,
    CriticalityDiagnostics,
    C-RNTI,
    CUtoDURRCInformation,
    DRB-Activity-Item,
```

```
    DRBID,
    DRBs-FailedToBeModified-Item,
    DRBs-FailedToBeSetup-Item,
    DRBs-FailedToBeSetupMod-Item,
    DRB-Notify-Item,
    DRBs-ModifiedConf-Item,
    DRBs-Modified-Item,
    DRBs-Required-ToBeModified-Item,
    DRBs-Required-ToBeReleased-Item,
    DRBs-Setup-Item,
    DRBs-SetupMod-Item,
    DRBs-ToBeModified-Item,
    DRBs-ToBeReleased-Item,
    DRBs-ToBeSetup-Item,
    DRBs-ToBeSetupMod-Item,
    DRXCycle,
    DRXConfigurationIndicator,
    DUtoCURRCInformation,
    EUTRANQoS,
    ExecuteDuplication,
    FullConfiguration,
    GNB-CU-UE-F1AP-ID,
    GNB-DU-UE-F1AP-ID,
    GNB-DU-ID,
    GNB-DU-Served-Cells-Item,
    GNB-DU-System-Information,
    GNB-CU-Name,
    GNB-DU-Name,
    InactivityMonitoringRequest,
    InactivityMonitoringResponse,
    LowerLayerPresenceStatusChange,
    NotificationControl,
    NRCGI,
    NRPCI,
    UEContextNotRetrievable,
    Potential-SpCell-Item,
    RAT-FrequencyPriorityInformation,
    ResourceCoordinationTransferContainer,
    RRCContainer,
    RRCContainer-RRCSetupComplete,
    RRCReconfigurationCompleteIndicator,
    SCellIndex,
    SCell-ToBeRemoved-Item,
    SCell-ToBeSetup-Item,
    SCell-ToBeSetupMod-Item,
    SCell-FailedtoSetup-Item,
    SCell-FailedtoSetupMod-Item,
    ServCellIndex,
    Served-Cell-Information,
    Served-Cells-To-Add-Item,
    Served-Cells-To-Delete-Item,
    Served-Cells-To-Modify-Item,
    ServingCellMO,
    SRBID,
```

```
    SRBs-FailedToBeSetup-Item,
    SRBs-FailedToBeSetupMod-Item,
    SRBs-Required-ToBeReleased-Item,
    SRBs-ToBeReleased-Item,
    SRBs-ToBeSetup-Item,
    SRBs-ToBeSetupMod-Item,
    SRBs-Modified-Item,
    SRBs-Setup-Item,
    SRBs-SetupMod-Item,
    TimeToWait,
    TransactionID,
    TransmissionActionIndicator,
    UE-associatedLogicalF1-ConnectionItem,
    DUtoCURRCContainer,
    PagingCell-Item,
    SItype-List,
    UEIdentityIndexValue,
    GNB-CU-TNL-Association-Setup-Item,
    GNB-CU-TNL-Association-Failed-To-Setup-Item,
    GNB-CU-TNL-Association-To-Add-Item,
    GNB-CU-TNL-Association-To-Remove-Item,
    GNB-CU-TNL-Association-To-Update-Item,
    MaskedIMEISV,
    PagingDRX,
    PagingPriority,
    PagingIdentity,
    Cells-to-be-Barred-Item,
    PWSSystemInformation,
    Broadcast-To-Be-Cancelled-Item,
    Cells-Broadcast-Cancelled-Item,
    NR-CGI-List-For-Restart-Item,
    PWS-Failed-NR-CGI-Item,
    RepetitionPeriod,
    NumberofBroadcastRequest,
    Cells-To-Be-Broadcast-Item,
    Cells-Broadcast-Completed-Item,
    Cancel-all-Warning-Messages-Indicator,
    EUTRA-NR-CellResourceCoordinationReq-Container,
    EUTRA-NR-CellResourceCoordinationReqAck-Container,
    RequestType,
    PLMN-Identity,
    RLCFailureIndication,
    UplinkTxDirectCurrentListInformation,
    SULAccessIndication,
    Protected-EUTRA-Resources-Item,
    GNB-DUConfigurationQuery,
    BitRate,
    RRC-Version,
    GNBDUOverloadInformation,
    RRCDeliveryStatusRequest,
    NeedforGap,
    RRCDeliveryStatus,
    ResourceCoordinationTransferInformation,
    Dedicated-SIDelivery-NeededUE-Item,
```

```
    Associated-SCell-Item,
    IgnoreResourceCoordinationContainer,
    PagingOrigin,
    UAC-Assistance-Info,
    RANUEID,
    GNB-DU-TNL-Association-To-Remove-Item,
    NotificationInformation,
    TraceActivation,
    TraceID,
    Neighbour-Cell-Information-Item,
    SymbolAllocInSlot,
    Slot-Configuration-Item,
    NumDLULSymbols,
    AdditionalRRMPriorityIndex,
    DUCURadioInformationType,
    CUDURadioInformationType,
    Transport-Layer-Addresses-Info


FROM F1AP-IEs

    PrivateIE-Container{},
    ProtocolExtensionContainer{},
    ProtocolIE-Container{},
    ProtocolIE-ContainerPair{},
    ProtocolIE-SingleContainer{},
    F1AP-PRIVATE-IES,
    F1AP-PROTOCOL-EXTENSION,
    F1AP-PROTOCOL-IES,
    F1AP-PROTOCOL-IES-PAIR

FROM F1AP-Containers

    id-Candidate-SpCell-Item,
    id-Candidate-SpCell-List,
    id-Cause,
    id-Cancel-all-Warning-Messages-Indicator,
    id-Cells-Failed-to-be-Activated-List,
    id-Cells-Failed-to-be-Activated-List-Item,
    id-Cells-Status-Item,
    id-Cells-Status-List,
    id-Cells-to-be-Activated-List,
    id-Cells-to-be-Activated-List-Item,
    id-Cells-to-be-Deactivated-List,
    id-Cells-to-be-Deactivated-List-Item,
    id-ConfirmedUEID,
    id-CriticalityDiagnostics,
    id-C-RNTI,
    id-CUtoDURRCInformation,
    id-DRB-Activity-Item,
    id-DRB-Activity-List,
    id-DRBs-FailedToBeModified-Item,
    id-DRBs-FailedToBeModified-List,
    id-DRBs-FailedToBeSetup-Item,
```

```
    id-DRBs-FailedToBeSetup-List,
    id-DRBs-FailedToBeSetupMod-Item,
    id-DRBs-FailedToBeSetupMod-List,
    id-DRBs-ModifiedConf-Item,
    id-DRBs-ModifiedConf-List,
    id-DRBs-Modified-Item,
    id-DRBs-Modified-List,
    id-DRB-Notify-Item,
    id-DRB-Notify-List,
    id-DRBs-Required-ToBeModified-Item,
    id-DRBs-Required-ToBeModified-List,
    id-DRBs-Required-ToBeReleased-Item,
    id-DRBs-Required-ToBeReleased-List,
    id-DRBs-Setup-Item,
    id-DRBs-Setup-List,
    id-DRBs-SetupMod-Item,
    id-DRBs-SetupMod-List,
    id-DRBs-ToBeModified-Item,
    id-DRBs-ToBeModified-List,
    id-DRBs-ToBeReleased-Item,
    id-DRBs-ToBeReleased-List,
    id-DRBs-ToBeSetup-Item,
    id-DRBs-ToBeSetup-List,
    id-DRBs-ToBeSetupMod-Item,
    id-DRBs-ToBeSetupMod-List,
    id-DRXCycle,
    id-DUtoCURRCInformation,
    id-ExecuteDuplication,
    id-FullConfiguration,
    id-gNB-CU-UE-F1AP-ID,
    id-gNB-DU-UE-F1AP-ID,
    id-gNB-DU-ID,
    id-GNB-DU-Served-Cells-Item,
    id-gNB-DU-Served-Cells-List,
    id-gNB-CU-Name,
    id-gNB-DU-Name,
    id-InactivityMonitoringRequest,
    id-InactivityMonitoringResponse,
    id-new-gNB-CU-UE-F1AP-ID,
    id-new-gNB-DU-UE-F1AP-ID,
    id-oldgNB-DU-UE-F1AP-ID,
    id-PLMNAssistanceInfoForNetShar,
    id-Potential-SpCell-Item,
    id-Potential-SpCell-List,
    id-RAT-FrequencyPriorityInformation,
    id-RedirectedRRCmessage,
    id-ResetType,
    id-ResourceCoordinationTransferContainer,
    id-RRCContainer,
    id-RRCContainer-RRCSetupComplete,
    id-RRCReconfigurationCompleteIndicator,
    id-SCell-FailedtoSetup-List,
    id-SCell-FailedtoSetup-Item,
    id-SCell-FailedtoSetupMod-List,
```

```
    id-SCell-FailedtoSetupMod-Item,
    id-SCell-ToBeRemoved-Item,
    id-SCell-ToBeRemoved-List,
    id-SCell-ToBeSetup-Item,
    id-SCell-ToBeSetup-List,
    id-SCell-ToBeSetupMod-Item,
    id-SCell-ToBeSetupMod-List,
    id-SelectedPLMNID,
    id-Served-Cells-To-Add-Item,
    id-Served-Cells-To-Add-List,
    id-Served-Cells-To-Delete-Item,
    id-Served-Cells-To-Delete-List,
    id-Served-Cells-To-Modify-Item,
    id-Served-Cells-To-Modify-List,
    id-ServCellIndex,
    id-ServingCellMO,
    id-SpCell-ID,
    id-SpCellULConfigured,
    id-SRBID,
    id-SRBs-FailedToBeSetup-Item,
    id-SRBs-FailedToBeSetup-List,
    id-SRBs-FailedToBeSetupMod-Item,
    id-SRBs-FailedToBeSetupMod-List,
    id-SRBs-Required-ToBeReleased-Item,
    id-SRBs-Required-ToBeReleased-List,
    id-SRBs-ToBeReleased-Item,
    id-SRBs-ToBeReleased-List,
    id-SRBs-ToBeSetup-Item,
    id-SRBs-ToBeSetup-List,
    id-SRBs-ToBeSetupMod-Item,
    id-SRBs-ToBeSetupMod-List,
    id-SRBs-Modified-Item,
    id-SRBs-Modified-List,
    id-SRBs-Setup-Item,
    id-SRBs-Setup-List,
    id-SRBs-SetupMod-Item,
    id-SRBs-SetupMod-List,
    id-TimeToWait,
    id-TransactionID,
    id-TransmissionActionIndicator,
    id-UEContextNotRetrievable,
    id-UE-associatedLogicalF1-ConnectionItem,
    id-UE-associatedLogicalF1-ConnectionListResAck,
    id-DUtoCURRCContainer,
    id-NRCGI,
    id-PagingCell-Item,
    id-PagingCell-List,
    id-PagingDRX,
    id-PagingPriority,
    id-SItype-List,
    id-UEIdentityIndexValue,
    id-GNB-CU-TNL-Association-Setup-List,
    id-GNB-CU-TNL-Association-Setup-Item,
    id-GNB-CU-TNL-Association-Failed-To-Setup-List,
```

```
    id-GNB-CU-TNL-Association-Failed-To-Setup-Item,
    id-GNB-CU-TNL-Association-To-Add-Item,
    id-GNB-CU-TNL-Association-To-Add-List,
    id-GNB-CU-TNL-Association-To-Remove-Item,
    id-GNB-CU-TNL-Association-To-Remove-List,
    id-GNB-CU-TNL-Association-To-Update-Item,
    id-GNB-CU-TNL-Association-To-Update-List,
    id-MaskedIMEISV,
    id-PagingIdentity,
    id-Cells-to-be-Barred-List,
    id-Cells-to-be-Barred-Item,
    id-PWSSystemInformation,
    id-RepetitionPeriod,
    id-NumberofBroadcastRequest,
    id-Cells-To-Be-Broadcast-List,
    id-Cells-To-Be-Broadcast-Item,
    id-Cells-Broadcast-Completed-List,
    id-Cells-Broadcast-Completed-Item,
    id-Broadcast-To-Be-Cancelled-List,
    id-Broadcast-To-Be-Cancelled-Item,
    id-Cells-Broadcast-Cancelled-List,
    id-Cells-Broadcast-Cancelled-Item,
    id-NR-CGI-List-For-Restart-List,
    id-NR-CGI-List-For-Restart-Item,
    id-PWS-Failed-NR-CGI-List,
    id-PWS-Failed-NR-CGI-Item,
    id-EUTRA-NR-CellResourceCoordinationReq-Container,
    id-EUTRA-NR-CellResourceCoordinationReqAck-Container,
    id-Protected-EUTRA-Resources-List,
    id-RequestType,
    id-ServingPLMN,
    id-DRXConfigurationIndicator,
    id-RLCFailureIndication,
    id-UplinkTxDirectCurrentListInformation,
    id-SULAccessIndication,
    id-Protected-EUTRA-Resources-Item,
    id-GNB-DUConfigurationQuery,
    id-GNB-DU-UE-AMBR-UL,
    id-GNB-CU-RRC-Version,
    id-GNB-DU-RRC-Version,
    id-GNBDUOverloadInformation,
    id-NeedforGap,
    id-RRCDeliveryStatusRequest,
    id-RRCDeliveryStatus,
    id-Dedicated-SIDelivery-NeededUE-List,
    id-Dedicated-SIDelivery-NeededUE-Item,
    id-ResourceCoordinationTransferInformation,
    id-Associated-SCell-List,
    id-Associated-SCell-Item,
    id-IgnoreResourceCoordinationContainer,
    id-UAC-Assistance-Info,
    id-RANUEID,
    id-PagingOrigin,
    id-GNB-DU-TNL-Association-To-Remove-Item,
```

```
    id-GNB-DU-TNL-Association-To-Remove-List,
    id-NotificationInformation,
    id-TraceActivation,
    id-TraceID,
    id-Neighbour-Cell-Information-List,
    id-Neighbour-Cell-Information-Item,
    id-Slot-Configuration-Item,
    id-SymbolAllocInSlot,
    id-NumDLULSymbols,
    id-AdditionalRRMPriorityIndex,
    id-DUCURadioInformationType,
    id-CUDURadioInformationType,
    id-LowerLayerPresenceStatusChange,
    id-Transport-Layer-Addresses-Info,
    maxCellingNBDU,
    maxnoofCandidateSpCells,
    maxnoofDRBs,
    maxnoofErrors,
    maxnoofIndividualF1ConnectionsToReset,
    maxnoofPotentialSpCells,
    maxnoofSCells,
    maxnoofSRBs,
    maxnoofPagingCells,
    maxnoofTNLAssociations,
    maxCellineNB,
    maxnoofUEIDs,
    maxnoofslots


FROM F1AP-Constants;


-- **************************************************************
--
-- RESET ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Reset
--
-- **************************************************************

Reset ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ResetIEs} },
    ...
}

ResetIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID              CRITICALITY reject  TYPE TransactionID             PRESENCE mandatory  }|
    { ID id-Cause                      CRITICALITY ignore  TYPE Cause                     PRESENCE mandatory  }|
    { ID id-ResetType                  CRITICALITY reject  TYPE ResetType                 PRESENCE mandatory  },
```

```
    ...
}

ResetType ::= CHOICE {
    f1-Interface                    ResetAll,
    partOfF1-Interface              UE-associatedLogicalF1-ConnectionListRes,
    choice-extension                ProtocolIE-SingleContainer { { ResetType-ExtIEs} }
}

ResetType-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}


ResetAll ::= ENUMERATED {
    reset-all,
    ...
}

UE-associatedLogicalF1-ConnectionListRes ::= SEQUENCE (SIZE(1.. maxnoofIndividualF1ConnectionsToReset)) OF ProtocolIE-SingleContainer { { UE-
associatedLogicalF1-ConnectionItemRes } }

UE-associatedLogicalF1-ConnectionItemRes F1AP-PROTOCOL-IES ::= {
    { ID id-UE-associatedLogicalF1-ConnectionItem   CRITICALITY reject  TYPE UE-associatedLogicalF1-ConnectionItem  PRESENCE mandatory},
    ...
}


-- **************************************************************
--
-- Reset Acknowledge
--
-- **************************************************************

ResetAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {ResetAcknowledgeIEs} },
    ...
}

ResetAcknowledgeIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                                   CRITICALITY reject  TYPE TransactionID                                      PRESENCE
mandatory   }|
    { ID id-UE-associatedLogicalF1-ConnectionListResAck     CRITICALITY ignore  TYPE UE-associatedLogicalF1-ConnectionListResAck        PRESENCE
optional    }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional  },
    ...
}

UE-associatedLogicalF1-ConnectionListResAck ::= SEQUENCE (SIZE(1.. maxnoofIndividualF1ConnectionsToReset)) OF ProtocolIE-SingleContainer { { UE-
associatedLogicalF1-ConnectionItemResAck } }

UE-associatedLogicalF1-ConnectionItemResAck     F1AP-PROTOCOL-IES ::= {
    { ID id-UE-associatedLogicalF1-ConnectionItem    CRITICALITY ignore     TYPE UE-associatedLogicalF1-ConnectionItem   PRESENCE mandatory },
    ...
```

```
}

-- **************************************************************
--
-- ERROR INDICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Error Indication
--
-- **************************************************************

ErrorIndication ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ErrorIndicationIEs}},
    ...
}

ErrorIndicationIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID               CRITICALITY reject  TYPE TransactionID              PRESENCE mandatory}|
    { ID id-gNB-CU-UE-F1AP-ID           CRITICALITY ignore  TYPE GNB-CU-UE-F1AP-ID          PRESENCE optional }|
    { ID id-gNB-DU-UE-F1AP-ID           CRITICALITY ignore  TYPE GNB-DU-UE-F1AP-ID          PRESENCE optional }|
    { ID id-Cause                       CRITICALITY ignore  TYPE Cause                      PRESENCE optional }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional },
    ...
}

-- **************************************************************
--
-- F1 SETUP ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- F1 Setup Request
--
-- **************************************************************

F1SetupRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {F1SetupRequestIEs} },
    ...
}

F1SetupRequestIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                  PRESENCE mandatory   }|
    { ID id-gNB-DU-ID                       CRITICALITY reject  TYPE GNB-DU-ID                      PRESENCE mandatory   }|
    { ID id-gNB-DU-Name                     CRITICALITY ignore  TYPE GNB-DU-Name                    PRESENCE optional }|
    { ID id-gNB-DU-Served-Cells-List        CRITICALITY reject  TYPE GNB-DU-Served-Cells-List       PRESENCE optional }|
    { ID id-GNB-DU-RRC-Version              CRITICALITY reject  TYPE RRC-Version                    PRESENCE mandatory   }|
    { ID id-Transport-Layer-Addresses-Info  CRITICALITY ignore  TYPE Transport-Layer-Addresses-Info  PRESENCE optional },
    ...
}
```

```
GNB-DU-Served-Cells-List    ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { GNB-DU-Served-Cells-ItemIEs } }

GNB-DU-Served-Cells-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-GNB-DU-Served-Cells-Item        CRITICALITY reject  TYPE        GNB-DU-Served-Cells-Item PRESENCE mandatory   },
    ...
}


-- **************************************************************
--
-- F1 Setup Response
--
-- **************************************************************

F1SetupResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {F1SetupResponseIEs} },
    ...
}


F1SetupResponseIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                   PRESENCE mandatory   }|
    { ID id-gNB-CU-Name                     CRITICALITY ignore  TYPE GNB-CU-Name                     PRESENCE optional }|
    { ID id-Cells-to-be-Activated-List      CRITICALITY reject  TYPE Cells-to-be-Activated-List      PRESENCE optional }|
    { ID id-GNB-CU-RRC-Version              CRITICALITY reject  TYPE RRC-Version                     PRESENCE mandatory   }|
    { ID id-Transport-Layer-Addresses-Info  CRITICALITY ignore  TYPE Transport-Layer-Addresses-Info  PRESENCE optional },
    ...
}


Cells-to-be-Activated-List  ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-to-be-Activated-List-ItemIEs } }

Cells-to-be-Activated-List-ItemIEs  F1AP-PROTOCOL-IES::= {
    { ID id-Cells-to-be-Activated-List-Item            CRITICALITY reject  TYPE Cells-to-be-Activated-List-Item              PRESENCE mandatory},
    ...
}



-- **************************************************************
--
-- F1 Setup Failure
--
-- **************************************************************

F1SetupFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {F1SetupFailureIEs} },
    ...
}

F1SetupFailureIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID               CRITICALITY reject  TYPE TransactionID             PRESENCE mandatory   }|
```

```
    { ID id-Cause                     CRITICALITY ignore  TYPE Cause                     PRESENCE mandatory   }|
    { ID id-TimeToWait                CRITICALITY ignore  TYPE TimeToWait                PRESENCE optional }|
    { ID id-CriticalityDiagnostics    CRITICALITY ignore  TYPE CriticalityDiagnostics    PRESENCE optional },
    ...
}


-- **************************************************************
--
-- GNB-DU CONFIGURATION UPDATE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- GNB-DU CONFIGURATION UPDATE
--
-- **************************************************************

GNBDUConfigurationUpdate::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {GNBDUConfigurationUpdateIEs} },
    ...
}

GNBDUConfigurationUpdateIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                          CRITICALITY reject  TYPE TransactionID                                PRESENCE mandatory   }|
    { ID id-Served-Cells-To-Add-List               CRITICALITY reject  TYPE Served-Cells-To-Add-List                     PRESENCE optional }|
    { ID id-Served-Cells-To-Modify-List            CRITICALITY reject  TYPE Served-Cells-To-Modify-List                  PRESENCE optional }|
    { ID id-Served-Cells-To-Delete-List            CRITICALITY reject  TYPE Served-Cells-To-Delete-List                  PRESENCE optional }|
    { ID id-Cells-Status-List                      CRITICALITY reject  TYPE Cells-Status-List                            PRESENCE optional }|
    { ID id-Dedicated-SIDelivery-NeededUE-List     CRITICALITY ignore  TYPE Dedicated-SIDelivery-NeededUE-List           PRESENCE optional }|
    { ID id-gNB-DU-ID                              CRITICALITY reject  TYPE GNB-DU-ID                                    PRESENCE optional }|
    { ID id-GNB-DU-TNL-Association-To-Remove-List  CRITICALITY reject  TYPE GNB-DU-TNL-Association-To-Remove-List        PRESENCE optional }|
    { ID id-Transport-Layer-Addresses-Info         CRITICALITY ignore  TYPE Transport-Layer-Addresses-Info                PRESENCE optional },
    ...
}

Served-Cells-To-Add-List        ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Served-Cells-To-Add-ItemIEs } }
Served-Cells-To-Modify-List ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Served-Cells-To-Modify-ItemIEs } }
Served-Cells-To-Delete-List ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Served-Cells-To-Delete-ItemIEs } }
Cells-Status-List   ::= SEQUENCE (SIZE(0.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-Status-ItemIEs } }

Dedicated-SIDelivery-NeededUE-List::= SEQUENCE (SIZE(1.. maxnoofUEIDs)) OF ProtocolIE-SingleContainer { { Dedicated-SIDelivery-NeededUE-ItemIEs } }

GNB-DU-TNL-Association-To-Remove-List   ::= SEQUENCE (SIZE(1.. maxnoofTNLAssociations)) OF ProtocolIE-SingleContainer { { GNB-DU-TNL-Association-
To-Remove-ItemIEs } }


Served-Cells-To-Add-ItemIEs F1AP-PROTOCOL-IES   ::= {
    { ID id-Served-Cells-To-Add-Item        CRITICALITY reject  TYPE    Served-Cells-To-Add-Item          PRESENCE mandatory   },
    ...
}

Served-Cells-To-Modify-ItemIEs F1AP-PROTOCOL-IES    ::= {
```

```
    { ID id-Served-Cells-To-Modify-Item        CRITICALITY reject  TYPE       Served-Cells-To-Modify-Item                  PRESENCE mandatory
    },
    ...
}

Served-Cells-To-Delete-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Served-Cells-To-Delete-Item            CRITICALITY reject  TYPE       Served-Cells-To-Delete-Item            PRESENCE mandatory   },
    ...
}

Cells-Status-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-Cells-Status-Item              CRITICALITY reject  TYPE       Cells-Status-Item            PRESENCE mandatory   },
    ...
}

Dedicated-SIDelivery-NeededUE-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-Dedicated-SIDelivery-NeededUE-Item     CRITICALITY ignore  TYPE    Dedicated-SIDelivery-NeededUE-Item          PRESENCE mandatory   },
    ...
}

GNB-DU-TNL-Association-To-Remove-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-GNB-DU-TNL-Association-To-Remove-Item       CRITICALITY reject  TYPE     GNB-DU-TNL-Association-To-Remove-Item        PRESENCE
mandatory   },
    ...
}


-- **************************************************************
--
-- GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE
--
-- **************************************************************

GNBDUConfigurationUpdateAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {GNBDUConfigurationUpdateAcknowledgeIEs} },
    ...
}


GNBDUConfigurationUpdateAcknowledgeIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                      CRITICALITY reject  TYPE TransactionID                       PRESENCE mandatory   }|
    { ID id-Cells-to-be-Activated-List         CRITICALITY reject  TYPE Cells-to-be-Activated-List          PRESENCE optional }|
    { ID id-CriticalityDiagnostics             CRITICALITY ignore  TYPE CriticalityDiagnostics              PRESENCE optional }|
    { ID id-Cells-to-be-Deactivated-List       CRITICALITY reject  TYPE Cells-to-be-Deactivated-List        PRESENCE optional }|
    { ID id-Transport-Layer-Addresses-Info     CRITICALITY ignore  TYPE Transport-Layer-Addresses-Info      PRESENCE optional },
    ...
}

-- **************************************************************
--
-- GNB-DU CONFIGURATION UPDATE FAILURE
--
-- **************************************************************
```

```
GNBDUConfigurationUpdateFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {GNBDUConfigurationUpdateFailureIEs} },
    ...
}

GNBDUConfigurationUpdateFailureIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID               CRITICALITY reject  TYPE TransactionID              PRESENCE mandatory  }|
    { ID id-Cause                       CRITICALITY ignore  TYPE Cause                      PRESENCE mandatory  }|
    { ID id-TimeToWait                  CRITICALITY ignore  TYPE TimeToWait                 PRESENCE optional }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional },
    ...
}

-- **************************************************************
--
-- GNB-CU CONFIGURATION UPDATE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- GNB-CU CONFIGURATION UPDATE
--
-- **************************************************************

GNBCUConfigurationUpdate ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { GNBCUConfigurationUpdateIEs} },
    ...
}

GNBCUConfigurationUpdateIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                           CRITICALITY reject  TYPE TransactionID                                  PRESENCE mandatory  }|
    { ID id-Cells-to-be-Activated-List              CRITICALITY reject  TYPE     Cells-to-be-Activated-List                 PRESENCE optional }|
    { ID id-Cells-to-be-Deactivated-List            CRITICALITY reject  TYPE     Cells-to-be-Deactivated-List               PRESENCE optional }|
    { ID id-GNB-CU-TNL-Association-To-Add-List      CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-To-Add-List         PRESENCE optional }|
    { ID id-GNB-CU-TNL-Association-To-Remove-List   CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-To-Remove-List      PRESENCE optional }|
    { ID id-GNB-CU-TNL-Association-To-Update-List   CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-To-Update-List      PRESENCE optional }|
    { ID id-Cells-to-be-Barred-List                 CRITICALITY ignore  TYPE     Cells-to-be-Barred-List                    PRESENCE optional }|
    { ID id-Protected-EUTRA-Resources-List          CRITICALITY reject  TYPE     Protected-EUTRA-Resources-List             PRESENCE optional }|
    { ID id-Neighbour-Cell-Information-List         CRITICALITY ignore  TYPE     Neighbour-Cell-Information-List            PRESENCE optional }|
    { ID id-Transport-Layer-Addresses-Info          CRITICALITY ignore  TYPE     Transport-Layer-Addresses-Info             PRESENCE optional },
    ...
}

Cells-to-be-Deactivated-List    ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-to-be-Deactivated-List-ItemIEs } }
GNB-CU-TNL-Association-To-Add-List      ::= SEQUENCE (SIZE(1.. maxnoofTNLAssociations)) OF ProtocolIE-SingleContainer { { GNB-CU-TNL-Association-
To-Add-ItemIEs } }
GNB-CU-TNL-Association-To-Remove-List   ::= SEQUENCE (SIZE(1.. maxnoofTNLAssociations)) OF ProtocolIE-SingleContainer { { GNB-CU-TNL-Association-
To-Remove-ItemIEs } }
GNB-CU-TNL-Association-To-Update-List   ::= SEQUENCE (SIZE(1.. maxnoofTNLAssociations)) OF ProtocolIE-SingleContainer { { GNB-CU-TNL-Association-
To-Update-ItemIEs } }
Cells-to-be-Barred-List         ::= SEQUENCE(SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-to-be-Barred-ItemIEs } }
```

```
Cells-to-be-Deactivated-List-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-Cells-to-be-Deactivated-List-Item                    CRITICALITY reject  TYPE    Cells-to-be-Deactivated-List-Item
    PRESENCE mandatory  },
    ...
}


GNB-CU-TNL-Association-To-Add-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-GNB-CU-TNL-Association-To-Add-Item      CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-To-Add-Item      PRESENCE mandatory   },
    ...
}

GNB-CU-TNL-Association-To-Remove-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-GNB-CU-TNL-Association-To-Remove-Item       CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-To-Remove-Item        PRESENCE
mandatory   },
    ...
}

GNB-CU-TNL-Association-To-Update-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-GNB-CU-TNL-Association-To-Update-Item       CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-To-Update-Item        PRESENCE
mandatory   },
    ...
}

Cells-to-be-Barred-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Cells-to-be-Barred-Item     CRITICALITY ignore  TYPE     Cells-to-be-Barred-Item           PRESENCE mandatory   },
    ...
}

Protected-EUTRA-Resources-List ::= SEQUENCE (SIZE(1.. maxCellineNB))    OF ProtocolIE-SingleContainer { { Protected-EUTRA-Resources-ItemIEs } }
Protected-EUTRA-Resources-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-Protected-EUTRA-Resources-Item                  CRITICALITY reject  TYPE Protected-EUTRA-Resources-Item                  PRESENCE
mandatory},
    ...
}

Neighbour-Cell-Information-List ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Neighbour-Cell-Information-ItemIEs } }
Neighbour-Cell-Information-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Neighbour-Cell-Information-Item                     CRITICALITY ignore  TYPE Neighbour-Cell-Information-Item                  PRESENCE
mandatory},
    ...
}

Slot-Configuration-List ::= SEQUENCE (SIZE(1.. maxnoofslots))   OF ProtocolIE-SingleContainer { { Slot-Configuration-ItemIEs } }
Slot-Configuration-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Slot-Configuration-Item                     CRITICALITY ignore  TYPE Slot-Configuration-Item                    PRESENCE mandatory},
    ...
}

-- ************************************************************
--
-- GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE
--
-- ************************************************************
```

```
GNBCUConfigurationUpdateAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { GNBCUConfigurationUpdateAcknowledgeIEs} },
    ...
}


GNBCUConfigurationUpdateAcknowledgeIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                          CRITICALITY reject  TYPE TransactionID                          PRESENCE mandatory   }|
    { ID id-Cells-Failed-to-be-Activated-List      CRITICALITY reject   TYPE Cells-Failed-to-be-Activated-List        PRESENCE optional}|
    { ID id-CriticalityDiagnostics                 CRITICALITY ignore   TYPE CriticalityDiagnostics                 PRESENCE optional }|
    { ID id-GNB-CU-TNL-Association-Setup-List      CRITICALITY ignore   TYPE     GNB-CU-TNL-Association-Setup-List          PRESENCE optional }|
    { ID id-GNB-CU-TNL-Association-Failed-To-Setup-List     CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-Failed-To-Setup-List
    PRESENCE optional   }|
    { ID id-Dedicated-SIDelivery-NeededUE-List     CRITICALITY ignore   TYPE Dedicated-SIDelivery-NeededUE-List       PRESENCE optional }|
    { ID id-Transport-Layer-Addresses-Info         CRITICALITY ignore   TYPE Transport-Layer-Addresses-Info           PRESENCE optional },
    ...
}

Cells-Failed-to-be-Activated-List   ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-Failed-to-be-Activated-List-
ItemIEs } }
GNB-CU-TNL-Association-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofTNLAssociations))   OF ProtocolIE-SingleContainer { { GNB-CU-TNL-Association-Setup-
ItemIEs } }
GNB-CU-TNL-Association-Failed-To-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofTNLAssociations)) OF ProtocolIE-SingleContainer { { GNB-CU-TNL-
Association-Failed-To-Setup-ItemIEs } }

Cells-Failed-to-be-Activated-List-ItemIEs F1AP-PROTOCOL-IES     ::= {
    { ID id-Cells-Failed-to-be-Activated-List-Item      CRITICALITY reject  TYPE Cells-Failed-to-be-Activated-List-Item     PRESENCE mandatory   },
    ...
}

GNB-CU-TNL-Association-Setup-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-GNB-CU-TNL-Association-Setup-Item       CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-Setup-Item       PRESENCE mandatory   },
    ...
}


GNB-CU-TNL-Association-Failed-To-Setup-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-GNB-CU-TNL-Association-Failed-To-Setup-Item     CRITICALITY ignore  TYPE     GNB-CU-TNL-Association-Failed-To-Setup-Item       PRESENCE
mandatory   },
    ...
}


-- **************************************************************
--
-- GNB-CU CONFIGURATION UPDATE FAILURE
--
-- **************************************************************

GNBCUConfigurationUpdateFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { GNBCUConfigurationUpdateFailureIEs} },
    ...
}
```

```
GNBCUConfigurationUpdateFailureIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID               CRITICALITY reject  TYPE TransactionID              PRESENCE mandatory  }|
    { ID id-Cause                       CRITICALITY ignore  TYPE Cause                      PRESENCE mandatory  }|
    { ID id-TimeToWait                  CRITICALITY ignore  TYPE TimeToWait                 PRESENCE optional }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional },
    ...
}


-- **************************************************************
--
-- GNB-DU RESOURCE COORDINATION REQUEST
--
-- **************************************************************

GNBDUResourceCoordinationRequest ::= SEQUENCE {
    protocolIEs     ProtocolIE-Container        {{GNBDUResourceCoordinationRequest-IEs}},
    ...
}

GNBDUResourceCoordinationRequest-IEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                                 CRITICALITY reject  TYPE TransactionID                          PRESENCE mandatory  }|
    { ID id-RequestType                                   CRITICALITY reject  TYPE RequestType                            PRESENCE mandatory  }|
    { ID id-EUTRA-NR-CellResourceCoordinationReq-Container  CRITICALITY reject  TYPE EUTRA-NR-CellResourceCoordinationReq-Container     PRESENCE
mandatory}|
    { ID id-IgnoreResourceCoordinationContainer            CRITICALITY reject  TYPE IgnoreResourceCoordinationContainer    PRESENCE optional },
    ...
}


-- **************************************************************
--
-- GNB-DU RESOURCE COORDINATION RESPONSE
--
-- **************************************************************

GNBDUResourceCoordinationResponse ::= SEQUENCE {
    protocolIEs     ProtocolIE-Container        {{GNBDUResourceCoordinationResponse-IEs}},
    ...
}

GNBDUResourceCoordinationResponse-IEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                                   CRITICALITY reject  TYPE TransactionID                PRESENCE mandatory  }|
    { ID id-EUTRA-NR-CellResourceCoordinationReqAck-Container   CRITICALITY reject  TYPE EUTRA-NR-CellResourceCoordinationReqAck-Container
    PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- UE Context Setup ELEMENTARY PROCEDURE
--
-- **************************************************************
```

```
-- **************************************************************
--
-- UE CONTEXT SETUP REQUEST
--
-- **************************************************************

UEContextSetupRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextSetupRequestIEs} },
    ...
}

UEContextSetupRequestIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                      PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                       CRITICALITY ignore  TYPE GNB-DU-UE-F1AP-ID                      PRESENCE optional    }|
    { ID id-SpCell-ID                               CRITICALITY reject  TYPE NRCGI                                  PRESENCE mandatory   }|
    { ID id-ServCellIndex                           CRITICALITY reject  TYPE ServCellIndex                          PRESENCE mandatory   }|
    { ID id-SpCellULConfigured                      CRITICALITY ignore  TYPE CellULConfigured                       PRESENCE optional }|
    { ID id-CUtoDURRCInformation                    CRITICALITY reject  TYPE CUtoDURRCInformation                   PRESENCE mandatory}|
    { ID id-Candidate-SpCell-List                   CRITICALITY ignore  TYPE Candidate-SpCell-List                  PRESENCE optional }|
    { ID id-DRXCycle                                CRITICALITY ignore  TYPE DRXCycle                               PRESENCE optional }|
    { ID id-ResourceCoordinationTransferContainer   CRITICALITY ignore  TYPE ResourceCoordinationTransferContainer  PRESENCE optional }|
    { ID id-SCell-ToBeSetup-List                    CRITICALITY ignore  TYPE SCell-ToBeSetup-List                   PRESENCE optional }|
    { ID id-SRBs-ToBeSetup-List                     CRITICALITY reject  TYPE SRBs-ToBeSetup-List                    PRESENCE optional }|
    { ID id-DRBs-ToBeSetup-List                     CRITICALITY reject  TYPE DRBs-ToBeSetup-List                    PRESENCE optional }|
    { ID id-InactivityMonitoringRequest             CRITICALITY reject  TYPE InactivityMonitoringRequest            PRESENCE optional }|
    { ID id-RAT-FrequencyPriorityInformation        CRITICALITY reject  TYPE RAT-FrequencyPriorityInformation       PRESENCE optional }|
    { ID id-RRCContainer                            CRITICALITY ignore  TYPE RRCContainer                           PRESENCE optional }|
    { ID id-MaskedIMEISV                            CRITICALITY ignore  TYPE MaskedIMEISV                           PRESENCE optional }|
    { ID id-ServingPLMN                             CRITICALITY ignore  TYPE PLMN-Identity                          PRESENCE optional }|
    { ID id-GNB-DU-UE-AMBR-UL                       CRITICALITY ignore  TYPE BitRate                                PRESENCE conditional }|
    { ID id-RRCDeliveryStatusRequest                CRITICALITY ignore  TYPE RRCDeliveryStatusRequest               PRESENCE optional }|
    { ID id-ResourceCoordinationTransferInformation CRITICALITY ignore  TYPE ResourceCoordinationTransferInformation  PRESENCE optional }|
    { ID id-ServingCellMO                           CRITICALITY ignore  TYPE ServingCellMO                          PRESENCE optional }|
    { ID id-new-gNB-CU-UE-F1AP-ID                   CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID                      PRESENCE optional }|
    { ID id-RANUEID                                 CRITICALITY ignore  TYPE RANUEID                                PRESENCE optional }|
    { ID id-TraceActivation                         CRITICALITY ignore  TYPE TraceActivation                        PRESENCE optional }|
    { ID id-AdditionalRRMPriorityIndex          CRITICALITY ignore  TYPE AdditionalRRMPriorityIndex              PRESENCE optional },
    ...
}

Candidate-SpCell-List::= SEQUENCE (SIZE(1..maxnoofCandidateSpCells)) OF ProtocolIE-SingleContainer { { Candidate-SpCell-ItemIEs} }
SCell-ToBeSetup-List::= SEQUENCE (SIZE(1..maxnoofSCells)) OF ProtocolIE-SingleContainer { { SCell-ToBeSetup-ItemIEs} }
SRBs-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-ToBeSetup-ItemIEs} }
DRBs-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-ToBeSetup-ItemIEs} }


Candidate-SpCell-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-Candidate-SpCell-Item                   CRITICALITY ignore  TYPE Candidate-SpCell-Item                 PRESENCE mandatory   },
    ...
}


SCell-ToBeSetup-ItemIEs F1AP-PROTOCOL-IES ::= {
```

```
    { ID id-SCell-ToBeSetup-Item                    CRITICALITY ignore  TYPE SCell-ToBeSetup-Item             PRESENCE mandatory   },
    ...
}

SRBs-ToBeSetup-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-ToBeSetup-Item     CRITICALITY reject      TYPE SRBs-ToBeSetup-Item        PRESENCE mandatory},
    ...
}

DRBs-ToBeSetup-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-ToBeSetup-Item                CRITICALITY reject  TYPE DRBs-ToBeSetup-Item             PRESENCE mandatory},
    ...
}



-- **************************************************************
--
-- UE CONTEXT SETUP RESPONSE
--
-- **************************************************************

UEContextSetupResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextSetupResponseIEs} },
    ...
}


UEContextSetupResponseIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                  PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID                  PRESENCE mandatory   }|
    { ID id-DUtoCURRCInformation                    CRITICALITY reject  TYPE DUtoCURRCInformation               PRESENCE mandatory }|
    { ID id-C-RNTI                                  CRITICALITY ignore  TYPE C-RNTI                             PRESENCE optional }|
    { ID id-ResourceCoordinationTransferContainer   CRITICALITY ignore  TYPE ResourceCoordinationTransferContainer PRESENCE optional }|
    { ID id-FullConfiguration                       CRITICALITY reject  TYPE FullConfiguration                  PRESENCE optional }|
    { ID id-DRBs-Setup-List                         CRITICALITY ignore  TYPE DRBs-Setup-List                    PRESENCE optional }|
    { ID id-SRBs-FailedToBeSetup-List               CRITICALITY ignore  TYPE SRBs-FailedToBeSetup-List          PRESENCE optional }|
    { ID id-DRBs-FailedToBeSetup-List               CRITICALITY ignore  TYPE DRBs-FailedToBeSetup-List          PRESENCE optional }|
    { ID id-SCell-FailedtoSetup-List                CRITICALITY ignore  TYPE SCell-FailedtoSetup-List           PRESENCE optional }|
    { ID id-InactivityMonitoringResponse            CRITICALITY reject  TYPE InactivityMonitoringResponse       PRESENCE optional }|
    { ID id-CriticalityDiagnostics                  CRITICALITY ignore  TYPE CriticalityDiagnostics             PRESENCE optional }|
    { ID id-SRBs-Setup-List                         CRITICALITY ignore  TYPE SRBs-Setup-List                    PRESENCE optional },
    ...
}

DRBs-Setup-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-Setup-ItemIEs} }


SRBs-FailedToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-FailedToBeSetup-ItemIEs} }
DRBs-FailedToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-FailedToBeSetup-ItemIEs} }
SCell-FailedtoSetup-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF ProtocolIE-SingleContainer { { SCell-FailedtoSetup-ItemIEs} }
SRBs-Setup-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-Setup-ItemIEs} }

DRBs-Setup-ItemIEs F1AP-PROTOCOL-IES ::= {
```

```
    { ID id-DRBs-Setup-Item                    CRITICALITY ignore  TYPE DRBs-Setup-Item                 PRESENCE mandatory},
    ...
}

SRBs-Setup-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-Setup-Item                    CRITICALITY ignore  TYPE SRBs-Setup-Item                 PRESENCE mandatory},
    ...
}

SRBs-FailedToBeSetup-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-FailedToBeSetup-Item       CRITICALITY ignore      TYPE SRBs-FailedToBeSetup-Item     PRESENCE mandatory},
    ...
}


DRBs-FailedToBeSetup-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-FailedToBeSetup-Item       CRITICALITY ignore  TYPE DRBs-FailedToBeSetup-Item      PRESENCE mandatory},
    ...
}

SCell-FailedtoSetup-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SCell-FailedtoSetup-Item            CRITICALITY ignore  TYPE SCell-FailedtoSetup-Item      PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- UE CONTEXT SETUP FAILURE
--
-- **************************************************************

UEContextSetupFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextSetupFailureIEs} },
    ...
}

UEContextSetupFailureIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID           CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID          PRESENCE mandatory  }|
    { ID id-gNB-DU-UE-F1AP-ID           CRITICALITY ignore  TYPE GNB-DU-UE-F1AP-ID          PRESENCE optional }|
    { ID id-Cause                       CRITICALITY ignore  TYPE Cause                      PRESENCE mandatory  }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional }|
    { ID id-Potential-SpCell-List       CRITICALITY ignore  TYPE Potential-SpCell-List      PRESENCE optional },
    ...
}

Potential-SpCell-List::= SEQUENCE (SIZE(0..maxnoofPotentialSpCells)) OF ProtocolIE-SingleContainer { { Potential-SpCell-ItemIEs} }

Potential-SpCell-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-Potential-SpCell-Item               CRITICALITY ignore  TYPE Potential-SpCell-Item            PRESENCE mandatory   },
    ...
}

-- **************************************************************
--
```

```
-- UE Context Release Request ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- UE Context Release Request
--
-- **************************************************************

UEContextReleaseRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ UEContextReleaseRequestIEs}},
    ...
}

UEContextReleaseRequestIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-Cause                          CRITICALITY ignore  TYPE Cause                       PRESENCE mandatory   },
    ...
}


-- **************************************************************
--
-- UE Context Release (gNB-CU initiated) ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- UE CONTEXT RELEASE COMMAND
--
-- **************************************************************

UEContextReleaseCommand ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextReleaseCommandIEs} },
    ...
}

UEContextReleaseCommandIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-Cause                          CRITICALITY ignore  TYPE Cause                       PRESENCE mandatory   }|
    { ID id-RRCContainer                   CRITICALITY ignore  TYPE RRCContainer                PRESENCE optional }|
    { ID id-SRBID                          CRITICALITY ignore  TYPE SRBID                       PRESENCE conditional }|
    { ID id-oldgNB-DU-UE-F1AP-ID           CRITICALITY ignore  TYPE GNB-DU-UE-F1AP-ID           PRESENCE optional }|
    { ID id-ExecuteDuplication             CRITICALITY ignore  TYPE ExecuteDuplication          PRESENCE optional}|
    { ID id-RRCDeliveryStatusRequest       CRITICALITY ignore  TYPE RRCDeliveryStatusRequest    PRESENCE optional },
    ...
}

-- **************************************************************
--
```

```
-- UE CONTEXT RELEASE COMPLETE
--
-- **************************************************************

UEContextReleaseComplete ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextReleaseCompleteIEs} },
    ...
}


UEContextReleaseCompleteIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID           CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID          PRESENCE mandatory  }|
    { ID id-gNB-DU-UE-F1AP-ID           CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID          PRESENCE mandatory  }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional },
    ...
}

-- **************************************************************
--
-- UE Context Modification ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- UE CONTEXT MODIFICATION REQUEST
--
-- **************************************************************

UEContextModificationRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextModificationRequestIEs} },
    ...
}

UEContextModificationRequestIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                      PRESENCE mandatory  }|
    { ID id-gNB-DU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID                      PRESENCE mandatory  }|
    { ID id-SpCell-ID                               CRITICALITY ignore  TYPE NRCGI                                  PRESENCE optional }|
    { ID id-ServCellIndex                           CRITICALITY reject  TYPE ServCellIndex                          PRESENCE optional }|
    { ID id-SpCellULConfigured                      CRITICALITY ignore  TYPE CellULConfigured                       PRESENCE optional }|
    { ID id-DRXCycle                                CRITICALITY ignore  TYPE DRXCycle                               PRESENCE optional }|
    { ID id-CUtoDURRCInformation                    CRITICALITY reject  TYPE CUtoDURRCInformation                   PRESENCE optional }|
    { ID id-TransmissionActionIndicator             CRITICALITY ignore  TYPE TransmissionActionIndicator            PRESENCE optional }|
    { ID id-ResourceCoordinationTransferContainer   CRITICALITY ignore  TYPE ResourceCoordinationTransferContainer  PRESENCE optional }|
    { ID id-RRCReconfigurationCompleteIndicator     CRITICALITY ignore  TYPE RRCReconfigurationCompleteIndicator    PRESENCE optional }|
    { ID id-RRCContainer                            CRITICALITY reject  TYPE RRCContainer                           PRESENCE optional }|
    { ID id-SCell-ToBeSetupMod-List                 CRITICALITY ignore  TYPE SCell-ToBeSetupMod-List                PRESENCE optional }|
    { ID id-SCell-ToBeRemoved-List                  CRITICALITY ignore  TYPE SCell-ToBeRemoved-List                 PRESENCE optional }|
    { ID id-SRBs-ToBeSetupMod-List                  CRITICALITY reject  TYPE SRBs-ToBeSetupMod-List                 PRESENCE optional }|
    { ID id-DRBs-ToBeSetupMod-List                  CRITICALITY reject  TYPE DRBs-ToBeSetupMod-List                 PRESENCE optional }|
    { ID id-DRBs-ToBeModified-List                  CRITICALITY reject  TYPE DRBs-ToBeModified-List                 PRESENCE optional }|
    { ID id-SRBs-ToBeReleased-List                  CRITICALITY reject  TYPE SRBs-ToBeReleased-List                 PRESENCE optional }|
    { ID id-DRBs-ToBeReleased-List                  CRITICALITY reject  TYPE DRBs-ToBeReleased-List                 PRESENCE optional }|
    { ID id-InactivityMonitoringRequest             CRITICALITY reject  TYPE InactivityMonitoringRequest            PRESENCE optional }|
```

```
    { ID id-RAT-FrequencyPriorityInformation        CRITICALITY reject  TYPE RAT-FrequencyPriorityInformation         PRESENCE optional }|
    { ID id-DRXConfigurationIndicator               CRITICALITY ignore  TYPE DRXConfigurationIndicator               PRESENCE optional }|
    { ID id-RLCFailureIndication                    CRITICALITY ignore  TYPE RLCFailureIndication                    PRESENCE optional }|
    { ID id-UplinkTxDirectCurrentListInformation    CRITICALITY ignore  TYPE UplinkTxDirectCurrentListInformation    PRESENCE optional }|
    { ID id-GNB-DUConfigurationQuery                CRITICALITY reject  TYPE GNB-DUConfigurationQuery                PRESENCE optional }|
    { ID id-GNB-DU-UE-AMBR-UL                       CRITICALITY ignore  TYPE BitRate                                 PRESENCE optional }|
    { ID id-ExecuteDuplication                      CRITICALITY ignore  TYPE ExecuteDuplication                      PRESENCE optional}|
    { ID id-RRCDeliveryStatusRequest                CRITICALITY ignore  TYPE RRCDeliveryStatusRequest                PRESENCE optional }|
    { ID id-ResourceCoordinationTransferInformation CRITICALITY ignore  TYPE ResourceCoordinationTransferInformation  PRESENCE optional }|
    { ID id-ServingCellMO                           CRITICALITY ignore  TYPE ServingCellMO                           PRESENCE optional }|
    { ID id-NeedforGap                              CRITICALITY ignore  TYPE NeedforGap                              PRESENCE optional }|
    { ID id-FullConfiguration                       CRITICALITY reject  TYPE FullConfiguration                       PRESENCE optional }|
    { ID id-AdditionalRRMPriorityIndex              CRITICALITY ignore  TYPE AdditionalRRMPriorityIndex              PRESENCE optional }|
    { ID id-LowerLayerPresenceStatusChange          CRITICALITY ignore  TYPE LowerLayerPresenceStatusChange          PRESENCE optional },
    ...
}

SCell-ToBeSetupMod-List::= SEQUENCE (SIZE(1..maxnoofSCells)) OF ProtocolIE-SingleContainer { { SCell-ToBeSetupMod-ItemIEs} }
SCell-ToBeRemoved-List::= SEQUENCE (SIZE(1..maxnoofSCells)) OF ProtocolIE-SingleContainer { { SCell-ToBeRemoved-ItemIEs} }
SRBs-ToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-ToBeSetupMod-ItemIEs} }
DRBs-ToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-ToBeSetupMod-ItemIEs} }

DRBs-ToBeModified-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-ToBeModified-ItemIEs} }
SRBs-ToBeReleased-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-ToBeReleased-ItemIEs} }
DRBs-ToBeReleased-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-ToBeReleased-ItemIEs} }

SCell-ToBeSetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SCell-ToBeSetupMod-Item         CRITICALITY ignore  TYPE SCell-ToBeSetupMod-Item         PRESENCE mandatory   },
    ...
}

SCell-ToBeRemoved-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SCell-ToBeRemoved-Item          CRITICALITY ignore  TYPE SCell-ToBeRemoved-Item       PRESENCE mandatory   },
    ...
}


SRBs-ToBeSetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-ToBeSetupMod-Item      CRITICALITY reject  TYPE SRBs-ToBeSetupMod-Item     PRESENCE mandatory},
    ...
}


DRBs-ToBeSetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-ToBeSetupMod-Item      CRITICALITY reject  TYPE DRBs-ToBeSetupMod-Item     PRESENCE mandatory},
    ...
}

DRBs-ToBeModified-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-ToBeModified-Item      CRITICALITY reject  TYPE DRBs-ToBeModified-Item         PRESENCE mandatory},
    ...
}
```

```
SRBs-ToBeReleased-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-ToBeReleased-Item  CRITICALITY reject  TYPE SRBs-ToBeReleased-Item     PRESENCE mandatory},
    ...
}

DRBs-ToBeReleased-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-ToBeReleased-Item      CRITICALITY reject  TYPE DRBs-ToBeReleased-Item     PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- UE CONTEXT MODIFICATION RESPONSE
--
-- **************************************************************

UEContextModificationResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextModificationResponseIEs} },
    ...
}


UEContextModificationResponseIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                    PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID                    PRESENCE mandatory   }|
    { ID id-ResourceCoordinationTransferContainer   CRITICALITY ignore  TYPE ResourceCoordinationTransferContainer PRESENCE optional }|
    { ID id-DUtoCURRCInformation                    CRITICALITY reject  TYPE DUtoCURRCInformation                 PRESENCE optional}|
    { ID id-DRBs-SetupMod-List                      CRITICALITY ignore  TYPE DRBs-SetupMod-List                   PRESENCE optional}|
    { ID id-DRBs-Modified-List                      CRITICALITY ignore  TYPE DRBs-Modified-List                   PRESENCE optional}|
    { ID id-SRBs-FailedToBeSetupMod-List            CRITICALITY ignore  TYPE SRBs-FailedToBeSetupMod-List         PRESENCE optional }|
    { ID id-DRBs-FailedToBeSetupMod-List            CRITICALITY ignore  TYPE DRBs-FailedToBeSetupMod-List         PRESENCE optional }|
    { ID id-SCell-FailedtoSetupMod-List             CRITICALITY ignore  TYPE SCell-FailedtoSetupMod-List          PRESENCE optional }|
    { ID id-DRBs-FailedToBeModified-List            CRITICALITY ignore  TYPE DRBs-FailedToBeModified-List         PRESENCE optional }|
    { ID id-InactivityMonitoringResponse            CRITICALITY reject  TYPE InactivityMonitoringResponse         PRESENCE optional }|
    { ID id-CriticalityDiagnostics                  CRITICALITY ignore  TYPE CriticalityDiagnostics               PRESENCE optional }|
    { ID id-C-RNTI                                  CRITICALITY ignore  TYPE C-RNTI                               PRESENCE optional }|
    { ID id-Associated-SCell-List                   CRITICALITY ignore  TYPE Associated-SCell-List                PRESENCE optional }|
    { ID id-SRBs-SetupMod-List                      CRITICALITY ignore  TYPE SRBs-SetupMod-List                   PRESENCE optional }|
    { ID id-SRBs-Modified-List                      CRITICALITY ignore  TYPE SRBs-Modified-List                   PRESENCE optional }|
    { ID id-FullConfiguration                       CRITICALITY reject  TYPE FullConfiguration                    PRESENCE optional },
    ...
}


DRBs-SetupMod-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-SetupMod-ItemIEs} }
DRBs-Modified-List::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-Modified-ItemIEs } }
SRBs-SetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-SetupMod-ItemIEs} }
SRBs-Modified-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-Modified-ItemIEs } }
DRBs-FailedToBeModified-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-FailedToBeModified-ItemIEs} }
SRBs-FailedToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-FailedToBeSetupMod-ItemIEs} }
DRBs-FailedToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-FailedToBeSetupMod-ItemIEs} }
SCell-FailedtoSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF ProtocolIE-SingleContainer { { SCell-FailedtoSetupMod-ItemIEs} }

Associated-SCell-List ::= SEQUENCE (SIZE(1.. maxnoofSCells)) OF ProtocolIE-SingleContainer { { Associated-SCell-ItemIEs} }
```

```
DRBs-SetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-SetupMod-Item      CRITICALITY ignore      TYPE DRBs-SetupMod-Item     PRESENCE mandatory},
    ...
}


DRBs-Modified-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-Modified-Item          CRITICALITY ignore  TYPE DRBs-Modified-Item     PRESENCE mandatory},
    ...
}

SRBs-SetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-SetupMod-Item      CRITICALITY ignore      TYPE SRBs-SetupMod-Item     PRESENCE mandatory},
    ...
}


SRBs-Modified-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-Modified-Item          CRITICALITY ignore  TYPE SRBs-Modified-Item     PRESENCE mandatory},
    ...
}

SRBs-FailedToBeSetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-FailedToBeSetupMod-Item        CRITICALITY ignore  TYPE SRBs-FailedToBeSetupMod-Item     PRESENCE mandatory},
    ...
}


DRBs-FailedToBeSetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-FailedToBeSetupMod-Item        CRITICALITY ignore  TYPE DRBs-FailedToBeSetupMod-Item     PRESENCE mandatory},
    ...
}


DRBs-FailedToBeModified-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-FailedToBeModified-Item        CRITICALITY ignore  TYPE DRBs-FailedToBeModified-Item     PRESENCE mandatory},
    ...
}

SCell-FailedtoSetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SCell-FailedtoSetupMod-Item         CRITICALITY ignore  TYPE SCell-FailedtoSetupMod-Item      PRESENCE mandatory},
    ...
}

Associated-SCell-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-Associated-SCell-Item           CRITICALITY ignore  TYPE Associated-SCell-Item       PRESENCE mandatory},
    ...
}


-- **************************************************************
--
-- UE CONTEXT MODIFICATION FAILURE
```

```
--
-- **************************************************************

UEContextModificationFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextModificationFailureIEs} },
    ...
}

UEContextModificationFailureIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID               CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID               CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-Cause                           CRITICALITY ignore  TYPE Cause                       PRESENCE mandatory   }|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics      PRESENCE optional },
    ...
}


-- **************************************************************
--
-- UE Context Modification Required (gNB-DU initiated) ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- UE CONTEXT MODIFICATION REQUIRED
--
-- **************************************************************

UEContextModificationRequired ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextModificationRequiredIEs} },
    ...
}

UEContextModificationRequiredIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                           CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                      PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                           CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID                      PRESENCE mandatory   }|
    { ID id-ResourceCoordinationTransferContainer       CRITICALITY ignore  TYPE ResourceCoordinationTransferContainer  PRESENCE optional }|
    { ID id-DUtoCURRCInformation                        CRITICALITY reject  TYPE DUtoCURRCInformation                   PRESENCE optional}|
    { ID id-DRBs-Required-ToBeModified-List             CRITICALITY reject  TYPE DRBs-Required-ToBeModified-List        PRESENCE optional}|
    { ID id-SRBs-Required-ToBeReleased-List             CRITICALITY reject  TYPE SRBs-Required-ToBeReleased-List        PRESENCE optional}|
    { ID id-DRBs-Required-ToBeReleased-List             CRITICALITY reject  TYPE DRBs-Required-ToBeReleased-List        PRESENCE optional}|
    { ID id-Cause                                       CRITICALITY ignore  TYPE Cause                                  PRESENCE mandatory   },
    ...
}

DRBs-Required-ToBeModified-List::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-Required-ToBeModified-ItemIEs } }
DRBs-Required-ToBeReleased-List::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-Required-ToBeReleased-ItemIEs } }

SRBs-Required-ToBeReleased-List::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF ProtocolIE-SingleContainer { { SRBs-Required-ToBeReleased-ItemIEs } }

DRBs-Required-ToBeModified-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-Required-ToBeModified-Item         CRITICALITY reject  TYPE DRBs-Required-ToBeModified-Item    PRESENCE mandatory},
    ...
```

```
}

DRBs-Required-ToBeReleased-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-Required-ToBeReleased-Item         CRITICALITY reject  TYPE DRBs-Required-ToBeReleased-Item     PRESENCE mandatory},
    ...
}

SRBs-Required-ToBeReleased-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-SRBs-Required-ToBeReleased-Item         CRITICALITY reject  TYPE SRBs-Required-ToBeReleased-Item       PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- UE CONTEXT MODIFICATION CONFIRM
--
-- **************************************************************

UEContextModificationConfirm::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextModificationConfirmIEs} },
    ...
}


UEContextModificationConfirmIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                           CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                      PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                           CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID                      PRESENCE mandatory   }|
    { ID id-ResourceCoordinationTransferContainer       CRITICALITY ignore  TYPE ResourceCoordinationTransferContainer  PRESENCE optional }|
    { ID id-DRBs-ModifiedConf-List                      CRITICALITY ignore  TYPE DRBs-ModifiedConf-List                 PRESENCE optional}|
    { ID id-RRCContainer                                CRITICALITY ignore  TYPE RRCContainer                           PRESENCE optional }|
    { ID id-CriticalityDiagnostics                      CRITICALITY ignore  TYPE CriticalityDiagnostics                 PRESENCE optional }|
    { ID id-ExecuteDuplication                          CRITICALITY ignore  TYPE ExecuteDuplication                     PRESENCE optional}|
    { ID id-ResourceCoordinationTransferInformation     CRITICALITY ignore  TYPE ResourceCoordinationTransferInformation PRESENCE optional },
    ...
}

DRBs-ModifiedConf-List::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRBs-ModifiedConf-ItemIEs } }

DRBs-ModifiedConf-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-ModifiedConf-Item      CRITICALITY ignore  TYPE DRBs-ModifiedConf-Item         PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- UE CONTEXT MODIFICATION REFUSE
--
-- **************************************************************

UEContextModificationRefuse::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { UEContextModificationRefuseIEs} },
    ...
}
```

```
UEContextModificationRefuseIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-Cause                          CRITICALITY ignore  TYPE Cause                       PRESENCE mandatory   }|
    { ID id-CriticalityDiagnostics         CRITICALITY ignore  TYPE CriticalityDiagnostics      PRESENCE optional },
    ...
}


-- **************************************************************
--
-- WRITE-REPLACE WARNING ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Write-Replace Warning Request
--
-- **************************************************************

WriteReplaceWarningRequest ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {WriteReplaceWarningRequestIEs} },
    ...
}

WriteReplaceWarningRequestIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                    PRESENCE mandatory   }|
    { ID id-PWSSystemInformation            CRITICALITY reject  TYPE PWSSystemInformation             PRESENCE mandatory }|
    { ID id-RepetitionPeriod                CRITICALITY reject  TYPE RepetitionPeriod                 PRESENCE mandatory }|
    { ID id-NumberofBroadcastRequest        CRITICALITY reject  TYPE NumberofBroadcastRequest             PRESENCE mandatory }|
    { ID id-Cells-To-Be-Broadcast-List      CRITICALITY reject  TYPE Cells-To-Be-Broadcast-List           PRESENCE optional },
    ...
}

Cells-To-Be-Broadcast-List      ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-To-Be-Broadcast-List-ItemIEs } }

Cells-To-Be-Broadcast-List-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Cells-To-Be-Broadcast-Item      CRITICALITY reject  TYPE    Cells-To-Be-Broadcast-Item     PRESENCE mandatory   },
    ...
}

-- **************************************************************
--
-- Write-Replace Warning Response
--
-- **************************************************************

WriteReplaceWarningResponse ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {WriteReplaceWarningResponseIEs} },
    ...
}
```

```
WriteReplaceWarningResponseIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                          CRITICALITY reject  TYPE TransactionID                          PRESENCE mandatory   }|
    { ID id-Cells-Broadcast-Completed-List         CRITICALITY reject  TYPE Cells-Broadcast-Completed-List         PRESENCE optional }|
    { ID id-CriticalityDiagnostics                 CRITICALITY ignore  TYPE CriticalityDiagnostics                 PRESENCE optional }|
    { ID id-Dedicated-SIDelivery-NeededUE-List     CRITICALITY ignore  TYPE Dedicated-SIDelivery-NeededUE-List     PRESENCE optional },
    ...
}

Cells-Broadcast-Completed-List      ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-Broadcast-Completed-List-
ItemIEs } }

Cells-Broadcast-Completed-List-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Cells-Broadcast-Completed-Item      CRITICALITY reject  TYPE    Cells-Broadcast-Completed-Item    PRESENCE mandatory   },
    ...
}


-- **************************************************************
--
-- PWS CANCEL ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- PWS Cancel Request
--
-- **************************************************************

PWSCancelRequest ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {PWSCancelRequestIEs} },
    ...
}

PWSCancelRequestIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                          CRITICALITY reject TYPE TransactionID                          PRESENCE mandatory   }|
    { ID id-NumberofBroadcastRequest               CRITICALITY reject TYPE NumberofBroadcastRequest               PRESENCE mandatory }|
    { ID id-Broadcast-To-Be-Cancelled-List         CRITICALITY reject TYPE Broadcast-To-Be-Cancelled-List         PRESENCE optional }|
    { ID id-Cancel-all-Warning-Messages-Indicator  CRITICALITY reject TYPE Cancel-all-Warning-Messages-Indicator  PRESENCE optional }|
    { ID id-NotificationInformation                CRITICALITY reject TYPE NotificationInformation                PRESENCE optional},
    ...
}

Broadcast-To-Be-Cancelled-List      ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Broadcast-To-Be-Cancelled-List-
ItemIEs } }

Broadcast-To-Be-Cancelled-List-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Broadcast-To-Be-Cancelled-Item      CRITICALITY reject  TYPE    Broadcast-To-Be-Cancelled-Item    PRESENCE mandatory   },
    ...
}

-- **************************************************************
--
-- PWS Cancel Response
```

```
--
-- **************************************************************

PWSCancelResponse ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {PWSCancelResponseIEs} },
    ...
}

PWSCancelResponseIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                   PRESENCE mandatory   }|
    { ID id-Cells-Broadcast-Cancelled-List  CRITICALITY reject  TYPE Cells-Broadcast-Cancelled-List  PRESENCE optional }|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics          PRESENCE optional },
    ...
}

Cells-Broadcast-Cancelled-List      ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Cells-Broadcast-Cancelled-List-
ItemIEs } }

Cells-Broadcast-Cancelled-List-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-Cells-Broadcast-Cancelled-Item      CRITICALITY reject  TYPE    Cells-Broadcast-Cancelled-Item    PRESENCE mandatory   },
    ...
}

-- **************************************************************
--
-- UE Inactivity Notification ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- UE Inactivity Notification
--
-- **************************************************************

UEInactivityNotification ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ UEInactivityNotificationIEs}},
    ...
}

UEInactivityNotificationIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                  PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                       CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID                  PRESENCE mandatory   }|
    { ID id-DRB-Activity-List                       CRITICALITY reject  TYPE DRB-Activity-List                  PRESENCE mandatory   }  ,
    ...
}

DRB-Activity-List::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRB-Activity-ItemIEs } }

DRB-Activity-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRB-Activity-Item           CRITICALITY reject  TYPE DRB-Activity-Item      PRESENCE mandatory},
    ...
}
```

```
-- **************************************************************
--
-- Initial UL RRC Message Transfer ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- INITIAL UL RRC Message Transfer
--
-- **************************************************************

InitialULRRCMessageTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ InitialULRRCMessageTransferIEs}},
    ...
}

InitialULRRCMessageTransferIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-DU-UE-F1AP-ID                  CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID               PRESENCE mandatory   }|
    { ID id-NRCGI                              CRITICALITY reject  TYPE NRCGI                           PRESENCE mandatory   }|
    { ID id-C-RNTI                             CRITICALITY reject  TYPE C-RNTI                          PRESENCE mandatory   }|
    { ID id-RRCContainer                       CRITICALITY reject  TYPE RRCContainer                    PRESENCE mandatory   }|
    { ID id-DUtoCURRCContainer                 CRITICALITY reject  TYPE DUtoCURRCContainer              PRESENCE optional }|
    { ID id-SULAccessIndication                CRITICALITY ignore  TYPE SULAccessIndication             PRESENCE optional }|
    { ID id-TransactionID                      CRITICALITY ignore  TYPE TransactionID                   PRESENCE mandatory   }|
    { ID id-RANUEID                            CRITICALITY ignore  TYPE RANUEID                         PRESENCE optional }|
    { ID id-RRCContainer-RRCSetupComplete      CRITICALITY ignore  TYPE RRCContainer-RRCSetupComplete   PRESENCE optional },
    ...
}


-- **************************************************************
--
-- DL RRC Message Transfer ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- DL RRC Message Transfer
--
-- **************************************************************

DLRRCMessageTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ DLRRCMessageTransferIEs}},
    ...
}

DLRRCMessageTransferIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                      CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID               PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                      CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID               PRESENCE mandatory   }|
    { ID id-oldgNB-DU-UE-F1AP-ID                   CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID               PRESENCE optional }|
    { ID id-SRBID                                  CRITICALITY reject  TYPE SRBID                           PRESENCE mandatory   }|
    { ID id-ExecuteDuplication                     CRITICALITY ignore  TYPE ExecuteDuplication              PRESENCE optional}|
```

```
    { ID id-RRCContainer                              CRITICALITY reject  TYPE RRCContainer                          PRESENCE mandatory   }|
    { ID id-RAT-FrequencyPriorityInformation          CRITICALITY reject  TYPE RAT-FrequencyPriorityInformation    PRESENCE optional }|
    { ID id-RRCDeliveryStatusRequest                  CRITICALITY ignore  TYPE RRCDeliveryStatusRequest            PRESENCE optional }|
    { ID id-UEContextNotRetrievable                   CRITICALITY reject  TYPE UEContextNotRetrievable             PRESENCE optional }|
    { ID id-RedirectedRRCmessage                      CRITICALITY reject  TYPE OCTET STRING                        PRESENCE optional }|
    { ID id-PLMNAssistanceInfoForNetShar              CRITICALITY ignore  TYPE PLMN-Identity                       PRESENCE optional }|
    { ID id-new-gNB-CU-UE-F1AP-ID                     CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID                   PRESENCE optional }|
    { ID id-AdditionalRRMPriorityIndex             CRITICALITY ignore  TYPE AdditionalRRMPriorityIndex         PRESENCE optional },
    ...
}
-- **************************************************************
--
-- UL RRC Message Transfer ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- UL RRC Message Transfer
--
-- **************************************************************

ULRRCMessageTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ ULRRCMessageTransferIEs}},
    ...
}

ULRRCMessageTransferIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID              CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID           PRESENCE mandatory   }|
    { ID id-SRBID                          CRITICALITY reject  TYPE SRBID                       PRESENCE mandatory   }|
    { ID id-RRCContainer                   CRITICALITY reject  TYPE RRCContainer                PRESENCE mandatory   }|
    { ID id-SelectedPLMNID                 CRITICALITY reject  TYPE PLMN-Identity               PRESENCE optional    }|
    { ID id-new-gNB-DU-UE-F1AP-ID          CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID           PRESENCE optional    },
    ...
}

-- **************************************************************
--
-- PRIVATE MESSAGE
--
-- **************************************************************

PrivateMessage ::= SEQUENCE {
    privateIEs      PrivateIE-Container {{PrivateMessage-IEs}},
    ...
}

PrivateMessage-IEs F1AP-PRIVATE-IES ::= {
    ...
}


-- **************************************************************
```

```
--
-- System Information ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- System information Delivery Command
--
-- **************************************************************

SystemInformationDeliveryCommand ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ SystemInformationDeliveryCommandIEs}},
    ...
}

SystemInformationDeliveryCommandIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID           CRITICALITY reject  TYPE TransactionID                 PRESENCE mandatory  }|
    { ID id-NRCGI                   CRITICALITY reject  TYPE NRCGI                         PRESENCE mandatory  }|
    { ID id-SItype-List             CRITICALITY reject  TYPE SItype-List                   PRESENCE mandatory  }|
    { ID id-ConfirmedUEID           CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID             PRESENCE mandatory  },
    ...
}


-- **************************************************************
--
-- Paging PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Paging
--
-- **************************************************************

Paging ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ PagingIEs}},
    ...
}

PagingIEs F1AP-PROTOCOL-IES ::= {
    { ID id-UEIdentityIndexValue    CRITICALITY reject  TYPE UEIdentityIndexValue       PRESENCE mandatory }|
    { ID id-PagingIdentity          CRITICALITY reject  TYPE PagingIdentity             PRESENCE mandatory }|
    { ID id-PagingDRX               CRITICALITY ignore  TYPE PagingDRX                  PRESENCE optional  }|
    { ID id-PagingPriority          CRITICALITY ignore  TYPE PagingPriority             PRESENCE optional  }|
    { ID id-PagingCell-List         CRITICALITY ignore  TYPE PagingCell-list            PRESENCE mandatory }|
    { ID id-PagingOrigin            CRITICALITY ignore  TYPE PagingOrigin               PRESENCE optional  },
    ...
}

PagingCell-list::= SEQUENCE (SIZE(1.. maxnoofPagingCells)) OF ProtocolIE-SingleContainer { { PagingCell-ItemIEs } }
```

```
PagingCell-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-PagingCell-Item     CRITICALITY ignore  TYPE PagingCell-Item           PRESENCE mandatory} ,
    ...
}



-- **************************************************************
--
-- Notify
--
-- **************************************************************

Notify ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ NotifyIEs}},
    ...
}

NotifyIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID                  CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID               PRESENCE mandatory   }|
    { ID id-gNB-DU-UE-F1AP-ID                  CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID               PRESENCE mandatory   }|
    { ID id-DRB-Notify-List                    CRITICALITY reject  TYPE DRB-Notify-List                 PRESENCE mandatory   },
    ...
}

DRB-Notify-List::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF ProtocolIE-SingleContainer { { DRB-Notify-ItemIEs } }

DRB-Notify-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRB-Notify-Item         CRITICALITY reject  TYPE DRB-Notify-Item        PRESENCE mandatory},
    ...
}


-- **************************************************************
--
-- NETWORK ACCESS RATE REDUCTION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- Network Access Rate Reduction
--
-- **************************************************************

NetworkAccessRateReduction ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ NetworkAccessRateReductionIEs }},
    ...
}

NetworkAccessRateReductionIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID              PRESENCE mandatory   }|
    { ID id-UAC-Assistance-Info             CRITICALITY reject  TYPE UAC-Assistance-Info        PRESENCE mandatory   },
    ...
```

```
}

-- **************************************************************
--
-- PWS RESTART INDICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- PWS Restart Indication
--
-- **************************************************************

PWSRestartIndication ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { { PWSRestartIndicationIEs} },
    ...
}

PWSRestartIndicationIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                PRESENCE mandatory   }|
    { ID id-NR-CGI-List-For-Restart-List    CRITICALITY reject  TYPE NR-CGI-List-For-Restart-List PRESENCE mandatory   },
    ...
}

NR-CGI-List-For-Restart-List        ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { NR-CGI-List-For-Restart-List-
ItemIEs } }

NR-CGI-List-For-Restart-List-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-NR-CGI-List-For-Restart-Item        CRITICALITY reject  TYPE    NR-CGI-List-For-Restart-Item     PRESENCE mandatory   },
    ...
}

-- **************************************************************
--
-- PWS FAILURE INDICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- PWS Failure Indication
--
-- **************************************************************

PWSFailureIndication ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { { PWSFailureIndicationIEs} },
    ...
}

PWSFailureIndicationIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID           CRITICALITY reject  TYPE TransactionID              PRESENCE mandatory }|
    { ID id-PWS-Failed-NR-CGI-List  CRITICALITY reject  TYPE PWS-Failed-NR-CGI-List     PRESENCE optional  },
    ...
```

```
}

PWS-Failed-NR-CGI-List      ::= SEQUENCE (SIZE(1.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { PWS-Failed-NR-CGI-List-ItemIEs } }

PWS-Failed-NR-CGI-List-ItemIEs F1AP-PROTOCOL-IES    ::= {
    { ID id-PWS-Failed-NR-CGI-Item      CRITICALITY reject  TYPE    PWS-Failed-NR-CGI-Item      PRESENCE mandatory },
    ...
}


-- **************************************************************
--
-- gNB-DU STATUS INDICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- gNB-DU Status Indication
--
-- **************************************************************

GNBDUStatusIndication ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {GNBDUStatusIndicationIEs} },
    ...
}

GNBDUStatusIndicationIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                PRESENCE mandatory   }|
    { ID id-GNBDUOverloadInformation        CRITICALITY reject  TYPE GNBDUOverloadInformation     PRESENCE mandatory   },
    ...
}



-- **************************************************************
--
-- RRC Delivery Report ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- RRC Delivery Report
--
-- **************************************************************

RRCDeliveryReport ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ RRCDeliveryReportIEs}},
    ...
}

RRCDeliveryReportIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID   CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID  PRESENCE mandatory  }|
```

```
    { ID id-gNB-DU-UE-F1AP-ID   CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID  PRESENCE mandatory  }|
    { ID id-RRCDeliveryStatus   CRITICALITY ignore  TYPE RRCDeliveryStatus  PRESENCE mandatory  }|
    { ID id-SRBID               CRITICALITY ignore  TYPE SRBID              PRESENCE mandatory  },
    ...
}

-- **************************************************************
--
-- F1 Removal ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- F1 Removal Request
--
-- **************************************************************

F1RemovalRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ F1RemovalRequestIEs }},
    ...
}

F1RemovalRequestIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID           CRITICALITY reject  TYPE TransactionID                 PRESENCE mandatory  },
    ...
}

-- **************************************************************
--
-- F1 Removal Response
--
-- **************************************************************

F1RemovalResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ F1RemovalResponseIEs }},
    ...
}

F1RemovalResponseIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID               CRITICALITY reject  TYPE TransactionID                PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics       PRESENCE optional  },

    ...
}

-- **************************************************************
--
-- F1 Removal Failure
--
-- **************************************************************

F1RemovalFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ F1RemovalFailureIEs }},
```

```
    ...
}

F1RemovalFailureIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID               CRITICALITY reject  TYPE TransactionID                PRESENCE mandatory }|
    { ID id-Cause                       CRITICALITY ignore  TYPE Cause                        PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics       PRESENCE optional  },

    ...
}


-- **************************************************************
--
-- TRACE ELEMENTARY PROCEDURES
--
-- **************************************************************

-- **************************************************************
--
-- TRACE START
--
-- **************************************************************

TraceStart ::= SEQUENCE {
    protocolIEs     ProtocolIE-Container        { {TraceStartIEs} },
    ...
}

TraceStartIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID           CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID            PRESENCE mandatory }|
    { ID id-gNB-DU-UE-F1AP-ID           CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID            PRESENCE mandatory }|
    { ID id-TraceActivation             CRITICALITY ignore  TYPE TraceActivation              PRESENCE mandatory },
    ...
}

-- **************************************************************
--
-- DEACTIVATE TRACE
--
-- **************************************************************

DeactivateTrace ::= SEQUENCE {
    protocolIEs     ProtocolIE-Container        { {DeactivateTraceIEs} },
    ...
}

DeactivateTraceIEs F1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-UE-F1AP-ID           CRITICALITY reject  TYPE GNB-CU-UE-F1AP-ID            PRESENCE mandatory }|
    { ID id-gNB-DU-UE-F1AP-ID           CRITICALITY reject  TYPE GNB-DU-UE-F1AP-ID            PRESENCE mandatory }|
    { ID id-TraceID                     CRITICALITY ignore  TYPE TraceID                      PRESENCE mandatory },
    ...
}
```

```
-- **************************************************************
--
-- DU-CU Radio Information Transfer ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- DU-CU Radio Information Transfer
--
-- **************************************************************

DUCURadioInformationTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ DUCURadioInformationTransferIEs}},
    ...
}

DUCURadioInformationTransferIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                    PRESENCE mandatory   }|
    { ID id-DUCURadioInformationType        CRITICALITY ignore  TYPE DUCURadioInformationType         PRESENCE mandatory   },
    ...
}



-- **************************************************************
--
-- CU-DU Radio Information Transfer ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- CU-DU Radio Information Transfer
--
-- **************************************************************

CUDURadioInformationTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ CUDURadioInformationTransferIEs}},
    ...
}

CUDURadioInformationTransferIEs F1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject  TYPE TransactionID                    PRESENCE mandatory   }|
    { ID id-CUDURadioInformationType        CRITICALITY ignore  TYPE CUDURadioInformationType         PRESENCE mandatory   },
    ...
}

END
-- ASN1STOP
```

9.4.5 Information Element Definitions

```
-- ASN1START
-- **************************************************************
--
-- Information Element Definitions
--
-- **************************************************************

F1AP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    id-gNB-CUSystemInformation,
    id-HandoverPreparationInformation,
    id-TAISliceSupportList,
    id-RANAC,
    id-BearerTypeChange,
    id-Cell-Direction,
    id-Cell-Type,
    id-CellGroupConfig,
    id-AvailablePLMNList,
    id-PDUSessionID,
    id-ULPDUSessionAggregateMaximumBitRate,
    id-DC-Based-Duplication-Configured,
    id-DC-Based-Duplication-Activation,
    id-Duplication-Activation,
    id-DLPDCPSNLength,
    id-ULPDCPSNLength,
    id-RLC-Status,
    id-MeasurementTimingConfiguration,
    id-DRB-Information,
    id-QoSFlowMappingIndication,
    id-ServingCellMO,
    id-RLCMode,
    id-ExtendedServedPLMNs-List,
    id-ExtendedAvailablePLMN-List,
    id-DRX-LongCycleStartOffset,
    id-SelectedBandCombinationIndex,
    id-SelectedFeatureSetEntryIndex,
    id-Ph-InfoSCG,
    id-latest-RRC-Version-Enhanced,
    id-RequestedBandCombinationIndex,
    id-RequestedFeatureSetEntryIndex,
    id-RequestedP-MaxFR2,
    id-DRX-Config,
    id-UEAssistanceInformation,
    id-PDCCH-BlindDetectionSCG,
    id-Requested-PDCCH-BlindDetectionSCG,
```

```
    id-BPLMN-ID-Info-List,
    id-NotificationInformation,
    id-TNLAssociationTransportLayerAddressgNBDU,
    id-portNumber,
    id-AdditionalSIBMessageList,
    id-IgnorePRACHConfiguration,
    id-CG-Config,
    id-Ph-InfoMCG,
    id-AggressorgNBSetID,
    id-VictimgNBSetID,
    id-MeasGapSharingConfig,
    id-systemInformationAreaID,
    id-areaScope,
    maxNRARFCN,
    maxnoofErrors,
    maxnoofBPLMNs,
    maxnoofBPLMNsNRminus1,
    maxnoofDLUPTNLInformation,
    maxnoofNrCellBands,
    maxnoofULUPTNLInformation,
    maxnoofQoSFlows,
    maxnoofSliceItems,
    maxnoofSIBTypes,
    maxnoofSITypes,
    maxCellineNB,
    maxnoofExtendedBPLMNs,
    maxnoofAdditionalSIBs,
    maxnoofUACPLMNs,
    maxnoofUACperPLMN,
    maxCellingNBDU,
    maxnoofTLAs,
    maxnoofGTPTLAs


FROM F1AP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage

FROM F1AP-CommonDataTypes

    ProtocolExtensionContainer{},
    F1AP-PROTOCOL-EXTENSION,
    ProtocolIE-SingleContainer{},
    F1AP-PROTOCOL-IES

FROM F1AP-Containers;

-- A

AdditionalSIBMessageList ::= SEQUENCE (SIZE(1..maxnoofAdditionalSIBs)) OF AdditionalSIBMessageList-Item
```

```
AdditionalSIBMessageList-Item ::= SEQUENCE {
    additionalSIB           OCTET STRING,
    iE-Extensions       ProtocolExtensionContainer { { AdditionalSIBMessageList-Item-ExtIEs} } OPTIONAL
}

AdditionalSIBMessageList-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

AdditionalRRMPriorityIndex ::= BIT STRING (SIZE(32))

AggressorCellList ::= SEQUENCE (SIZE(1..maxCellingNBDU)) OF AggressorCellList-Item

AggressorCellList-Item ::= SEQUENCE {
    aggressorCell-ID        NRCGI,
    iE-Extensions   ProtocolExtensionContainer { { AggressorCellList-Item-ExtIEs } }        OPTIONAL
}

AggressorCellList-Item-ExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

AggressorgNBSetID ::= SEQUENCE {
    aggressorgNBSetID       GNBSetID,
    iE-Extensions   ProtocolExtensionContainer { { AggressorgNBSetID-ExtIEs } } OPTIONAL
}

AggressorgNBSetID-ExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

AllocationAndRetentionPriority ::= SEQUENCE {
    priorityLevel               PriorityLevel,
    pre-emptionCapability       Pre-emptionCapability,
    pre-emptionVulnerability    Pre-emptionVulnerability,
    iE-Extensions               ProtocolExtensionContainer { {AllocationAndRetentionPriority-ExtIEs} } OPTIONAL,
    ...
}

AllocationAndRetentionPriority-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Associated-SCell-Item ::= SEQUENCE {
    sCell-ID        NRCGI,
    iE-Extensions   ProtocolExtensionContainer { { Associated-SCell-ItemExtIEs } }  OPTIONAL
}

Associated-SCell-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

AvailablePLMNList ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF AvailablePLMNList-Item
```

```
AvailablePLMNList-Item ::= SEQUENCE {
    pLMNIdentity            PLMN-Identity,
    iE-Extensions       ProtocolExtensionContainer { { AvailablePLMNList-Item-ExtIEs} } OPTIONAL
}

AvailablePLMNList-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

AveragingWindow  ::= INTEGER (0..4095, ...)

AreaScope ::= ENUMERATED {true, ...}

-- B

BitRate ::= INTEGER (0..4000000000000,...)

BearerTypeChange ::= ENUMERATED {true, ...}

BPLMN-ID-Info-List ::= SEQUENCE (SIZE(1..maxnoofBPLMNsNRminus1)) OF BPLMN-ID-Info-Item

BPLMN-ID-Info-Item ::= SEQUENCE {
    pLMN-Identity-List          AvailablePLMNList,
    extended-PLMN-Identity-List ExtendedAvailablePLMN-List  OPTIONAL,
    fiveGS-TAC                  FiveGS-TAC                  OPTIONAL,
    nr-cell-ID                  NRCellIdentity,
    ranac                       RANAC                       OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { BPLMN-ID-Info-ItemExtIEs} } OPTIONAL,
    ...
}

BPLMN-ID-Info-ItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ServedPLMNs-List ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF ServedPLMNs-Item

ServedPLMNs-Item ::= SEQUENCE {
    pLMN-Identity               PLMN-Identity,
    iE-Extensions               ProtocolExtensionContainer { { ServedPLMNs-ItemExtIEs} } OPTIONAL,
    ...
}

ServedPLMNs-ItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {
{ ID id-TAISliceSupportList CRITICALITY ignore  EXTENSION SliceSupportList      PRESENCE optional },
    ...
}


-- C

Cancel-all-Warning-Messages-Indicator ::= ENUMERATED {true, ...}

Candidate-SpCell-Item ::= SEQUENCE {
```

```
    candidate-SpCell-ID         NRCGI   ,
    iE-Extensions   ProtocolExtensionContainer { { Candidate-SpCell-ItemExtIEs } }  OPTIONAL,
    ...
}

Candidate-SpCell-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cause ::= CHOICE {
    radioNetwork        CauseRadioNetwork,
    transport           CauseTransport,
    protocol            CauseProtocol,
    misc                CauseMisc,
    choice-extension    ProtocolIE-SingleContainer { { Cause-ExtIEs} }
}

Cause-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

CauseMisc ::= ENUMERATED {
    control-processing-overload,
    not-enough-user-plane-processing-resources,
    hardware-failure,
    om-intervention,
    unspecified,
    ...
}

CauseProtocol ::= ENUMERATED {
    transfer-syntax-error,
    abstract-syntax-error-reject,
    abstract-syntax-error-ignore-and-notify,
    message-not-compatible-with-receiver-state,
    semantic-error,
    abstract-syntax-error-falsely-constructed-message,
    unspecified,
    ...
}

CauseRadioNetwork ::= ENUMERATED {
    unspecified,
    rl-failure-rlc,
    unknown-or-already-allocated-gnb-cu-ue-f1ap-id,
    unknown-or-already-allocated-gnb-du-ue-f1ap-id,
    unknown-or-inconsistent-pair-of-ue-f1ap-id,
    interaction-with-other-procedure,
    not-supported-qci-Value,
    action-desirable-for-radio-reasons,
    no-radio-resources-available,
    procedure-cancelled,
    normal-release,
    ...,
```

```
    cell-not-available,
    rl-failure-others,
    ue-rejection,
    resources-not-available-for-the-slice,
    amf-initiated-abnormal-release,
    release-due-to-pre-emption,
    plmn-not-served-by-the-gNB-CU,
    multiple-drb-id-instances,
    unknown-drb-id
}

CauseTransport ::= ENUMERATED {
    unspecified,
    transport-resource-unavailable,
    ...
}

CellGroupConfig ::= OCTET STRING

Cell-Direction ::= ENUMERATED {dl-only, ul-only}

Cells-Failed-to-be-Activated-List-Item ::= SEQUENCE {
    nRCGI               NRCGI,
    cause               Cause,
    iE-Extensions       ProtocolExtensionContainer { { Cells-Failed-to-be-Activated-List-ItemExtIEs } } OPTIONAL,
    ...
}

Cells-Failed-to-be-Activated-List-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-Status-Item ::= SEQUENCE {
    nRCGI           NRCGI,
    service-status      Service-Status,
    iE-Extensions               ProtocolExtensionContainer { { Cells-Status-ItemExtIEs } }  OPTIONAL,
    ...
}

Cells-Status-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-To-Be-Broadcast-Item ::= SEQUENCE {
    nRCGI               NRCGI,
    iE-Extensions       ProtocolExtensionContainer { { Cells-To-Be-Broadcast-ItemExtIEs } } OPTIONAL,
    ...
}

Cells-To-Be-Broadcast-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-Broadcast-Completed-Item ::= SEQUENCE {
```

```
    nRCGI               NRCGI,
    iE-Extensions       ProtocolExtensionContainer { { Cells-Broadcast-Completed-ItemExtIEs } } OPTIONAL,
    ...
}

Cells-Broadcast-Completed-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Broadcast-To-Be-Cancelled-Item ::= SEQUENCE {
    nRCGI               NRCGI,
    iE-Extensions       ProtocolExtensionContainer { { Broadcast-To-Be-Cancelled-ItemExtIEs } } OPTIONAL,
    ...
}

Broadcast-To-Be-Cancelled-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


Cells-Broadcast-Cancelled-Item ::= SEQUENCE {
    nRCGI               NRCGI,
    numberOfBroadcasts  NumberOfBroadcasts,
    iE-Extensions       ProtocolExtensionContainer { { Cells-Broadcast-Cancelled-ItemExtIEs } } OPTIONAL,
    ...
}

Cells-Broadcast-Cancelled-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-to-be-Activated-List-Item ::= SEQUENCE {
    nRCGI       NRCGI,
    nRPCI       NRPCI       OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { Cells-to-be-Activated-List-ItemExtIEs} } OPTIONAL,
    ...
}

Cells-to-be-Activated-List-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-gNB-CUSystemInformation         CRITICALITY reject  EXTENSION GNB-CUSystemInformation      PRESENCE optional }|
    { ID id-AvailablePLMNList               CRITICALITY ignore  EXTENSION AvailablePLMNList            PRESENCE optional }|
    { ID id-ExtendedAvailablePLMN-List      CRITICALITY ignore  EXTENSION ExtendedAvailablePLMN-List   PRESENCE optional },
    ...
}

Cells-to-be-Deactivated-List-Item ::= SEQUENCE {
    nRCGI           NRCGI   ,
    iE-Extensions               ProtocolExtensionContainer { { Cells-to-be-Deactivated-List-ItemExtIEs } } OPTIONAL,
    ...
}

Cells-to-be-Deactivated-List-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
Cells-to-be-Barred-Item::= SEQUENCE {
    nRCGI           NRCGI   ,
    cellBarred      CellBarred,
    iE-Extensions               ProtocolExtensionContainer { { Cells-to-be-Barred-Item-ExtIEs } } OPTIONAL
}

Cells-to-be-Barred-Item-ExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

CellBarred  ::= ENUMERATED {barred, not-barred, ...}

CellSize ::= ENUMERATED {verysmall, small, medium, large, ...}

CellType ::= SEQUENCE {
    cellSize        CellSize,
    iE-Extensions       ProtocolExtensionContainer { {CellType-ExtIEs} }    OPTIONAL,
    ...
}

CellType-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

CellULConfigured ::=  ENUMERATED {none, ul, sul, ul-and-sul, ...}

CNUEPagingIdentity ::= CHOICE {
    fiveG-S-TMSI            BIT STRING (SIZE(48)),
    choice-extension            ProtocolIE-SingleContainer { { CNUEPagingIdentity-ExtIEs } }
}

CNUEPagingIdentity-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}


CP-TransportLayerAddress ::= CHOICE {
    endpoint-IP-address             TransportLayerAddress,
    endpoint-IP-address-and-port    Endpoint-IP-address-and-port,
    choice-extension            ProtocolIE-SingleContainer { { CP-TransportLayerAddress-ExtIEs } }
}

CP-TransportLayerAddress-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

CriticalityDiagnostics ::= SEQUENCE {
    procedureCode                   ProcedureCode                                               OPTIONAL,
    triggeringMessage               TriggeringMessage                                           OPTIONAL,
    procedureCriticality            Criticality                                                 OPTIONAL,
    transactionID                   TransactionID                                               OPTIONAL,
    iEsCriticalityDiagnostics       CriticalityDiagnostics-IE-List                              OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer {{CriticalityDiagnostics-ExtIEs}}    OPTIONAL,
```

```
    ...
}

CriticalityDiagnostics-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1.. maxnoofErrors)) OF CriticalityDiagnostics-IE-Item

CriticalityDiagnostics-IE-Item ::= SEQUENCE {
    iECriticality           Criticality,
    iE-ID                   ProtocolIE-ID,
    typeOfError             TypeOfError,
    iE-Extensions           ProtocolExtensionContainer {{CriticalityDiagnostics-IE-Item-ExtIEs}}  OPTIONAL,
    ...
}

CriticalityDiagnostics-IE-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

C-RNTI ::= INTEGER (0..65535, ...)

CUDURadioInformationType ::= CHOICE {
    rIM                         CUDURIMInformation,
    choice-extension            ProtocolIE-SingleContainer { { CUDURadioInformationType-ExtIEs} }
}

CUDURadioInformationType-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

CUDURIMInformation ::= SEQUENCE {
    victimgNBSetID          GNBSetID,
    rIMRSDetectionStatus    RIMRSDetectionStatus,
    iE-Extensions           ProtocolExtensionContainer { { CUDURIMInformation-ExtIEs} } OPTIONAL
}

CUDURIMInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

CUtoDURRCInformation ::= SEQUENCE {
    cG-ConfigInfo                       CG-ConfigInfo                       OPTIONAL,
    uE-CapabilityRAT-ContainerList      UE-CapabilityRAT-ContainerList      OPTIONAL,
    measConfig                          MeasConfig                          OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { CUtoDURRCInformation-ExtIEs} } OPTIONAL,
    ...
}

CUtoDURRCInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-HandoverPreparationInformation  CRITICALITY ignore  EXTENSION HandoverPreparationInformation     PRESENCE optional }|
    { ID id-CellGroupConfig                 CRITICALITY ignore  EXTENSION CellGroupConfig                   PRESENCE optional }|
    { ID id-MeasurementTimingConfiguration  CRITICALITY ignore  EXTENSION MeasurementTimingConfiguration    PRESENCE optional }|
```

```
    { ID id-UEAssistanceInformation         CRITICALITY ignore  EXTENSION UEAssistanceInformation           PRESENCE optional }|
    { ID id-CG-Config                       CRITICALITY ignore  EXTENSION CG-Config                       PRESENCE optional },
    ...
}

-- D

DCBasedDuplicationConfigured::= ENUMERATED{true,..., false}

Dedicated-SIDelivery-NeededUE-Item ::= SEQUENCE {
    gNB-CU-UE-F1AP-ID                       GNB-CU-UE-F1AP-ID,
    nRCGI                                   NRCGI,
    iE-Extensions                           ProtocolExtensionContainer { { DedicatedSIDeliveryNeededUE-Item-ExtIEs} } OPTIONAL,
    ...
}

DedicatedSIDeliveryNeededUE-Item-ExtIEs F1AP-PROTOCOL-EXTENSION::={
    ...
}

DLUPTNLInformation-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofDLUPTNLInformation)) OF DLUPTNLInformation-ToBeSetup-Item

DLUPTNLInformation-ToBeSetup-Item ::= SEQUENCE {
    dLUPTNLInformation  UPTransportLayerInformation ,
    iE-Extensions   ProtocolExtensionContainer { { DLUPTNLInformation-ToBeSetup-ItemExtIEs } }  OPTIONAL,
    ...
}

DLUPTNLInformation-ToBeSetup-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Activity-Item ::= SEQUENCE {
    dRBID           DRBID,
    dRB-Activity    DRB-Activity        OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { DRB-Activity-ItemExtIEs } }  OPTIONAL,
    ...
}

DRB-Activity-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Activity ::= ENUMERATED {active, not-active}

DRBID ::= INTEGER (1..32, ...)

DRBs-FailedToBeModified-Item    ::= SEQUENCE {
    dRBID       DRBID       ,
    cause       Cause       OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-FailedToBeModified-ItemExtIEs } }   OPTIONAL,
    ...
}
```

```
DRBs-FailedToBeModified-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-FailedToBeSetup-Item   ::= SEQUENCE {
    dRBID   DRBID,
    cause   Cause   OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-FailedToBeSetup-ItemExtIEs } }  OPTIONAL,
    ...
}

DRBs-FailedToBeSetup-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


DRBs-FailedToBeSetupMod-Item    ::= SEQUENCE {
    dRBID       DRBID   ,
    cause       Cause           OPTIONAL ,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-FailedToBeSetupMod-ItemExtIEs } }   OPTIONAL,
    ...
}

DRBs-FailedToBeSetupMod-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Information ::= SEQUENCE {
    dRB-QoS     QoSFlowLevelQoSParameters,
    sNSSAI      SNSSAI,
    notificationControl     NotificationControl     OPTIONAL,
    flows-Mapped-To-DRB-List    Flows-Mapped-To-DRB-List,
    iE-Extensions   ProtocolExtensionContainer { { DRB-Information-ItemExtIEs } }   OPTIONAL
}

DRB-Information-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-Modified-Item  ::= SEQUENCE {
    dRBID                           DRBID,
    lCID                                LCID        OPTIONAL,
    dLUPTNLInformation-ToBeSetup-List       DLUPTNLInformation-ToBeSetup-List,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-Modified-ItemExtIEs } } OPTIONAL,
    ...
}

DRBs-Modified-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-RLC-Status          CRITICALITY ignore          EXTENSION RLC-Status                PRESENCE optional },
    ...
}

DRBs-ModifiedConf-Item  ::= SEQUENCE {
    dRBID                           DRBID,
```

```
    uLUPTNLInformation-ToBeSetup-List       ULUPTNLInformation-ToBeSetup-List   ,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-ModifiedConf-ItemExtIEs } } OPTIONAL,
    ...
}

DRBs-ModifiedConf-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Notify-Item ::= SEQUENCE {
    dRBID           DRBID,
    notification-Cause  Notification-Cause,
    iE-Extensions   ProtocolExtensionContainer { { DRB-Notify-ItemExtIEs } }    OPTIONAL,
    ...
}

DRB-Notify-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-Required-ToBeModified-Item ::= SEQUENCE {
    dRBID                           DRBID,
    dLUPTNLInformation-ToBeSetup-List       DLUPTNLInformation-ToBeSetup-List   ,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-Required-ToBeModified-ItemExtIEs } }    OPTIONAL,
    ...
}

DRBs-Required-ToBeModified-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-RLC-Status          CRITICALITY ignore          EXTENSION RLC-Status                PRESENCE optional },
    ...
}

DRBs-Required-ToBeReleased-Item ::= SEQUENCE {
    dRBID       DRBID,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-Required-ToBeReleased-ItemExtIEs } }    OPTIONAL,
    ...
}

DRBs-Required-ToBeReleased-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-Setup-Item ::= SEQUENCE {
    dRBID                           DRBID,
    lCID                                LCID        OPTIONAL,
    dLUPTNLInformation-ToBeSetup-List       DLUPTNLInformation-ToBeSetup-List   ,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-Setup-ItemExtIEs } }    OPTIONAL,
    ...
}

DRBs-Setup-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
DRBs-SetupMod-Item  ::= SEQUENCE {
    dRBID                           DRBID,
    lCID                                LCID        OPTIONAL,
    dLUPTNLInformation-ToBeSetup-List       DLUPTNLInformation-ToBeSetup-List   ,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-SetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

DRBs-SetupMod-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


DRBs-ToBeModified-Item  ::= SEQUENCE {
    dRBID                       DRBID,
    qoSInformation              QoSInformation  OPTIONAL,
    uLUPTNLInformation-ToBeSetup-List   ULUPTNLInformation-ToBeSetup-List   ,
    uLConfiguration             ULConfiguration OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-ToBeModified-ItemExtIEs } } OPTIONAL,
    ...
}

DRBs-ToBeModified-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-DLPDCPSNLength                      CRITICALITY ignore  EXTENSION PDCPSNLength                  PRESENCE optional }|
    { ID id-ULPDCPSNLength                      CRITICALITY ignore  EXTENSION PDCPSNLength                  PRESENCE optional }|
    {ID id-BearerTypeChange                     CRITICALITY ignore  EXTENSION BearerTypeChange              PRESENCE optional}|
    { ID id-RLCMode                             CRITICALITY ignore  EXTENSION RLCMode                       PRESENCE optional }|
    { ID id-Duplication-Activation              CRITICALITY reject  EXTENSION DuplicationActivation         PRESENCE optional }|
    { ID id-DC-Based-Duplication-Configured     CRITICALITY reject  EXTENSION DCBasedDuplicationConfigured  PRESENCE optional }|
    { ID id-DC-Based-Duplication-Activation     CRITICALITY reject  EXTENSION DuplicationActivation         PRESENCE optional },
    ...
}

DRBs-ToBeReleased-Item  ::= SEQUENCE {
    dRBID   DRBID,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-ToBeReleased-ItemExtIEs } } OPTIONAL,
    ...
}

DRBs-ToBeReleased-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-ToBeSetup-Item ::= SEQUENCE    {
    dRBID                       DRBID,
    qoSInformation              QoSInformation,
    uLUPTNLInformation-ToBeSetup-List   ULUPTNLInformation-ToBeSetup-List   ,
    rLCMode                     RLCMode,
    uLConfiguration             ULConfiguration OPTIONAL,
    duplicationActivation       DuplicationActivation   OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-ToBeSetup-ItemExtIEs } }    OPTIONAL,
    ...
}
```

```
DRBs-ToBeSetup-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-DC-Based-Duplication-Configured     CRITICALITY reject  EXTENSION DCBasedDuplicationConfigured      PRESENCE optional }|
    { ID id-DC-Based-Duplication-Activation     CRITICALITY reject  EXTENSION DuplicationActivation             PRESENCE optional }|
    { ID id-DLPDCPSNLength                      CRITICALITY ignore  EXTENSION PDCPSNLength                       PRESENCE mandatory }|
    { ID id-ULPDCPSNLength                      CRITICALITY ignore  EXTENSION PDCPSNLength                       PRESENCE optional },
    ...
}


DRBs-ToBeSetupMod-Item  ::= SEQUENCE {
    dRBID                       DRBID,
    qoSInformation              QoSInformation,
    uLUPTNLInformation-ToBeSetup-List       ULUPTNLInformation-ToBeSetup-List,
    rLCMode                     RLCMode,
    uLConfiguration             ULConfiguration OPTIONAL,
    duplicationActivation       DuplicationActivation   OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-ToBeSetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

DRBs-ToBeSetupMod-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-DC-Based-Duplication-Configured     CRITICALITY reject  EXTENSION DCBasedDuplicationConfigured      PRESENCE optional }|
    { ID id-DC-Based-Duplication-Activation     CRITICALITY reject  EXTENSION DuplicationActivation             PRESENCE optional }|
    { ID id-DLPDCPSNLength                      CRITICALITY ignore  EXTENSION PDCPSNLength                       PRESENCE optional }|
    { ID id-ULPDCPSNLength                      CRITICALITY ignore  EXTENSION PDCPSNLength                       PRESENCE optional },
    ...
}

DRXCycle    ::= SEQUENCE {
    longDRXCycleLength  LongDRXCycleLength,
    shortDRXCycleLength     ShortDRXCycleLength OPTIONAL,
    shortDRXCycleTimer  ShortDRXCycleTimer OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { DRXCycle-ExtIEs} } OPTIONAL,
    ...
}

DRXCycle-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRX-Config ::= OCTET STRING

DRXConfigurationIndicator   ::= ENUMERATED{ release, ...}

DRX-LongCycleStartOffset ::= INTEGER (0..10239)

DUtoCURRCContainer ::= OCTET STRING

DUCURadioInformationType ::= CHOICE {
    rIM                         DUCURIMInformation,
    choice-extension            ProtocolIE-SingleContainer { { DUCURadioInformationType-ExtIEs} }
}

DUCURadioInformationType-ExtIEs F1AP-PROTOCOL-IES ::= {
```

```
    ...
}

DUCURIMInformation ::= SEQUENCE {
    victimgNBSetID              GNBSetID,
    rIMRSDetectionStatus        RIMRSDetectionStatus,
    aggressorCellList           AggressorCellList,
    iE-Extensions               ProtocolExtensionContainer { { DUCURIMInformation-ExtIEs} }     OPTIONAL
}

DUCURIMInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DUtoCURRCInformation ::= SEQUENCE {
    cellGroupConfig     CellGroupConfig,
    measGapConfig           MeasGapConfig   OPTIONAL,
    requestedP-MaxFR1               OCTET STRING                OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { DUtoCURRCInformation-ExtIEs} } OPTIONAL,
    ...
}

DUtoCURRCInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-DRX-LongCycleStartOffset            CRITICALITY ignore  EXTENSION DRX-LongCycleStartOffset          PRESENCE optional }|
    { ID id-SelectedBandCombinationIndex        CRITICALITY ignore  EXTENSION SelectedBandCombinationIndex      PRESENCE optional }|
    { ID id-SelectedFeatureSetEntryIndex        CRITICALITY ignore  EXTENSION SelectedFeatureSetEntryIndex      PRESENCE optional }|
    { ID id-Ph-InfoSCG                          CRITICALITY ignore  EXTENSION Ph-InfoSCG                        PRESENCE optional }|
    { ID id-RequestedBandCombinationIndex       CRITICALITY ignore  EXTENSION RequestedBandCombinationIndex     PRESENCE optional }|
    { ID id-RequestedFeatureSetEntryIndex       CRITICALITY ignore  EXTENSION RequestedFeatureSetEntryIndex     PRESENCE optional }|
    { ID id-DRX-Config                          CRITICALITY ignore  EXTENSION DRX-Config                        PRESENCE optional }|
    { ID id-PDCCH-BlindDetectionSCG             CRITICALITY ignore  EXTENSION PDCCH-BlindDetectionSCG           PRESENCE optional }|
    { ID id-Requested-PDCCH-BlindDetectionSCG   CRITICALITY ignore  EXTENSION Requested-PDCCH-BlindDetectionSCG PRESENCE optional }|
    { ID id-Ph-InfoMCG                          CRITICALITY ignore  EXTENSION Ph-InfoMCG                        PRESENCE optional }|
    { ID id-MeasGapSharingConfig                CRITICALITY ignore  EXTENSION MeasGapSharingConfig              PRESENCE optional },
    ...
}

DuplicationActivation ::= ENUMERATED{active,inactive,... }

DuplicationIndication ::= ENUMERATED {true, ... , false }

Dynamic5QIDescriptor    ::= SEQUENCE {
    qoSPriorityLevel                    INTEGER (1..127),
    packetDelayBudget                   PacketDelayBudget,
    packetErrorRate                     PacketErrorRate,
    fiveQI                              INTEGER (0..255, ...)                               OPTIONAL,
    delayCritical                       ENUMERATED {delay-critical, non-delay-critical}     OPTIONAL,
    -- C-ifGBRflow: This IE shall be present if the GBR QoS Flow Information IE is present in the QoS Flow Level QoS Parameters IE.
    averagingWindow                     AveragingWindow                                     OPTIONAL,
    -- C-ifGBRflow: This IE shall be present if the GBR QoS Flow Information IE is present in the QoS Flow Level QoS Parameters IE.
    maxDataBurstVolume                  MaxDataBurstVolume                                  OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { Dynamic5QIDescriptor-ExtIEs } } OPTIONAL
}
```

```
Dynamic5QIDescriptor-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- E

Endpoint-IP-address-and-port ::=SEQUENCE {
    endpointIPAddress TransportLayerAddress,
    iE-Extensions                   ProtocolExtensionContainer { { Endpoint-IP-address-and-port-ExtIEs} } OPTIONAL
}

Endpoint-IP-address-and-port-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-portNumber  CRITICALITY reject  EXTENSION PortNumber        PRESENCE optional},
    ...
}

ExtendedAvailablePLMN-List ::= SEQUENCE (SIZE(1..maxnoofExtendedBPLMNs)) OF ExtendedAvailablePLMN-Item

ExtendedAvailablePLMN-Item ::= SEQUENCE {
    pLMNIdentity            PLMN-Identity,
    iE-Extensions       ProtocolExtensionContainer { { ExtendedAvailablePLMN-Item-ExtIEs} } OPTIONAL
}

ExtendedAvailablePLMN-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ExtendedServedPLMNs-List ::= SEQUENCE (SIZE(1.. maxnoofExtendedBPLMNs)) OF ExtendedServedPLMNs-Item

ExtendedServedPLMNs-Item ::= SEQUENCE {
    pLMN-Identity               PLMN-Identity,
    tAISliceSupportList         SliceSupportList    OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { ExtendedServedPLMNs-ItemExtIEs} } OPTIONAL,
    ...
}

ExtendedServedPLMNs-ItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRACells-List  ::= SEQUENCE (SIZE (1.. maxCellineNB)) OF EUTRACells-List-item

EUTRACells-List-item ::= SEQUENCE {
    eUTRA-Cell-ID                   EUTRA-Cell-ID,
    served-EUTRA-Cells-Information  Served-EUTRA-Cells-Information,
    iE-Extensions ProtocolExtensionContainer { { EUTRACells-List-itemExtIEs } }    OPTIONAL
}

EUTRACells-List-itemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


EUTRA-Cell-ID ::= BIT STRING (SIZE(28))
```

```
EUTRA-Coex-FDD-Info ::= SEQUENCE {
    uL-EARFCN                       ExtendedEARFCN                  OPTIONAL,
    dL-EARFCN                       ExtendedEARFCN,
    uL-Transmission-Bandwidth       EUTRA-Transmission-Bandwidth    OPTIONAL,
    dL-Transmission-Bandwidth       EUTRA-Transmission-Bandwidth,
    iE-Extensions                   ProtocolExtensionContainer { {EUTRA-Coex-FDD-Info-ExtIEs} } OPTIONAL,
    ...
}

EUTRA-Coex-FDD-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-Coex-Mode-Info ::= CHOICE {
    fDD     EUTRA-Coex-FDD-Info,
    tDD     EUTRA-Coex-TDD-Info,
    ...
}

EUTRA-Coex-TDD-Info ::= SEQUENCE {
    eARFCN                          ExtendedEARFCN,
    transmission-Bandwidth          EUTRA-Transmission-Bandwidth,
    subframeAssignment              EUTRA-SubframeAssignment,
    specialSubframe-Info            EUTRA-SpecialSubframe-Info,
    iE-Extensions                   ProtocolExtensionContainer { {EUTRA-Coex-TDD-Info-ExtIEs} } OPTIONAL,
    ...
}
EUTRA-Coex-TDD-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}
EUTRA-CyclicPrefixDL ::= ENUMERATED {
    normal,
    extended,
    ...
}

EUTRA-CyclicPrefixUL ::= ENUMERATED {
    normal,
    extended,
    ...
}

EUTRA-PRACH-Configuration ::= SEQUENCE {
    rootSequenceIndex                       INTEGER (0..837),
    zeroCorrelationIndex                    INTEGER (0..15),
    highSpeedFlag                           BOOLEAN,
    prach-FreqOffset                        INTEGER (0..94),
    prach-ConfigIndex                       INTEGER (0..63)     OPTIONAL,
    -- C-ifTDD: This IE shall be present if the EUTRA-Mode-Info IE in the Resource Coordination E-UTRA Cell Information IE is set to the value
"TDD"
    iE-Extensions                           ProtocolExtensionContainer { {EUTRA-PRACH-Configuration-ExtIEs} } OPTIONAL,
    ...
}
```

```
EUTRA-PRACH-Configuration-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


EUTRA-SpecialSubframe-Info ::= SEQUENCE {
    specialSubframePatterns     EUTRA-SpecialSubframePatterns,
    cyclicPrefixDL              EUTRA-CyclicPrefixDL,
    cyclicPrefixUL              EUTRA-CyclicPrefixUL,
    iE-Extensions               ProtocolExtensionContainer { { EUTRA-SpecialSubframe-Info-ExtIEs} } OPTIONAL,
    ...
}

EUTRA-SpecialSubframe-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-SpecialSubframePatterns ::= ENUMERATED {
    ssp0,
    ssp1,
    ssp2,
    ssp3,
    ssp4,
    ssp5,
    ssp6,
    ssp7,
    ssp8,
    ssp9,
    ssp10,
    ...
}

EUTRA-SubframeAssignment ::= ENUMERATED {
    sa0,
    sa1,
    sa2,
    sa3,
    sa4,
    sa5,
    sa6,
    ...
}

EUTRA-Transmission-Bandwidth ::= ENUMERATED {
    bw6,
    bw15,
    bw25,
    bw50,
    bw75,
    bw100,
    ...
}
```

```
EUTRANQoS   ::= SEQUENCE {
    qCI                             QCI,
    allocationAndRetentionPriority  AllocationAndRetentionPriority,
    gbrQosInformation               GBR-QosInformation                                  OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { EUTRANQoS-ExtIEs} }  OPTIONAL,
    ...
}

EUTRANQoS-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ExecuteDuplication ::= ENUMERATED{true,...}

ExtendedEARFCN ::= INTEGER (0..262143)

EUTRA-Mode-Info ::= CHOICE {
    eUTRAFDD        EUTRA-FDD-Info,
    eUTRATDD        EUTRA-TDD-Info,
    choice-extension    ProtocolIE-SingleContainer { { EUTRA-Mode-Info-ExtIEs} }
}

EUTRA-Mode-Info-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

EUTRA-NR-CellResourceCoordinationReq-Container  ::= OCTET STRING

EUTRA-NR-CellResourceCoordinationReqAck-Container   ::= OCTET STRING

EUTRA-FDD-Info ::= SEQUENCE {
    uL-offsetToPointA               OffsetToPointA,
    dL-offsetToPointA               OffsetToPointA,
    iE-Extensions                   ProtocolExtensionContainer { {EUTRA-FDD-Info-ExtIEs} } OPTIONAL,
    ...
}

EUTRA-FDD-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-TDD-Info ::= SEQUENCE {
    offsetToPointA                  OffsetToPointA,
    iE-Extensions                   ProtocolExtensionContainer { {EUTRA-TDD-Info-ExtIEs} } OPTIONAL,
    ...
}

EUTRA-TDD-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- F

FDD-Info ::= SEQUENCE {
```

```
    uL-NRFreqInfo                       NRFreqInfo,
    dL-NRFreqInfo                       NRFreqInfo,
    uL-Transmission-Bandwidth       Transmission-Bandwidth,
    dL-Transmission-Bandwidth       Transmission-Bandwidth,
    iE-Extensions                   ProtocolExtensionContainer { {FDD-Info-ExtIEs} } OPTIONAL,
    ...
}

FDD-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


Flows-Mapped-To-DRB-List    ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF Flows-Mapped-To-DRB-Item

Flows-Mapped-To-DRB-Item    ::= SEQUENCE {
    qoSFlowIdentifier                           QoSFlowIdentifier,
    qoSFlowLevelQoSParameters               QoSFlowLevelQoSParameters,
    iE-Extensions                           ProtocolExtensionContainer { { Flows-Mapped-To-DRB-ItemExtIEs} } OPTIONAL
}

Flows-Mapped-To-DRB-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    {ID id-QoSFlowMappingIndication     CRITICALITY ignore EXTENSION QoSFlowMappingIndication    PRESENCE optional},
    ...
}

FreqBandNrItem ::= SEQUENCE {
    freqBandIndicatorNr             INTEGER (1..1024,...),
    supportedSULBandList        SEQUENCE (SIZE(0..maxnoofNrCellBands)) OF SupportedSULFreqBandItem,
    iE-Extensions               ProtocolExtensionContainer { {FreqBandNrItem-ExtIEs} } OPTIONAL,
    ...
}

FreqBandNrItem-ExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

FullConfiguration ::= ENUMERATED {full, ...}

-- G


GBR-QosInformation ::= SEQUENCE {
    e-RAB-MaximumBitrateDL          BitRate,
    e-RAB-MaximumBitrateUL          BitRate,
    e-RAB-GuaranteedBitrateDL       BitRate,
    e-RAB-GuaranteedBitrateUL       BitRate,
    iE-Extensions                   ProtocolExtensionContainer { { GBR-QosInformation-ExtIEs} } OPTIONAL,
    ...
}

GBR-QosInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
GBR-QoSFlowInformation::= SEQUENCE {
    maxFlowBitRateDownlink          BitRate,
    maxFlowBitRateUplink            BitRate,
    guaranteedFlowBitRateDownlink   BitRate,
    guaranteedFlowBitRateUplink     BitRate,
    maxPacketLossRateDownlink       MaxPacketLossRate       OPTIONAL,
    maxPacketLossRateUplink         MaxPacketLossRate       OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { GBR-QosFlowInformation-ExtIEs} } OPTIONAL,
    ...
}

GBR-QosFlowInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

CG-Config ::= OCTET STRING

GNB-CUSystemInformation::= SEQUENCE {
    sibtypetobeupdatedlist  SEQUENCE (SIZE(1.. maxnoofSIBTypes)) OF SibtypetobeupdatedListItem,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-CUSystemInformation-ExtIEs} } OPTIONAL,
    ...
}

GNB-CUSystemInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    {ID id-systemInformationAreaID  CRITICALITY ignore  EXTENSION SystemInformationAreaID PRESENCE optional},
    ...
}

GNB-CU-TNL-Association-Setup-Item::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CP-TransportLayerAddress    ,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-CU-TNL-Association-Setup-Item-ExtIEs} } OPTIONAL
}

GNB-CU-TNL-Association-Setup-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-CU-TNL-Association-Failed-To-Setup-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CP-TransportLayerAddress    ,
    cause                                   Cause,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-CU-TNL-Association-Failed-To-Setup-Item-ExtIEs} } OPTIONAL
}

GNB-CU-TNL-Association-Failed-To-Setup-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


GNB-CU-TNL-Association-To-Add-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CP-TransportLayerAddress    ,
    tNLAssociationUsage                         TNLAssociationUsage,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-CU-TNL-Association-To-Add-Item-ExtIEs} } OPTIONAL
}
```

```
GNB-CU-TNL-Association-To-Add-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-CU-TNL-Association-To-Remove-Item::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CP-TransportLayerAddress    ,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-CU-TNL-Association-To-Remove-Item-ExtIEs} } OPTIONAL
}

GNB-CU-TNL-Association-To-Remove-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    {ID id-TNLAssociationTransportLayerAddressgNBDU CRITICALITY reject  EXTENSION CP-TransportLayerAddress PRESENCE optional},
    ...
}


GNB-CU-TNL-Association-To-Update-Item::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CP-TransportLayerAddress    ,
    tNLAssociationUsage                         TNLAssociationUsage OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-CU-TNL-Association-To-Update-Item-ExtIEs} } OPTIONAL
}

GNB-CU-TNL-Association-To-Update-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-CU-UE-F1AP-ID       ::= INTEGER (0..4294967295)

GNB-DU-UE-F1AP-ID       ::= INTEGER (0..4294967295)

GNB-DU-ID           ::= INTEGER (0..68719476735)

GNB-CU-Name ::= PrintableString(SIZE(1..150,...))

GNB-DU-Name ::= PrintableString(SIZE(1..150,...))

GNB-DU-Served-Cells-Item ::= SEQUENCE {
    served-Cell-Information     Served-Cell-Information,
    gNB-DU-System-Information   GNB-DU-System-Information   OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { GNB-DU-Served-Cells-ItemExtIEs} }  OPTIONAL,
    ...
}

GNB-DU-Served-Cells-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-DU-System-Information ::= SEQUENCE {
    mIB-message     MIB-message,
    sIB1-message        SIB1-message,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-DU-System-Information-ExtIEs } } OPTIONAL,
    ...
}
```

```
GNB-DU-System-Information-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-DUConfigurationQuery ::= ENUMERATED {true, ...}

GNBDUOverloadInformation ::= ENUMERATED {overloaded, not-overloaded}

GNB-DU-TNL-Association-To-Remove-Item::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CP-TransportLayerAddress    ,
    tNLAssociationTransportLayerAddressgNBCU        CP-TransportLayerAddress        OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-DU-TNL-Association-To-Remove-Item-ExtIEs} } OPTIONAL
}

GNB-DU-TNL-Association-To-Remove-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

GNBSetID ::= BIT STRING (SIZE(22))

GTP-TEID                ::= OCTET STRING (SIZE (4))

GTPTLAs ::= SEQUENCE (SIZE(1.. maxnoofGTPTLAs)) OF  GTPTLA-Item


GTPTLA-Item ::= SEQUENCE {
    gTPTransportLayerAddresses              TransportLayerAddress,
    iE-Extensions   ProtocolExtensionContainer { { GTPTLA-Item-ExtIEs } }           OPTIONAL
}

GTPTLA-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

GTPTunnel               ::= SEQUENCE {
    transportLayerAddress       TransportLayerAddress,
    gTP-TEID        GTP-TEID,
    iE-Extensions                   ProtocolExtensionContainer { { GTPTunnel-ExtIEs } } OPTIONAL,
    ...
}

GTPTunnel-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- H

HandoverPreparationInformation ::= OCTET STRING

-- I

IgnorePRACHConfiguration::= ENUMERATED { true,...}

IgnoreResourceCoordinationContainer ::= ENUMERATED { yes,...}
```

```
InactivityMonitoringRequest ::= ENUMERATED { true,...}
InactivityMonitoringResponse ::= ENUMERATED { not-supported,...}
InterfacesToTrace ::= BIT STRING (SIZE(8))

IntendedTDD-DL-ULConfig ::= SEQUENCE {
    nRSCS                       ENUMERATED { scs15, scs30, scs60, scs120,...},
    nRCP                        ENUMERATED { normal, extended,...},
    nRDLULTxPeriodicity         ENUMERATED { ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms3, ms4, ms5, ms10, ms20, ms40, ms60, ms80, ms100, ms120,
ms140, ms160, ...},
    iE-Extensions                       ProtocolExtensionContainer { {IntendedTDD-DL-ULConfig-ExtIEs} } OPTIONAL
}

IntendedTDD-DL-ULConfig-ExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- J

-- K

-- L

LCID ::= INTEGER (1..32, ...)


LongDRXCycleLength ::=  ENUMERATED
{ms10, ms20, ms32, ms40, ms60, ms64, ms70, ms80, ms128, ms160, ms256, ms320, ms512, ms640, ms1024, ms1280, ms2048, ms2560, ms5120, ms10240, ...}

LowerLayerPresenceStatusChange ::= ENUMERATED {
    suspend-lower-layers,
    resume-lower-layers,
    ...

}

-- M

MaskedIMEISV ::=    BIT STRING (SIZE (64))

MaxDataBurstVolume  ::= INTEGER (0..4095, ..., 4096.. 2000000)
MaxPacketLossRate ::= INTEGER (0..1000)

MIB-message ::= OCTET STRING

MeasConfig ::= OCTET STRING

MeasGapConfig ::= OCTET STRING

MeasGapSharingConfig ::= OCTET STRING

MeasurementTimingConfiguration ::= OCTET STRING

MessageIdentifier ::= BIT STRING (SIZE (16))
```

```
-- N

NeedforGap::= ENUMERATED {true, ...}

Neighbour-Cell-Information-Item ::= SEQUENCE {
    nRCGI               NRCGI,
    intendedTDD-DL-ULConfig     IntendedTDD-DL-ULConfig OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { Neighbour-Cell-Information-ItemExtIEs } }    OPTIONAL
}

Neighbour-Cell-Information-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NGRANAllocationAndRetentionPriority ::= SEQUENCE {
    priorityLevel               PriorityLevel,
    pre-emptionCapability       Pre-emptionCapability,
    pre-emptionVulnerability    Pre-emptionVulnerability,
    iE-Extensions               ProtocolExtensionContainer { {NGRANAllocationAndRetentionPriority-ExtIEs} } OPTIONAL
}

NGRANAllocationAndRetentionPriority-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NR-CGI-List-For-Restart-Item ::= SEQUENCE {
    nRCGI               NRCGI,
    iE-Extensions       ProtocolExtensionContainer { { NR-CGI-List-For-Restart-ItemExtIEs } }   OPTIONAL,
    ...
}

NR-CGI-List-For-Restart-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NonDynamic5QIDescriptor ::= SEQUENCE {
    fiveQI                      INTEGER (0..255, ...),
    qoSPriorityLevel            INTEGER (1..127)                OPTIONAL,
    averagingWindow             AveragingWindow                 OPTIONAL,
    maxDataBurstVolume          MaxDataBurstVolume              OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { NonDynamic5QIDescriptor-ExtIEs } } OPTIONAL
}

NonDynamic5QIDescriptor-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Notification-Cause ::= ENUMERATED {fulfilled, not-fulfilled, ...}

NotificationControl ::= ENUMERATED {active, not-active, ...}

NotificationInformation ::= SEQUENCE {
    message-Identifier  MessageIdentifier,
    serialNumber        SerialNumber,
```

```
    iE-Extensions   ProtocolExtensionContainer { { NotificationInformationExtIEs} } OPTIONAL,
    ...
}

NotificationInformationExtIEs       F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NRFreqInfo ::=  SEQUENCE {
    nRARFCN         INTEGER (0..maxNRARFCN),
    sul-Information SUL-Information     OPTIONAL,
    freqBandListNr  SEQUENCE (SIZE(1..maxnoofNrCellBands)) OF FreqBandNrItem,
    iE-Extensions   ProtocolExtensionContainer { { NRFreqInfoExtIEs} } OPTIONAL,
    ...
}

NRFreqInfoExtIEs        F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NRCGI ::= SEQUENCE {
    pLMN-Identity           PLMN-Identity,
    nRCellIdentity          NRCellIdentity,
    iE-Extensions           ProtocolExtensionContainer { {NRCGI-ExtIEs} } OPTIONAL,
    ...
}

NRCGI-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NR-Mode-Info ::= CHOICE {
    fDD     FDD-Info,
    tDD     TDD-Info,
    choice-extension            ProtocolIE-SingleContainer { { NR-Mode-Info-ExtIEs} }
}

NR-Mode-Info-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}


NRCellIdentity ::= BIT STRING (SIZE(36))

NRNRB ::= ENUMERATED { nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121,
nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...}

NRPCI ::= INTEGER(0..1007)

NRSCS ::= ENUMERATED { scs15, scs30, scs60, scs120, ...}

NumberOfBroadcasts ::= INTEGER (0..65535)

NumberofBroadcastRequest ::= INTEGER (0..65535)
```

```
NumDLULSymbols ::= SEQUENCE {
    numDLSymbols    INTEGER (0..13, ...),
    numULSymbols    INTEGER (0..13, ...),
    iE-Extensions           ProtocolExtensionContainer { { NumDLULSymbols-ExtIEs} } OPTIONAL
}

NumDLULSymbols-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- O

OffsetToPointA  ::= INTEGER (0..2199,...)


-- P

PacketDelayBudget ::= INTEGER (0..1023, ...)

PacketErrorRate ::= SEQUENCE {
    pER-Scalar          PER-Scalar,
    pER-Exponent        PER-Exponent,
    iE-Extensions       ProtocolExtensionContainer { {PacketErrorRate-ExtIEs} } OPTIONAL,
    ...
}

PacketErrorRate-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

PER-Scalar ::= INTEGER (0..9, ...)
PER-Exponent ::= INTEGER (0..9, ...)

PagingCell-Item ::= SEQUENCE {
    nRCGI       NRCGI   ,
    iE-Extensions   ProtocolExtensionContainer { { PagingCell-ItemExtIEs } }    OPTIONAL
}

PagingCell-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

PagingDRX ::= ENUMERATED {
    v32,
    v64,
    v128,
    v256,
    ...
}

PagingIdentity ::=  CHOICE {
    rANUEPagingIdentity RANUEPagingIdentity,
    cNUEPagingIdentity  CNUEPagingIdentity,
```

```
    choice-extension            ProtocolIE-SingleContainer { { PagingIdentity-ExtIEs } }
}

PagingIdentity-ExtIEs F1AP-PROTOCOL-IES::= {
    ...
}

PagingOrigin ::= ENUMERATED { non-3gpp, ...}

PagingPriority ::= ENUMERATED { priolevel1, priolevel2, priolevel3, priolevel4, priolevel5, priolevel6, priolevel7, priolevel8,...}

PDCCH-BlindDetectionSCG ::= OCTET STRING

PDCP-SN ::= INTEGER (0..4095)

PDCPSNLength    ::= ENUMERATED { twelve-bits,eighteen-bits,...}

PDUSessionID ::= INTEGER (0..255)

Ph-InfoMCG  ::= OCTET STRING

Ph-InfoSCG  ::= OCTET STRING

PLMN-Identity ::= OCTET STRING (SIZE(3))

PortNumber ::= BIT STRING (SIZE (16))

Pre-emptionCapability ::= ENUMERATED {
    shall-not-trigger-pre-emption,
    may-trigger-pre-emption
}

Pre-emptionVulnerability ::= ENUMERATED {
    not-pre-emptable,
    pre-emptable
}

PriorityLevel   ::= INTEGER { spare (0), highest (1), lowest (14), no-priority (15) } (0..15)

ProtectedEUTRAResourceIndication        ::= OCTET STRING

Protected-EUTRA-Resources-Item ::= SEQUENCE {
    spectrumSharingGroupID                  SpectrumSharingGroupID,
    eUTRACells-List     EUTRACells-List,
    iE-Extensions   ProtocolExtensionContainer { { Protected-EUTRA-Resources-ItemExtIEs } } OPTIONAL
}

Protected-EUTRA-Resources-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Potential-SpCell-Item ::= SEQUENCE {
    potential-SpCell-ID         NRCGI   ,
    iE-Extensions   ProtocolExtensionContainer { { Potential-SpCell-ItemExtIEs } }  OPTIONAL,
```

```
    ...
}

Potential-SpCell-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

PWS-Failed-NR-CGI-Item ::= SEQUENCE {
    nRCGI               NRCGI,
    numberOfBroadcasts  NumberOfBroadcasts,
    iE-Extensions       ProtocolExtensionContainer { { PWS-Failed-NR-CGI-ItemExtIEs } } OPTIONAL,
    ...
}

PWS-Failed-NR-CGI-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

PWSSystemInformation ::= SEQUENCE {
    sIBtype                 SIBType-PWS,
    sIBmessage          OCTET STRING,
    iE-Extensions       ProtocolExtensionContainer { { PWSSystemInformationExtIEs } }   OPTIONAL,
    ...
}

PWSSystemInformationExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    {ID id-NotificationInformation      CRITICALITY ignore  EXTENSION NotificationInformation    PRESENCE optional}|
    { ID id-AdditionalSIBMessageList    CRITICALITY reject  EXTENSION AdditionalSIBMessageList   PRESENCE optional},
    ...
}


-- Q

QCI ::= INTEGER (0..255)

QoS-Characteristics ::= CHOICE {
    non-Dynamic-5QI             NonDynamic5QIDescriptor,
    dynamic-5QI                 Dynamic5QIDescriptor,
    choice-extension            ProtocolIE-SingleContainer { { QoS-Characteristics-ExtIEs } }
}

QoS-Characteristics-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

QoSFlowIdentifier ::= INTEGER (0..63)

QoSFlowLevelQoSParameters   ::= SEQUENCE {
    qoS-Characteristics                 QoS-Characteristics,
    nGRANallocationRetentionPriority        NGRANAllocationAndRetentionPriority,
    gBR-QoS-Flow-Information                 GBR-QoSFlowInformation              OPTIONAL,
    reflective-QoS-Attribute                ENUMERATED {subject-to, ...}                OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { QoSFlowLevelQoSParameters-ExtIEs } }  OPTIONAL
```

```
}

QoSFlowLevelQoSParameters-ExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-PDUSessionID                                CRITICALITY ignore  EXTENSION PDUSessionID     PRESENCE optional}|
    { ID id-ULPDUSessionAggregateMaximumBitRate         CRITICALITY ignore  EXTENSION BitRate          PRESENCE optional},
    ...
}

QoSFlowMappingIndication ::= ENUMERATED {ul,dl,...}

QoSInformation  ::= CHOICE {
    eUTRANQoS                   EUTRANQoS,
    choice-extension            ProtocolIE-SingleContainer { { QoSInformation-ExtIEs} }
}

QoSInformation-ExtIEs F1AP-PROTOCOL-IES ::= {
    {   ID id-DRB-Information       CRITICALITY ignore TYPE DRB-Information     PRESENCE mandatory},
    ...
}

-- R

RANAC ::= INTEGER (0..255)

RANUEID ::= OCTET STRING (SIZE (8))

RANUEPagingIdentity ::= SEQUENCE    {
    iRNTI                       BIT STRING (SIZE(40)),
    iE-Extensions               ProtocolExtensionContainer { { RANUEPagingIdentity-ExtIEs } }   OPTIONAL}

RANUEPagingIdentity-ExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

RAT-FrequencyPriorityInformation::= CHOICE {
    eNDC        SubscriberProfileIDforRFP,
    nGRAN       RAT-FrequencySelectionPriority,
    choice-extension            ProtocolIE-SingleContainer { { RAT-FrequencyPriorityInformation-ExtIEs} }
}

RAT-FrequencyPriorityInformation-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

RAT-FrequencySelectionPriority::= INTEGER (1.. 256, ...)

Reestablishment-Indication  ::= ENUMERATED  {
    reestablished,
    ...
}

RequestedBandCombinationIndex ::= OCTET STRING

RequestedFeatureSetEntryIndex ::= OCTET STRING
```

```
Requested-PDCCH-BlindDetectionSCG ::= OCTET STRING

RequestedP-MaxFR2 ::= OCTET STRING

RequestType ::= ENUMERATED {offer, execution, ...}

ResourceCoordinationEUTRACellInfo ::= SEQUENCE {
    eUTRA-Mode-Info                         EUTRA-Coex-Mode-Info,
    eUTRA-PRACH-Configuration               EUTRA-PRACH-Configuration,
    iE-Extensions   ProtocolExtensionContainer { { ResourceCoordinationEUTRACellInfo-ExtIEs } } OPTIONAL,
    ...
}

ResourceCoordinationEUTRACellInfo-ExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    {ID id-IgnorePRACHConfiguration     CRITICALITY reject EXTENSION IgnorePRACHConfiguration    PRESENCE optional },
    ...
}

ResourceCoordinationTransferInformation ::= SEQUENCE {
    meNB-Cell-ID                                EUTRA-Cell-ID,
    resourceCoordinationEUTRACellInfo       ResourceCoordinationEUTRACellInfo   OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { ResourceCoordinationTransferInformation-ExtIEs } }   OPTIONAL,
    ...
}

ResourceCoordinationTransferInformation-ExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ResourceCoordinationTransferContainer ::= OCTET STRING

RepetitionPeriod ::= INTEGER (0..131071, ...)

RLCFailureIndication ::= SEQUENCE {
    assocatedLCID               LCID,
    iE-Extensions               ProtocolExtensionContainer { {RLCFailureIndication-ExtIEs} } OPTIONAL
}

RLCFailureIndication-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

RLCMode ::= ENUMERATED {
    rlc-am,
    rlc-um-bidirectional,
    rlc-um-unidirectional-ul,
    rlc-um-unidirectional-dl,
    ...
}

RLC-Status ::= SEQUENCE {
    reestablishment-Indication  Reestablishment-Indication,
    iE-Extensions               ProtocolExtensionContainer { { RLC-Status-ExtIEs } } OPTIONAL,
```

```
    ...
}

RLC-Status-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

RIMRSDetectionStatus ::= ENUMERATED {rs-detected, rs-disappeared, ...}

RRCContainer ::= OCTET STRING

RRCContainer-RRCSetupComplete ::= OCTET STRING

RRCDeliveryStatus ::= SEQUENCE  {
    delivery-status             PDCP-SN,
    triggering-message          PDCP-SN,
    iE-Extensions               ProtocolExtensionContainer { { RRCDeliveryStatus-ExtIEs } } OPTIONAL}

RRCDeliveryStatus-ExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


RRCDeliveryStatusRequest ::= ENUMERATED {true, ...}

RRCReconfigurationCompleteIndicator ::= ENUMERATED {
    true,
     ...,
    failure
}

RRC-Version ::= SEQUENCE    {
    latest-RRC-Version          BIT STRING (SIZE(3)),
    iE-Extensions               ProtocolExtensionContainer { { RRC-Version-ExtIEs } }   OPTIONAL}

RRC-Version-ExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    {ID id-latest-RRC-Version-Enhanced      CRITICALITY ignore EXTENSION OCTET STRING (SIZE(3))   PRESENCE optional },
    ...
}

-- S

SCell-FailedtoSetup-Item    ::= SEQUENCE {
    sCell-ID            NRCGI   ,
    cause       Cause           OPTIONAL ,
    iE-Extensions   ProtocolExtensionContainer { { SCell-FailedtoSetup-ItemExtIEs } }   OPTIONAL,
    ...
}

SCell-FailedtoSetup-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SCell-FailedtoSetupMod-Item ::= SEQUENCE {
```

```
    sCell-ID            NRCGI   ,
    cause       Cause           OPTIONAL ,
    iE-Extensions   ProtocolExtensionContainer { { SCell-FailedtoSetupMod-ItemExtIEs } }    OPTIONAL,
    ...
}

SCell-FailedtoSetupMod-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SCell-ToBeRemoved-Item  ::= SEQUENCE {
    sCell-ID            NRCGI   ,
    iE-Extensions   ProtocolExtensionContainer { { SCell-ToBeRemoved-ItemExtIEs } } OPTIONAL,
    ...
}

SCell-ToBeRemoved-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SCell-ToBeSetup-Item ::= SEQUENCE {
    sCell-ID            NRCGI   ,
    sCellIndex          SCellIndex,
    sCellULConfigured       CellULConfigured    OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { SCell-ToBeSetup-ItemExtIEs } }   OPTIONAL,
    ...
}

SCell-ToBeSetup-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-ServingCellMO       CRITICALITY ignore  EXTENSION ServingCellMO     PRESENCE optional },
    ...
}

SCell-ToBeSetupMod-Item ::= SEQUENCE {
    sCell-ID            NRCGI   ,
    sCellIndex          SCellIndex,
    sCellULConfigured       CellULConfigured    OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { SCell-ToBeSetupMod-ItemExtIEs } }    OPTIONAL,
    ...
}

SCell-ToBeSetupMod-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    { ID id-ServingCellMO       CRITICALITY ignore  EXTENSION ServingCellMO     PRESENCE optional },
    ...
}

SCellIndex ::=INTEGER (1..31, ...)

SerialNumber ::= BIT STRING (SIZE (16))

SIBType-PWS ::=INTEGER (6..8, ...)

SelectedBandCombinationIndex ::= OCTET STRING
```

```
SelectedFeatureSetEntryIndex ::= OCTET STRING

CG-ConfigInfo ::= OCTET STRING

ServCellIndex ::= INTEGER (0..31, ...)

ServingCellMO ::= INTEGER (1..64, ...)

Served-Cell-Information ::= SEQUENCE {
    nRCGI                           NRCGI,
    nRPCI                           NRPCI,
    fiveGS-TAC                          FiveGS-TAC          OPTIONAL,
    configured-EPS-TAC              Configured-EPS-TAC      OPTIONAL,
    servedPLMNs                 ServedPLMNs-List,
    nR-Mode-Info                    NR-Mode-Info,
    measurementTimingConfiguration  OCTET STRING,
    iE-Extensions       ProtocolExtensionContainer { {Served-Cell-Information-ExtIEs} } OPTIONAL,
    ...
}

Served-Cell-Information-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    {   ID id-RANAC                         CRITICALITY ignore EXTENSION RANAC                      PRESENCE optional }|
    {   ID id-ExtendedServedPLMNs-List      CRITICALITY ignore EXTENSION ExtendedServedPLMNs-List   PRESENCE optional }|
    {   ID id-Cell-Direction                CRITICALITY ignore EXTENSION Cell-Direction             PRESENCE optional }|
    {   ID id-BPLMN-ID-Info-List            CRITICALITY ignore EXTENSION BPLMN-ID-Info-List         PRESENCE optional }|
    {   ID id-Cell-Type                     CRITICALITY ignore EXTENSION CellType                   PRESENCE optional}|
    {   ID id-AggressorgNBSetID             CRITICALITY ignore EXTENSION AggressorgNBSetID          PRESENCE optional}|
    {   ID id-VictimgNBSetID                CRITICALITY ignore EXTENSION VictimgNBSetID             PRESENCE optional},
    ...
}

Served-Cells-To-Add-Item ::= SEQUENCE {
    served-Cell-Information     Served-Cell-Information,
    gNB-DU-System-Information   GNB-DU-System-Information    OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { Served-Cells-To-Add-ItemExtIEs} }  OPTIONAL,
    ...
}

Served-Cells-To-Add-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Served-Cells-To-Delete-Item ::= SEQUENCE {
    oldNRCGI                    NRCGI   ,
    iE-Extensions               ProtocolExtensionContainer { { Served-Cells-To-Delete-ItemExtIEs } } OPTIONAL,
    ...
}

Served-Cells-To-Delete-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Served-Cells-To-Modify-Item ::= SEQUENCE {
    oldNRCGI                    NRCGI                           ,
```

```
    served-Cell-Information     Served-Cell-Information     ,
    gNB-DU-System-Information   GNB-DU-System-Information   OPTIONAL    ,
    iE-Extensions               ProtocolExtensionContainer { { Served-Cells-To-Modify-ItemExtIEs } } OPTIONAL,
    ...
}

Served-Cells-To-Modify-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Served-EUTRA-Cells-Information::= SEQUENCE {
    eUTRA-Mode-Info                     EUTRA-Mode-Info,
    protectedEUTRAResourceIndication    ProtectedEUTRAResourceIndication,
    iE-Extensions                       ProtocolExtensionContainer { {Served-EUTRA-Cell-Information-ExtIEs} } OPTIONAL,
    ...
}

Served-EUTRA-Cell-Information-ExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Service-State ::= ENUMERATED {
    in-service,
    out-of-service,
    ...
}

Service-Status ::= SEQUENCE {
    service-state               Service-State,
    switchingOffOngoing         ENUMERATED {true, ...}  OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { Service-Status-ExtIEs } }    OPTIONAL,
    ...
}

Service-Status-ExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ShortDRXCycleLength ::=  ENUMERATED {ms2, ms3, ms4, ms5, ms6, ms7, ms8, ms10, ms14, ms16, ms20, ms30, ms32, ms35, ms40, ms64, ms80, ms128, ms160,
ms256, ms320, ms512, ms640, ...}

ShortDRXCycleTimer ::= INTEGER (1..16)

SIB1-message ::= OCTET STRING

SItype ::= INTEGER (1..32, ...)

SItype-List ::= SEQUENCE (SIZE(1.. maxnoofSITypes)) OF SItype-Item

SItype-Item ::= SEQUENCE {
    sItype      SItype  ,
    iE-Extensions   ProtocolExtensionContainer { { SItype-ItemExtIEs } }    OPTIONAL
}
```

```
SItype-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SibtypetobeupdatedListItem ::= SEQUENCE {
    sIBtype             INTEGER (2..32,...),
    sIBmessage          OCTET STRING,
    valueTag            INTEGER (0..31,...),
    iE-Extensions   ProtocolExtensionContainer { { SibtypetobeupdatedListItem-ExtIEs } }    OPTIONAL,
    ...
}

SibtypetobeupdatedListItem-ExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    {ID id-areaScope    CRITICALITY ignore  EXTENSION   AreaScope   PRESENCE optional},
    ...
}

SliceSupportList ::= SEQUENCE (SIZE(1.. maxnoofSliceItems)) OF SliceSupportItem

SliceSupportItem ::= SEQUENCE {
    sNSSAI  SNSSAI,
    iE-Extensions               ProtocolExtensionContainer { { SliceSupportItem-ExtIEs } }  OPTIONAL
}

SliceSupportItem-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Slot-Configuration-Item ::= SEQUENCE {
    slotIndex               INTEGER (0..319, ...),
    symbolAllocInSlot       SymbolAllocInSlot,
    iE-Extensions   ProtocolExtensionContainer { { Slot-Configuration-ItemExtIEs } }    OPTIONAL
}

Slot-Configuration-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


SNSSAI ::= SEQUENCE {
    sST         OCTET STRING (SIZE(1)),
    sD          OCTET STRING (SIZE(3))  OPTIONAL    ,
    iE-Extensions               ProtocolExtensionContainer { { SNSSAI-ExtIEs } }    OPTIONAL
}

SNSSAI-ExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SpectrumSharingGroupID ::= INTEGER (1..maxCellineNB)

SRBID ::= INTEGER (0..3, ...)

SRBs-FailedToBeSetup-Item   ::= SEQUENCE {
```

```
    sRBID       SRBID   ,
    cause       Cause   OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-FailedToBeSetup-ItemExtIEs } }  OPTIONAL,
    ...
}

SRBs-FailedToBeSetup-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-FailedToBeSetupMod-Item    ::= SEQUENCE {
    sRBID       SRBID       ,
    cause       Cause       OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-FailedToBeSetupMod-ItemExtIEs } }   OPTIONAL,
    ...
}

SRBs-FailedToBeSetupMod-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-Modified-Item ::= SEQUENCE {
    sRBID                           SRBID,
    lCID                            LCID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-Modified-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-Modified-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-Required-ToBeReleased-Item ::= SEQUENCE {
    sRBID   SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-Required-ToBeReleased-ItemExtIEs } }    OPTIONAL,
    ...
}

SRBs-Required-ToBeReleased-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-Setup-Item ::= SEQUENCE {
    sRBID                           SRBID,
    lCID                                LCID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-Setup-ItemExtIEs } }    OPTIONAL,
    ...
}

SRBs-Setup-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-SetupMod-Item ::= SEQUENCE {
```

```
    sRBID                       SRBID,
    lCID                            LCID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-SetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-SetupMod-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-ToBeReleased-Item  ::= SEQUENCE {
    sRBID       SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-ToBeReleased-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-ToBeReleased-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-ToBeSetup-Item ::= SEQUENCE {
    sRBID    SRBID  ,
    duplicationIndication   DuplicationIndication   OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-ToBeSetup-ItemExtIEs } }    OPTIONAL,
    ...
}

SRBs-ToBeSetup-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-ToBeSetupMod-Item  ::= SEQUENCE {
    sRBID   SRBID,
    duplicationIndication   DuplicationIndication   OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-ToBeSetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-ToBeSetupMod-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SUL-Information ::= SEQUENCE {
    sUL-NRARFCN                         INTEGER (0..maxNRARFCN),
    sUL-transmission-Bandwidth          Transmission-Bandwidth,
    iE-Extensions               ProtocolExtensionContainer { { SUL-InformationExtIEs} } OPTIONAL,
    ...
}

SUL-InformationExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SubscriberProfileIDforRFP ::= INTEGER (1..256, ...)
```

```
SULAccessIndication ::= ENUMERATED {true,...}


SupportedSULFreqBandItem ::= SEQUENCE {
    freqBandIndicatorNr             INTEGER (1..1024,...),
    iE-Extensions               ProtocolExtensionContainer { { SupportedSULFreqBandItem-ExtIEs} } OPTIONAL,
    ...
}

SupportedSULFreqBandItem-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SymbolAllocInSlot ::= CHOICE {
    all-DL              NULL,
    all-UL              NULL,
    numDLULsymbols          NumDLULSymbols,
    choice-extension            ProtocolIE-SingleContainer { { SymbolAllocInSlot-ExtIEs } }
}

SymbolAllocInSlot-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

SystemInformationAreaID ::=BIT STRING (SIZE (24))

-- T

FiveGS-TAC ::= OCTET STRING (SIZE(3))

Configured-EPS-TAC ::= OCTET STRING (SIZE(2))

TDD-Info ::= SEQUENCE {
    nRFreqInfo                      NRFreqInfo,
    transmission-Bandwidth          Transmission-Bandwidth,
    intendedTDD-DL-ULConfig     IntendedTDD-DL-ULConfig OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { {TDD-Info-ExtIEs} } OPTIONAL,
    ...
}

TDD-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

TimeToWait ::= ENUMERATED {v1s, v2s, v5s, v10s, v20s, v60s, ...}

TNLAssociationUsage ::= ENUMERATED {
    ue,
    non-ue,
    both,
    ...
}
```

```
TraceActivation ::= SEQUENCE {
    traceID                          TraceID,
    interfacesToTrace                InterfacesToTrace,
    traceDepth                       TraceDepth,
    traceCollectionEntityIPAddress   TransportLayerAddress,
    iE-Extensions       ProtocolExtensionContainer { {TraceActivation-ExtIEs} } OPTIONAL
}

TraceActivation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

TraceDepth ::= ENUMERATED {
    minimum,
    medium,
    maximum,
    minimumWithoutVendorSpecificExtension,
    mediumWithoutVendorSpecificExtension,
    maximumWithoutVendorSpecificExtension,
    ...
}

TraceID ::= OCTET STRING (SIZE(8))

TransportLayerAddress       ::= BIT STRING (SIZE(1..160, ...))

TransactionID               ::= INTEGER (0..255, ...)

Transmission-Bandwidth ::= SEQUENCE {
    nRSCS   NRSCS,
    nRNRB   NRNRB,
    iE-Extensions               ProtocolExtensionContainer { { Transmission-Bandwidth-ExtIEs} } OPTIONAL,
    ...
}

Transmission-Bandwidth-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


Transport-UP-Layer-Addresses-Info-To-Add-List   ::= SEQUENCE (SIZE(1.. maxnoofTLAs)) OF Transport-UP-Layer-Addresses-Info-To-Add-Item

Transport-UP-Layer-Addresses-Info-To-Add-Item ::= SEQUENCE {
    iP-SecTransportLayerAddress     TransportLayerAddress,
    gTPTransportLayerAddressesToAdd         GTPTLAs                         OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { Transport-UP-Layer-Addresses-Info-To-Add-ItemExtIEs } }  OPTIONAL
}

Transport-UP-Layer-Addresses-Info-To-Add-ItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Transport-UP-Layer-Addresses-Info-To-Remove-List    ::= SEQUENCE (SIZE(1.. maxnoofTLAs)) OF Transport-UP-Layer-Addresses-Info-To-Remove-Item
```

```
Transport-UP-Layer-Addresses-Info-To-Remove-Item ::= SEQUENCE {
    iP-SecTransportLayerAddress     TransportLayerAddress,
    gTPTransportLayerAddressesToRemove          GTPTLAs                         OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { Transport-UP-Layer-Addresses-Info-To-Remove-ItemExtIEs } }  OPTIONAL
}

Transport-UP-Layer-Addresses-Info-To-Remove-ItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

TransmissionActionIndicator ::= ENUMERATED {stop, ..., restart }

TypeOfError ::= ENUMERATED {
    not-understood,
    missing,
    ...
}

Transport-Layer-Addresses-Info ::= SEQUENCE {
    transport-UP-Layer-Addresses-Info-To-Add-List       Transport-UP-Layer-Addresses-Info-To-Add-List                   OPTIONAL,
    transport-UP-Layer-Addresses-Info-To-Remove-List    Transport-UP-Layer-Addresses-Info-To-Remove-List                OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { Transport-Layer-Addresses-Info-ExtIEs } }                            OPTIONAL
}

Transport-Layer-Addresses-Info-ExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- U
UAC-Assistance-Info ::= SEQUENCE {
    uACPLMN-List        UACPLMN-List,
    iE-Extensions       ProtocolExtensionContainer { { UAC-Assistance-InfoExtIEs} } OPTIONAL
}

UAC-Assistance-InfoExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UACPLMN-List ::= SEQUENCE (SIZE(1..maxnoofUACPLMNs)) OF UACPLMN-Item

UACPLMN-Item::= SEQUENCE {
    pLMNIdentity                PLMN-Identity,
    uACType-List                UACType-List,   iE-Extensions       ProtocolExtensionContainer { { UACPLMN-Item-ExtIEs} } OPTIONAL
}

UACPLMN-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UACType-List ::= SEQUENCE (SIZE(1..maxnoofUACperPLMN)) OF UACType-Item

UACType-Item::= SEQUENCE {
    uACReductionIndication      UACReductionIndication,
    uACCategoryType             UACCategoryType,
```

```
    iE-Extensions       ProtocolExtensionContainer { { UACType-Item-ExtIEs } } OPTIONAL
}

UACType-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UACCategoryType ::= CHOICE {
    uACstandardized             UACAction,
    uACOperatorDefined          UACOperatorDefined,
    choice-extension            ProtocolIE-SingleContainer { { UACCategoryType-ExtIEs } }
}

UACCategoryType-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

UACOperatorDefined ::= SEQUENCE {
    accessCategory                  INTEGER (32..63,...),
    accessIdentity                  BIT STRING (SIZE(7)),
    iE-Extensions       ProtocolExtensionContainer { { UACOperatorDefined-ExtIEs} } OPTIONAL
}

UACOperatorDefined-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


UACAction ::= ENUMERATED {
    reject-non-emergency-mo-dt,
    reject-rrc-cr-signalling,
    permit-emergency-sessions-and-mobile-terminated-services-only,
    permit-high-priority-sessions-and-mobile-terminated-services-only,
    ...
}

UACReductionIndication ::= INTEGER (0..100)


UE-associatedLogicalF1-ConnectionItem ::= SEQUENCE {
    gNB-CU-UE-F1AP-ID       GNB-CU-UE-F1AP-ID    OPTIONAL,
    gNB-DU-UE-F1AP-ID       GNB-DU-UE-F1AP-ID    OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { UE-associatedLogicalF1-ConnectionItemExtIEs} } OPTIONAL,
    ...
}

UEAssistanceInformation ::= OCTET STRING

UE-associatedLogicalF1-ConnectionItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UE-CapabilityRAT-ContainerList::= OCTET STRING
```

```
UEContextNotRetrievable ::= ENUMERATED {true, ...}

UEIdentityIndexValue ::= CHOICE {
    indexLength10           BIT STRING (SIZE (10)),
    choice-extension        ProtocolIE-SingleContainer { {UEIdentityIndexValueChoice-ExtIEs} }
}

UEIdentityIndexValueChoice-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}

ULConfiguration ::= SEQUENCE    {
    uLUEConfiguration       ULUEConfiguration,
    iE-Extensions   ProtocolExtensionContainer { { ULConfigurationExtIEs } }    OPTIONAL,
    ...
}
ULConfigurationExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ULUEConfiguration ::= ENUMERATED {no-data, shared, only, ...}


ULUPTNLInformation-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofULUPTNLInformation)) OF ULUPTNLInformation-ToBeSetup-Item

ULUPTNLInformation-ToBeSetup-Item ::=SEQUENCE {
    uLUPTNLInformation      UPTransportLayerInformation,
    iE-Extensions   ProtocolExtensionContainer { { ULUPTNLInformation-ToBeSetup-ItemExtIEs } }  OPTIONAL,
    ...
}

ULUPTNLInformation-ToBeSetup-ItemExtIEs     F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UplinkTxDirectCurrentListInformation ::= OCTET STRING

UPTransportLayerInformation     ::= CHOICE {
    gTPTunnel       GTPTunnel,
    choice-extension            ProtocolIE-SingleContainer { { UPTransportLayerInformation-ExtIEs} }
}

UPTransportLayerInformation-ExtIEs F1AP-PROTOCOL-IES ::= {
    ...
}
-- V

VictimgNBSetID ::= SEQUENCE {
    victimgNBSetID      GNBSetID,
    iE-Extensions   ProtocolExtensionContainer { { VictimgNBSetID-ExtIEs } }        OPTIONAL
}

VictimgNBSetID-ExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
```

```
}

-- W

-- X

-- Y

-- Z

END
-- ASN1STOP
```

9.4.6 Common Definitions

```
-- ASN1START
-- **************************************************************
--
-- Common definitions
--
-- **************************************************************

F1AP-CommonDataTypes {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-CommonDataTypes (3) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

Criticality     ::= ENUMERATED { reject, ignore, notify }

Presence        ::= ENUMERATED { optional, conditional, mandatory }

PrivateIE-ID    ::= CHOICE {
    local               INTEGER (0..65535),
    global              OBJECT IDENTIFIER
}

ProcedureCode       ::= INTEGER (0..255)

ProtocolExtensionID ::= INTEGER (0..65535)

ProtocolIE-ID       ::= INTEGER (0..65535)

TriggeringMessage   ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome }

END
-- ASN1STOP
```

9.4.7 Constant Definitions

```
-- ASN1START
-- **************************************************************
--
-- Constant definitions
--
-- **************************************************************

F1AP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- IE parameter types from other modules.
--
-- **************************************************************

IMPORTS
    ProcedureCode,
    ProtocolIE-ID

FROM F1AP-CommonDataTypes;


-- **************************************************************
--
-- Elementary Procedures
--
-- **************************************************************

id-Reset                                ProcedureCode ::= 0
id-F1Setup                              ProcedureCode ::= 1
id-ErrorIndication                      ProcedureCode ::= 2
id-gNBDUConfigurationUpdate             ProcedureCode ::= 3
id-gNBCUConfigurationUpdate             ProcedureCode ::= 4
id-UEContextSetup                       ProcedureCode ::= 5
id-UEContextRelease                     ProcedureCode ::= 6
id-UEContextModification                ProcedureCode ::= 7
id-UEContextModificationRequired        ProcedureCode ::= 8
id-UEMobilityCommand                    ProcedureCode ::= 9
id-UEContextReleaseRequest              ProcedureCode ::= 10
id-InitialULRRCMessageTransfer          ProcedureCode ::= 11
id-DLRRCMessageTransfer                 ProcedureCode ::= 12
id-ULRRCMessageTransfer                 ProcedureCode ::= 13
id-privateMessage                       ProcedureCode ::= 14
id-UEInactivityNotification             ProcedureCode ::= 15
id-GNBDUResourceCoordination            ProcedureCode ::= 16
id-SystemInformationDeliveryCommand     ProcedureCode ::= 17
```

```
id-Paging                                   ProcedureCode ::= 18
id-Notify                                   ProcedureCode ::= 19
id-WriteReplaceWarning                      ProcedureCode ::= 20
id-PWSCancel                                ProcedureCode ::= 21
id-PWSRestartIndication                     ProcedureCode ::= 22
id-PWSFailureIndication                     ProcedureCode ::= 23
id-GNBDUStatusIndication                    ProcedureCode ::= 24
id-RRCDeliveryReport                        ProcedureCode ::= 25
id-F1Removal                                ProcedureCode ::= 26
id-NetworkAccessRateReduction               ProcedureCode ::= 27
id-TraceStart                               ProcedureCode ::= 28
id-DeactivateTrace                          ProcedureCode ::= 29
id-DUCURadioInformationTransfer             ProcedureCode ::= 30
id-CUDURadioInformationTransfer             ProcedureCode ::= 31


-- **************************************************************
--
-- Extension constants
--
-- **************************************************************

maxPrivateIEs                           INTEGER ::= 65535
maxProtocolExtensions                   INTEGER ::= 65535
maxProtocolIEs                          INTEGER ::= 65535
-- **************************************************************
--
-- Lists
--
-- **************************************************************

maxNRARFCN                              INTEGER ::= 3279165
maxnoofErrors                           INTEGER ::= 256
maxnoofIndividualF1ConnectionsToReset   INTEGER ::= 65536
maxCellingNBDU                          INTEGER ::= 512
maxnoofSCells                           INTEGER ::= 32
maxnoofSRBs                             INTEGER ::= 8
maxnoofDRBs                             INTEGER ::= 64
maxnoofULUPTNLInformation               INTEGER ::= 2
maxnoofDLUPTNLInformation               INTEGER ::= 2
maxnoofBPLMNs                           INTEGER ::= 6
maxnoofCandidateSpCells                 INTEGER ::= 64
maxnoofPotentialSpCells                 INTEGER ::= 64
maxnoofNrCellBands                      INTEGER ::= 32
maxnoofSIBTypes                         INTEGER ::= 32
maxnoofSITypes                          INTEGER ::= 32
maxnoofPagingCells                      INTEGER ::= 512
maxnoofTNLAssociations                  INTEGER ::= 32
maxnoofQoSFlows                         INTEGER ::= 64
maxnoofSliceItems                       INTEGER ::= 1024
maxCellineNB                            INTEGER ::= 256
maxnoofExtendedBPLMNs                   INTEGER ::= 6
maxnoofUEIDs                            INTEGER ::= 65536
maxnoofBPLMNsNRminus1                   INTEGER ::= 11
```

```
maxnoofUACPLMNs                         INTEGER ::= 12
maxnoofUACperPLMN                       INTEGER ::= 64
maxnoofAdditionalSIBs                   INTEGER ::= 63
maxnoofslots                            INTEGER ::= 320
maxnoofTLAs                             INTEGER ::= 16
maxnoofGTPTLAs                          INTEGER ::= 16

-- **************************************************************
--
-- IEs
--
-- **************************************************************

id-Cause                                                ProtocolIE-ID ::= 0
id-Cells-Failed-to-be-Activated-List                    ProtocolIE-ID ::= 1
id-Cells-Failed-to-be-Activated-List-Item               ProtocolIE-ID ::= 2
id-Cells-to-be-Activated-List                           ProtocolIE-ID ::= 3
id-Cells-to-be-Activated-List-Item                      ProtocolIE-ID ::= 4
id-Cells-to-be-Deactivated-List                         ProtocolIE-ID ::= 5
id-Cells-to-be-Deactivated-List-Item                    ProtocolIE-ID ::= 6
id-CriticalityDiagnostics                               ProtocolIE-ID ::= 7
id-CUtoDURRCInformation                                 ProtocolIE-ID ::= 9
id-DRBs-FailedToBeModified-Item                         ProtocolIE-ID ::= 12
id-DRBs-FailedToBeModified-List                         ProtocolIE-ID ::= 13
id-DRBs-FailedToBeSetup-Item                            ProtocolIE-ID ::= 14
id-DRBs-FailedToBeSetup-List                            ProtocolIE-ID ::= 15
id-DRBs-FailedToBeSetupMod-Item                         ProtocolIE-ID ::= 16
id-DRBs-FailedToBeSetupMod-List                         ProtocolIE-ID ::= 17
id-DRBs-ModifiedConf-Item                               ProtocolIE-ID ::= 18
id-DRBs-ModifiedConf-List                               ProtocolIE-ID ::= 19
id-DRBs-Modified-Item                                   ProtocolIE-ID ::= 20
id-DRBs-Modified-List                                   ProtocolIE-ID ::= 21
id-DRBs-Required-ToBeModified-Item                      ProtocolIE-ID ::= 22
id-DRBs-Required-ToBeModified-List                      ProtocolIE-ID ::= 23
id-DRBs-Required-ToBeReleased-Item                      ProtocolIE-ID ::= 24
id-DRBs-Required-ToBeReleased-List                      ProtocolIE-ID ::= 25
id-DRBs-Setup-Item                                      ProtocolIE-ID ::= 26
id-DRBs-Setup-List                                      ProtocolIE-ID ::= 27
id-DRBs-SetupMod-Item                                   ProtocolIE-ID ::= 28
id-DRBs-SetupMod-List                                   ProtocolIE-ID ::= 29
id-DRBs-ToBeModified-Item                               ProtocolIE-ID ::= 30
id-DRBs-ToBeModified-List                               ProtocolIE-ID ::= 31
id-DRBs-ToBeReleased-Item                               ProtocolIE-ID ::= 32
id-DRBs-ToBeReleased-List                               ProtocolIE-ID ::= 33
id-DRBs-ToBeSetup-Item                                  ProtocolIE-ID ::= 34
id-DRBs-ToBeSetup-List                                  ProtocolIE-ID ::= 35
id-DRBs-ToBeSetupMod-Item                               ProtocolIE-ID ::= 36
id-DRBs-ToBeSetupMod-List                               ProtocolIE-ID ::= 37
id-DRXCycle                                             ProtocolIE-ID ::= 38
id-DUtoCURRCInformation                                 ProtocolIE-ID ::= 39
id-gNB-CU-UE-F1AP-ID                                    ProtocolIE-ID ::= 40
id-gNB-DU-UE-F1AP-ID                                    ProtocolIE-ID ::= 41
id-gNB-DU-ID                                            ProtocolIE-ID ::= 42
id-GNB-DU-Served-Cells-Item                             ProtocolIE-ID ::= 43
```

```
id-gNB-DU-Served-Cells-List                     ProtocolIE-ID ::= 44
id-gNB-DU-Name                                  ProtocolIE-ID ::= 45
id-NRCellID                                     ProtocolIE-ID ::= 46
id-oldgNB-DU-UE-F1AP-ID                         ProtocolIE-ID ::= 47
id-ResetType                                    ProtocolIE-ID ::= 48
id-ResourceCoordinationTransferContainer        ProtocolIE-ID ::= 49
id-RRCContainer                                 ProtocolIE-ID ::= 50
id-SCell-ToBeRemoved-Item                       ProtocolIE-ID ::= 51
id-SCell-ToBeRemoved-List                       ProtocolIE-ID ::= 52
id-SCell-ToBeSetup-Item                         ProtocolIE-ID ::= 53
id-SCell-ToBeSetup-List                         ProtocolIE-ID ::= 54
id-SCell-ToBeSetupMod-Item                      ProtocolIE-ID ::= 55
id-SCell-ToBeSetupMod-List                      ProtocolIE-ID ::= 56
id-Served-Cells-To-Add-Item                     ProtocolIE-ID ::= 57
id-Served-Cells-To-Add-List                     ProtocolIE-ID ::= 58
id-Served-Cells-To-Delete-Item                  ProtocolIE-ID ::= 59
id-Served-Cells-To-Delete-List                  ProtocolIE-ID ::= 60
id-Served-Cells-To-Modify-Item                  ProtocolIE-ID ::= 61
id-Served-Cells-To-Modify-List                  ProtocolIE-ID ::= 62
id-SpCell-ID                                    ProtocolIE-ID ::= 63
id-SRBID                                        ProtocolIE-ID ::= 64
id-SRBs-FailedToBeSetup-Item                    ProtocolIE-ID ::= 65
id-SRBs-FailedToBeSetup-List                    ProtocolIE-ID ::= 66
id-SRBs-FailedToBeSetupMod-Item                 ProtocolIE-ID ::= 67
id-SRBs-FailedToBeSetupMod-List                 ProtocolIE-ID ::= 68
id-SRBs-Required-ToBeReleased-Item              ProtocolIE-ID ::= 69
id-SRBs-Required-ToBeReleased-List              ProtocolIE-ID ::= 70
id-SRBs-ToBeReleased-Item                       ProtocolIE-ID ::= 71
id-SRBs-ToBeReleased-List                       ProtocolIE-ID ::= 72
id-SRBs-ToBeSetup-Item                          ProtocolIE-ID ::= 73
id-SRBs-ToBeSetup-List                          ProtocolIE-ID ::= 74
id-SRBs-ToBeSetupMod-Item                       ProtocolIE-ID ::= 75
id-SRBs-ToBeSetupMod-List                       ProtocolIE-ID ::= 76
id-TimeToWait                                   ProtocolIE-ID ::= 77
id-TransactionID                                ProtocolIE-ID ::= 78
id-TransmissionActionIndicator                  ProtocolIE-ID ::= 79
id-UE-associatedLogicalF1-ConnectionItem        ProtocolIE-ID ::= 80
id-UE-associatedLogicalF1-ConnectionListResAck  ProtocolIE-ID ::= 81
id-gNB-CU-Name                                  ProtocolIE-ID ::= 82
id-SCell-FailedtoSetup-List                     ProtocolIE-ID ::= 83
id-SCell-FailedtoSetup-Item                     ProtocolIE-ID ::= 84
id-SCell-FailedtoSetupMod-List                  ProtocolIE-ID ::= 85
id-SCell-FailedtoSetupMod-Item                  ProtocolIE-ID ::= 86
id-RRCReconfigurationCompleteIndicator          ProtocolIE-ID ::= 87
id-Cells-Status-Item                            ProtocolIE-ID ::= 88
id-Cells-Status-List                            ProtocolIE-ID ::= 89
id-Candidate-SpCell-List                        ProtocolIE-ID ::= 90
id-Candidate-SpCell-Item                        ProtocolIE-ID ::= 91
id-Potential-SpCell-List                        ProtocolIE-ID ::= 92
id-Potential-SpCell-Item                        ProtocolIE-ID ::= 93
id-FullConfiguration                            ProtocolIE-ID ::= 94
id-C-RNTI                                       ProtocolIE-ID ::= 95
id-SpCellULConfigured                           ProtocolIE-ID ::= 96
id-InactivityMonitoringRequest                  ProtocolIE-ID ::= 97
```

```
id-InactivityMonitoringResponse                    ProtocolIE-ID ::= 98
id-DRB-Activity-Item                               ProtocolIE-ID ::= 99
id-DRB-Activity-List                               ProtocolIE-ID ::= 100
id-EUTRA-NR-CellResourceCoordinationReq-Container      ProtocolIE-ID ::= 101
id-EUTRA-NR-CellResourceCoordinationReqAck-Container   ProtocolIE-ID ::= 102
id-Protected-EUTRA-Resources-List                  ProtocolIE-ID ::= 105
id-RequestType                                     ProtocolIE-ID ::= 106
id-ServCellIndex                                   ProtocolIE-ID ::= 107
id-RAT-FrequencyPriorityInformation                ProtocolIE-ID ::= 108
id-ExecuteDuplication                              ProtocolIE-ID ::= 109
id-NRCGI                                           ProtocolIE-ID ::= 111
id-PagingCell-Item                                 ProtocolIE-ID ::= 112
id-PagingCell-List                                 ProtocolIE-ID ::= 113
id-PagingDRX                                       ProtocolIE-ID ::= 114
id-PagingPriority                                  ProtocolIE-ID ::= 115
id-SItype-List                                     ProtocolIE-ID ::= 116
id-UEIdentityIndexValue                            ProtocolIE-ID ::= 117
id-gNB-CUSystemInformation                         ProtocolIE-ID ::= 118
id-HandoverPreparationInformation                  ProtocolIE-ID ::= 119
id-GNB-CU-TNL-Association-To-Add-Item              ProtocolIE-ID ::= 120
id-GNB-CU-TNL-Association-To-Add-List              ProtocolIE-ID ::= 121
id-GNB-CU-TNL-Association-To-Remove-Item           ProtocolIE-ID ::= 122
id-GNB-CU-TNL-Association-To-Remove-List           ProtocolIE-ID ::= 123
id-GNB-CU-TNL-Association-To-Update-Item           ProtocolIE-ID ::= 124
id-GNB-CU-TNL-Association-To-Update-List           ProtocolIE-ID ::= 125
id-MaskedIMEISV                                    ProtocolIE-ID ::= 126
id-PagingIdentity                                  ProtocolIE-ID ::= 127
id-DUtoCURRCContainer                              ProtocolIE-ID ::= 128
id-Cells-to-be-Barred-List                         ProtocolIE-ID ::= 129
id-Cells-to-be-Barred-Item                         ProtocolIE-ID ::= 130
id-TAISliceSupportList                             ProtocolIE-ID ::= 131
id-GNB-CU-TNL-Association-Setup-List               ProtocolIE-ID ::= 132
id-GNB-CU-TNL-Association-Setup-Item               ProtocolIE-ID ::= 133
id-GNB-CU-TNL-Association-Failed-To-Setup-List     ProtocolIE-ID ::= 134
id-GNB-CU-TNL-Association-Failed-To-Setup-Item     ProtocolIE-ID ::= 135
id-DRB-Notify-Item                                 ProtocolIE-ID ::= 136
id-DRB-Notify-List                                 ProtocolIE-ID ::= 137
id-NotficationControl                              ProtocolIE-ID ::= 138
id-RANAC                                           ProtocolIE-ID ::= 139
id-PWSSystemInformation                            ProtocolIE-ID ::= 140
id-RepetitionPeriod                                ProtocolIE-ID ::= 141
id-NumberofBroadcastRequest                        ProtocolIE-ID ::= 142
id-Cells-To-Be-Broadcast-List                      ProtocolIE-ID ::= 144
id-Cells-To-Be-Broadcast-Item                      ProtocolIE-ID ::= 145
id-Cells-Broadcast-Completed-List                  ProtocolIE-ID ::= 146
id-Cells-Broadcast-Completed-Item                  ProtocolIE-ID ::= 147
id-Broadcast-To-Be-Cancelled-List                  ProtocolIE-ID ::= 148
id-Broadcast-To-Be-Cancelled-Item                  ProtocolIE-ID ::= 149
id-Cells-Broadcast-Cancelled-List                  ProtocolIE-ID ::= 150
id-Cells-Broadcast-Cancelled-Item                  ProtocolIE-ID ::= 151
id-NR-CGI-List-For-Restart-List                    ProtocolIE-ID ::= 152
id-NR-CGI-List-For-Restart-Item                    ProtocolIE-ID ::= 153
id-PWS-Failed-NR-CGI-List                          ProtocolIE-ID ::= 154
id-PWS-Failed-NR-CGI-Item                          ProtocolIE-ID ::= 155
```

```
id-ConfirmedUEID                                ProtocolIE-ID ::= 156
id-Cancel-all-Warning-Messages-Indicator        ProtocolIE-ID ::= 157
id-GNB-DU-UE-AMBR-UL                            ProtocolIE-ID ::= 158
id-DRXConfigurationIndicator                    ProtocolIE-ID ::= 159
id-RLC-Status                                   ProtocolIE-ID ::= 160
id-DLPDCPSNLength                               ProtocolIE-ID ::= 161
id-GNB-DUConfigurationQuery                     ProtocolIE-ID ::= 162
id-MeasurementTimingConfiguration               ProtocolIE-ID ::= 163
id-DRB-Information                              ProtocolIE-ID ::= 164
id-ServingPLMN                                  ProtocolIE-ID ::= 165
id-Protected-EUTRA-Resources-Item               ProtocolIE-ID ::= 168
id-GNB-CU-RRC-Version                           ProtocolIE-ID ::= 170
id-GNB-DU-RRC-Version                           ProtocolIE-ID ::= 171
id-GNBDUOverloadInformation                     ProtocolIE-ID ::= 172
id-CellGroupConfig                              ProtocolIE-ID ::= 173
id-RLCFailureIndication                         ProtocolIE-ID ::= 174
id-UplinkTxDirectCurrentListInformation         ProtocolIE-ID ::= 175
id-DC-Based-Duplication-Configured              ProtocolIE-ID ::= 176
id-DC-Based-Duplication-Activation              ProtocolIE-ID ::= 177
id-SULAccessIndication                          ProtocolIE-ID ::= 178
id-AvailablePLMNList                            ProtocolIE-ID ::= 179
id-PDUSessionID                                 ProtocolIE-ID ::= 180
id-ULPDUSessionAggregateMaximumBitRate          ProtocolIE-ID ::= 181
id-ServingCellMO                                ProtocolIE-ID ::= 182
id-QoSFlowMappingIndication                     ProtocolIE-ID ::= 183
id-RRCDeliveryStatusRequest                     ProtocolIE-ID ::= 184
id-RRCDeliveryStatus                            ProtocolIE-ID ::= 185
id-BearerTypeChange                             ProtocolIE-ID ::= 186
id-RLCMode                                      ProtocolIE-ID ::= 187
id-Duplication-Activation                       ProtocolIE-ID ::= 188
id-Dedicated-SIDelivery-NeededUE-List           ProtocolIE-ID ::= 189
id-Dedicated-SIDelivery-NeededUE-Item           ProtocolIE-ID ::= 190
id-DRX-LongCycleStartOffset                     ProtocolIE-ID ::= 191
id-ULPDCPSNLength                               ProtocolIE-ID ::= 192
id-SelectedBandCombinationIndex                 ProtocolIE-ID ::= 193
id-SelectedFeatureSetEntryIndex                 ProtocolIE-ID ::= 194
id-ResourceCoordinationTransferInformation      ProtocolIE-ID ::= 195
id-ExtendedServedPLMNs-List                     ProtocolIE-ID ::= 196
id-ExtendedAvailablePLMN-List                   ProtocolIE-ID ::= 197
id-Associated-SCell-List                        ProtocolIE-ID ::= 198
id-latest-RRC-Version-Enhanced                  ProtocolIE-ID ::= 199
id-Associated-SCell-Item                        ProtocolIE-ID ::= 200
id-Cell-Direction                               ProtocolIE-ID ::= 201
id-SRBs-Setup-List                              ProtocolIE-ID ::= 202
id-SRBs-Setup-Item                              ProtocolIE-ID ::= 203
id-SRBs-SetupMod-List                           ProtocolIE-ID ::= 204
id-SRBs-SetupMod-Item                           ProtocolIE-ID ::= 205
id-SRBs-Modified-List                           ProtocolIE-ID ::= 206
id-SRBs-Modified-Item                           ProtocolIE-ID ::= 207
id-Ph-InfoSCG                                   ProtocolIE-ID ::= 208
id-RequestedBandCombinationIndex                ProtocolIE-ID ::= 209
id-RequestedFeatureSetEntryIndex                ProtocolIE-ID ::= 210
id-RequestedP-MaxFR2                            ProtocolIE-ID ::= 211
id-DRX-Config                                   ProtocolIE-ID ::= 212
```

```
id-IgnoreResourceCoordinationContainer             ProtocolIE-ID ::= 213
id-UEAssistanceInformation                         ProtocolIE-ID ::= 214
id-NeedforGap                                      ProtocolIE-ID ::= 215
id-PagingOrigin                                    ProtocolIE-ID ::= 216
id-new-gNB-CU-UE-F1AP-ID                           ProtocolIE-ID ::= 217
id-RedirectedRRCmessage                            ProtocolIE-ID ::= 218
id-new-gNB-DU-UE-F1AP-ID                           ProtocolIE-ID ::= 219
id-NotificationInformation                         ProtocolIE-ID ::= 220
id-PLMNAssistanceInfoForNetShar                    ProtocolIE-ID ::= 221
id-UEContextNotRetrievable                         ProtocolIE-ID ::= 222
id-BPLMN-ID-Info-List                              ProtocolIE-ID ::= 223
id-SelectedPLMNID                                  ProtocolIE-ID ::= 224
id-UAC-Assistance-Info                             ProtocolIE-ID ::= 225
id-RANUEID                                         ProtocolIE-ID ::= 226
id-GNB-DU-TNL-Association-To-Remove-Item           ProtocolIE-ID ::= 227
id-GNB-DU-TNL-Association-To-Remove-List           ProtocolIE-ID ::= 228
id-TNLAssociationTransportLayerAddressgNBDU        ProtocolIE-ID ::= 229
id-portNumber                                      ProtocolIE-ID ::= 230
id-AdditionalSIBMessageList                        ProtocolIE-ID ::= 231
id-Cell-Type                                       ProtocolIE-ID ::= 232
id-IgnorePRACHConfiguration                        ProtocolIE-ID ::= 233
id-CG-Config                                       ProtocolIE-ID ::= 234
id-PDCCH-BlindDetectionSCG                         ProtocolIE-ID ::= 235
id-Requested-PDCCH-BlindDetectionSCG               ProtocolIE-ID ::= 236
id-Ph-InfoMCG                                      ProtocolIE-ID ::= 237
id-MeasGapSharingConfig                            ProtocolIE-ID ::= 238
id-systemInformationAreaID                         ProtocolIE-ID ::= 239
id-areaScope                                       ProtocolIE-ID ::= 240
id-RRCContainer-RRCSetupComplete                   ProtocolIE-ID ::= 241
id-TraceActivation                                 ProtocolIE-ID ::= 242
id-TraceID                                         ProtocolIE-ID ::= 243
id-Neighbour-Cell-Information-List                 ProtocolIE-ID ::= 244
id-Slot-Configuration-Item                         ProtocolIE-ID ::= 245
id-SymbolAllocInSlot                               ProtocolIE-ID ::= 246
id-NumDLULSymbols                                  ProtocolIE-ID ::= 247
id-AdditionalRRMPriorityIndex                      ProtocolIE-ID ::= 248
id-DUCURadioInformationType                        ProtocolIE-ID ::= 249
id-CUDURadioInformationType                        ProtocolIE-ID ::= 250
id-AggressorgNBSetID                               ProtocolIE-ID ::= 251
id-VictimgNBSetID                                  ProtocolIE-ID ::= 252
id-LowerLayerPresenceStatusChange                  ProtocolIE-ID ::= 253
id-Transport-Layer-Addresses-Info                  ProtocolIE-ID ::= 254
id-Neighbour-Cell-Information-Item                 ProtocolIE-ID ::= 255

END
-- ASN1STOP
```

9.4.8 Container Definitions

```
-- ASN1START
-- **************************************************************
--
-- Container definitions
```

```
--
-- **************************************************************

F1AP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- IE parameter types from other modules.
--
-- **************************************************************

IMPORTS
    Criticality,
    Presence,
    PrivateIE-ID,
    ProtocolExtensionID,
    ProtocolIE-ID

FROM F1AP-CommonDataTypes
    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs

FROM F1AP-Constants;

-- **************************************************************
--
-- Class Definition for Protocol IEs
--
-- **************************************************************

F1AP-PROTOCOL-IES ::= CLASS {
    &id             ProtocolIE-ID                   UNIQUE,
    &criticality    Criticality,
    &Value,
    &presence       Presence
}
WITH SYNTAX {
    ID              &id
    CRITICALITY     &criticality
    TYPE            &Value
    PRESENCE        &presence
}

-- **************************************************************
--
-- Class Definition for Protocol IEs
--
```

```
-- **************************************************************

F1AP-PROTOCOL-IES-PAIR ::= CLASS {
    &id                 ProtocolIE-ID              UNIQUE,
    &firstCriticality   Criticality,
    &FirstValue,
    &secondCriticality  Criticality,
    &SecondValue,
    &presence           Presence
}
WITH SYNTAX {
    ID              &id
    FIRST CRITICALITY       &firstCriticality
    FIRST TYPE              &FirstValue
    SECOND CRITICALITY      &secondCriticality
    SECOND TYPE             &SecondValue
    PRESENCE                &presence
}

-- **************************************************************
--
-- Class Definition for Protocol Extensions
--
-- **************************************************************

F1AP-PROTOCOL-EXTENSION ::= CLASS {
    &id             ProtocolExtensionID         UNIQUE,
    &criticality    Criticality,
    &Extension,
    &presence       Presence
}
WITH SYNTAX {
    ID              &id
    CRITICALITY     &criticality
    EXTENSION       &Extension
    PRESENCE        &presence
}

-- **************************************************************
--
-- Class Definition for Private IEs
--
-- **************************************************************

F1AP-PRIVATE-IES ::= CLASS {
    &id             PrivateIE-ID,
    &criticality    Criticality,
    &Value,
    &presence       Presence
}
WITH SYNTAX {
    ID              &id
    CRITICALITY     &criticality
    TYPE            &Value
```

```
    PRESENCE        &presence
}

-- **************************************************************
--
-- Container for Protocol IEs
--
-- **************************************************************

ProtocolIE-Container {F1AP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-SingleContainer {F1AP-PROTOCOL-IES : IEsSetParam} ::=
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field {F1AP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {
    id              F1AP-PROTOCOL-IES.&id              ({IEsSetParam}),
    criticality     F1AP-PROTOCOL-IES.&criticality     ({IEsSetParam}{@id}),
    value           F1AP-PROTOCOL-IES.&Value           ({IEsSetParam}{@id})
}

-- **************************************************************
--
-- Container for Protocol IE Pairs
--
-- **************************************************************

ProtocolIE-ContainerPair {F1AP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-FieldPair {{IEsSetParam}}

ProtocolIE-FieldPair {F1AP-PROTOCOL-IES-PAIR : IEsSetParam} ::= SEQUENCE {
    id                  F1AP-PROTOCOL-IES-PAIR.&id                  ({IEsSetParam}),
    firstCriticality    F1AP-PROTOCOL-IES-PAIR.&firstCriticality    ({IEsSetParam}{@id}),
    firstValue          F1AP-PROTOCOL-IES-PAIR.&FirstValue          ({IEsSetParam}{@id}),
    secondCriticality   F1AP-PROTOCOL-IES-PAIR.&secondCriticality   ({IEsSetParam}{@id}),
    secondValue         F1AP-PROTOCOL-IES-PAIR.&SecondValue         ({IEsSetParam}{@id})
}

-- **************************************************************
--
-- Container for Protocol Extensions
--
-- **************************************************************

ProtocolExtensionContainer {F1AP-PROTOCOL-EXTENSION : ExtensionSetParam} ::=
    SEQUENCE (SIZE (1..maxProtocolExtensions)) OF
    ProtocolExtensionField {{ExtensionSetParam}}

ProtocolExtensionField {F1AP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
    id                  F1AP-PROTOCOL-EXTENSION.&id             ({ExtensionSetParam}),
    criticality         F1AP-PROTOCOL-EXTENSION.&criticality    ({ExtensionSetParam}{@id}),
    extensionValue      F1AP-PROTOCOL-EXTENSION.&Extension      ({ExtensionSetParam}{@id})
```

```
}

-- **************************************************************
--
-- Container for Private IEs
--
-- **************************************************************

PrivateIE-Container {F1AP-PRIVATE-IES : IEsSetParam } ::=
    SEQUENCE (SIZE (1.. maxPrivateIEs)) OF
    PrivateIE-Field {{IEsSetParam}}

PrivateIE-Field {F1AP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
    id                  F1AP-PRIVATE-IES.&id                ({IEsSetParam}),
    criticality         F1AP-PRIVATE-IES.&criticality       ({IEsSetParam}{@id}),
    value               F1AP-PRIVATE-IES.&Value             ({IEsSetParam}{@id})
}

END
-- ASN1STOP
```

9.5 Message Transfer Syntax

F1AP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Recommendation X.691 [5].

9.6 Timers

10 Handling of unknown, unforeseen and erroneous protocol data

Clause 10 of TS 38.413 [3] is applicable for the purposes of the present document, with the following additions for non-UE-associated procedures:

- In case of Abstract Syntax Error, when reporting the *Criticality Diagnostics* IE for not comprehended IE/IEgroups or missing IE/IE groups, the *Transaction ID* IE shall also be included;
- In case of Logical Error, when reporting the *Criticality Diagnostics* IE, the *Transaction ID* IE shall also be included;
- In case of Logical Error in a response message of a Class 1 procedure, or failure to comprehend *Transaction ID* IE from a received message, the procedure shall be considered as unsuccessfully terminated or not terminated (e.g., transaction ID unknown in response message), and local error handling shall be initiated.

Annex A (informative): Change History

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-06	R3 NR#2	R3-172493	-	-	-	First version	0.1.0
2017-07	R3 NR#2	R3-172640	-	-	-	Incorporated agreed TPs from R3 NR#2 Adhoc	0.2.0
2017-08	R3#97	R3-173451	-	-	-	Incorporated agreed TPs from R3#97	0.3.0
2017-10	R3#97b	R3-174247	-	-	-	Incorporated agreed TPs from R3#97b	0.4.0
2017-12	R3#98	R3-175062	-	-	-	Incorporated agreed TPs from R3#98	0.5.0
2017-12	RAN#78	RP-172287				Submitted for approval to RAN	1.0.0
2017-12	RAN#78					TR approved by RAN plenary	15.0.0
2018-03	RP-79	RP-180468	0001	2	B	Baseline CR for March version of TS 38.473 covering agreements of RAN3#99	15.1.0
2018-04						Editorial correction to ASN.1 (correction to id-TimeToWait ProtocolIE-ID)	15.1.1
2018-06	RP-80	RP-181237	0011	6	B	Introduction of SA NR (38.473 Baseline CR covering RAN3 agreements)	15.2.0
2018-06	RP-80	RP-181239	0043	3	F	Essential corrections of EN-DC for NSA NR (38.473 Baseline CR covering RAN3 agreements)	15.2.0
2018-06	RP-80	RP-181237	0045	-	B	F1 support for LTE - NR coexistence	15.2.0
2018-06	RP-80					Correction to ASN.1 and to Change History table	15.2.1
2018-09	RP-81	RP-181920	0055	2	F	Introduction of DU Configuration Query	15.3.0
2018-09	RP-81	RP-181921	0056	4	F	CR to 38.473 on further clarifications on System information transfer over F1	15.3.0
2018-09	RP-81	RP-181921	0058	4	F	CR to 38.473 on corrections to System information delivery	15.3.0
2018-09	RP-81	RP-181920	0059	1	F	CR to 38.473 on corrections to PWS transfer over F1	15.3.0
2018-09	RP-81	RP-181921	0063	3	F	CR to 38.473 on PDCP SN over F1 interface	15.3.0
2018-09	RP-81	RP-181922	0064	3	F	NR Corrections (38.473 Baseline CR covering RAN3-101 agreements)	15.3.0
2018-09	RP-81	RP-181997	0068	-	F	Introduction of UL AMBR on F1	15.3.0
2018-09	RP-81	RP-181921	0072	3	F	Correction on cell management	15.3.0
2018-09	RP-81	RP-181921	0073	2	F	RLC Mode Indication over F1	15.3.0
2018-09	RP-81	RP-181921	0076	3	F	CR to 38.473 on UE Identity Index value	15.3.0
2018-09	RP-81	RP-181920	0077	1	F	Correction for UE Context Modification on presence of ServCellIndex IE	15.3.0
2018-09	RP-81	RP-181920	0078	-	F	Executing duplication for RRC-container	15.3.0
2018-09	RP-81	RP-181921	0079	1	F	Indication of RLC re-establishment at the gNB-DU	15.3.0
2018-09	RP-81	RP-181920	0080	-	F	Exchange of SMTC over F1	15.3.0
2018-09	RP-81	RP-181920	0081	-	F	Solving remaining issues with QoS parameters – TS 38.473	15.3.0
2018-09	RP-81	RP-181921	0090		F	Correction of 5GS TAC	15.3.0
2018-09	RP-81	RP-181921	0095	1	F	Extend the RANAC size to 8bits	15.3.0
2018-09	RP-81	RP-181921	0097	-	F	Corrections of Choice	15.3.0
2018-09	RP-81	RP-181921	0098	1	F	Correction of TNL criticality	15.3.0
2018-09	RP-81	RP-181921	0099	1	F	Corrections of usage of single container	15.3.0
2018-09	RP-81	RP-181921	0105	2	B	RRC version handling	15.3.0
2018-09	RP-81	RP-181921	0106	1	B	Introduction of Overload Handling in F1-C	15.3.0
2018-09	RP-81	RP-181921	0113	-	F	CR to 38.473 on presence of QoS information	15.3.0
2018-09	RP-81	RP-181921	0114	1	F	Correction C-RNTI format	15.3.0
2018-09	RP-81	RP-181921	0115	-	F	Correction of QoS Parameters	15.3.0
2018-09	RP-81	RP-181921	0116	1	F	Correction on F1 Setup Request	15.3.0
2018-12	RP-82	RP-182446	0070	3	F	RRC Delivery Indication	15.4.0
2018-12	RP-82	RP-182446	0117	1	F	Correction of AMBR Enforcement	15.4.0
2018-12	RP-82	RP-182446	0138	-	F	CR for correction on Initial UL RRC message transfer	15.4.0
2018-12	RP-82	RP-182446	0140	1	F	CR to 38.473 on bearer type change indication	15.4.0
2018-12	RP-82	RP-182446	0142	1	F	CR to 38.473 on correction to PWS System Information	15.4.0
2018-12	RP-82	RP-182446	0144	2	F	CR to 38.473 on asymmetric mapping for UL and DL QoS flow	15.4.0
2018-12	RP-82	RP-182447	0145	4	F	Corrections on UE-associated LTE/NR resource coordination	15.4.0
2018-12	RP-82	RP-182446	0147	2	F	CR for F1 Cell Management	15.4.0
2018-12	RP-82	RP-182447	0150	1	F	Missing Transaction ID in non-UE-associated procedures	15.4.0
2018-12	RP-82	RP-182446	0157	1	F	CR to 38.473 on mapping of servingCellMO and Serving Cell	15.4.0
2018-12	RP-82	RP-182446	0160	1	F	CR to 38.473 on UE context modification required procedure	15.4.0
2018-12	RP-82	RP-182447	0165	1	F	Addition of the RLC Mode information for bearer modification	15.4.0
2018-12	RP-82	RP-182448	0167	2	F	Rapporteur CR to align tabular	15.4.0
2018-12	RP-82	RP-182448	0168	2	F	Rapporteur CR to align ASN.1	15.4.0
2018-12	RP-82	RP-182447	0169	2	F	Correction of MaxnoofBPLMNs	15.4.0
2018-12	RP-82	RP-182351	0174	2	F	Correction on PDCP SN length on F1	15.4.0
2018-12	RP-82	RP-182447	0178	2	F	CR for TS 38.473 for MR-DC coordination	15.4.0
2018-12	RP-82	RP-182447	0179	2	F	Support of system information update for active UE without CSS	15.4.0
2018-12	RP-82	RP-182447	0187	1	F	CR to 38.473 on clarification to the presence of UE AMBR	15.4.0
2018-12	RP-82	RP-182506	0195	2	F	CR on Scell release for RLC failure	15.4.0
2018-12	RP-82	RP-182447	0205	1	F	About bandcombinationindex and featureSetEntryIndex	15.4.0
2018-12	RP-82	RP-182447	0211	1	F	CR to 38.473 on DRB PDCP duplication	15.4.0
2018-12	RP-82	RP-182447	0216	1	F	CR to 38.473 on clarifications on system information update over F1	15.4.0

2018-12	RP-82	RP-182448	0219	-	F	Correction of RRC version handling and UE inactivity notification	15.4.0
2019-01	RP-82					- correction to ASN.1: addiming a missing change to "WriteReplaceWarningResponseIEs F1AP-PROTOCOL-IES ::= {"	15.4.1
2019-03	RP-83	RP-190555	0202	2	F	Indication that cells are only UL or DL on F1	15.5.0
2019-03	RP-83	RP-190554	0204	1	F	AMF intitiated UE Context Release failure cause	15.5.0
2019-03	RP-83	RP-190554	0220	1	F	Correction to reconfiguration with sync for gNB-DU	15.5.0
2019-03	RP-83	RP-190554	0225	1	F	Introduction of PH-InforSCG in DU to CU RRC Information	15.5.0
2019-03	RP-83	RP-190554	0226	1	F	CR to 38.473 on Measurement gap coordination	15.5.0
2019-03	RP-83	RP-190554	0228	1	F	CR for TS 38.473 for MR-DC coordination	15.5.0
2019-03	RP-83	RP-190554	0229	2	F	Condition for inclusion of the Dedicated SI Delivery Needed UE List IE	15.5.0
2019-03	RP-83	RP-190554	0230	1	F	Correction of the Transmission stop/restart indication	15.5.0
2019-03	RP-83	RP-190554	0231	-	F	Corrections on gNB-CU/gNB-DU Configuration Update	15.5.0
2019-03	RP-83	RP-190556	0236	2	F	Correction of QoS Flow Mapping Indication	15.5.0
2019-03	RP-83	RP-190554	0244	-	F	Release due to pre-emption	15.5.0
2019-03	RP-83	RP-190554	0245	2	F	CR on RRC container in UE context modification request message	15.5.0
2019-03	RP-83	RP-190554	0246	2	F	CR on UE context modification refuse	15.5.0
2019-03	RP-83	RP-190554	0247	-	F	Transaction ID in Error Indication procedure	15.5.0
2019-03	RP-83	RP-190554	0249	2	F	Cells to be deactivated over F1	15.5.0
2019-03	RP-83	RP-190554	0251	1	F	CR to 38.473 on SRB duplication and LCID	15.5.0
2019-03	RP-83	RP-190554	0258	-	F	CR to 38.473 on corrections for removal of PDCP duplication for SRB	15.5.0
2019-03	RP-83	RP-190554	0263	1	F	CR to 38.473 on transfering UEAssistanceInformation over F1	15.5.0
2019-03	RP-83	RP-190554	0265	-	F	Rapporteur updates	15.5.0
2019-03	RP-83	RP-190554	0266	1	F	Correction on gNB-DU Resource Coordination	15.5.0
2019-03	RP-83	RP-190554	0267	1	F	Endpoint IP address and port	15.5.0
2019-03	RP-83	RP-190554	0268	1	F	Correction to add paging origin IE	15.5.0
2019-03	RP-83	RP-190555	0269	2	F	Multiple SCTP associations over F1AP	15.5.0
2019-03	RP-83	RP-190554	0272	1	F	About Cells Failed to be Activated IE in gNB-CU Configuration Update Ack	15.5.0
2019-03	RP-83	RP-190556	0273	1	F	gNB-DU UE Aggregate Maximum Bit Rate Uplink correction	15.5.0
2019-03	RP-83	RP-190554	0276	1	F	RRC Reconfiguration failure	15.5.0
2019-03	RP-83	RP-190554	0278	1	F	Node behaviour at reception of DU to CU RRC Information	15.5.0
2019-03	RP-83	RP-190554	0281	-	F	Addition of Transaction ID to Initial UL RRC Message Transfer	15.5.0
2019-07	RP-84	RP-191397	0200	5	F	RAN sharing with multiple Cell ID broadcast	15.6.0
2019-07	RP-84	RP-191397	0270	5	F	Addition of Network Access Rate Reduction message	15.6.0
2019-07	RP-84	RP-191397	0271	3	F	RAN UE ID for F1	15.6.0
2019-07	RP-84	RP-191396	0283	2	F	MR-DC resource coordination in F1	15.6.0
2019-07	RP-84	RP-191396	0316	2	F	Full configuration indication from gNB-CU to gNB-DU.	15.6.0
2019-07	RP-84	RP-191396	0322	2	F	CR to 38.473 on clarification to RRC reconfigure complete indicator	15.6.0
2019-07	RP-84	RP-191394	0326	2	F	CR to 38.473 on deconfiguring CA based PDCP duplication for DRB	15.6.0
2019-07	RP-84	RP-191395	0330	3	F	CR to 38.473 on Removal of Multiple TNLAs	15.6.0
2019-07	RP-84	RP-191396	0348	-	F	Full configuration in UE Context Setup	15.6.0
2019-07	RP-84	RP-191396	0351	2	F	CR on PWS segmentation over F1	15.6.0
2019-07	RP-84	RP-191396	0352	1	F	CR on cell type over F1	15.6.0
2019-07	RP-84	RP-191396	0357	-	F	Rapporteur updates: Alignment and editorials	15.5.0
2019-07	RP-84	RP-191396	0358	-	F	Rapporteur update: Correction of Presence for DRB information	15.6.0
2019-07	RP-84	RP-191396	0359	-	F	Rapporteur updates: Correction of Presence for E-UTRA PRACH Configuration	15.6.0
2019-07	RP-84	RP-191396	0370	-	F	Full configuration IE included in the UE Context Modification Response.	15.6.0
2019-07	RP-84	RP-191396	0376		F	CR to 38.473 on clarification for UP TNL Information IE over F1	15.6.0
2019-07	RP-84	RP-191396	0377	2	F	Procedure description on optional IEs in CU to DU RRC information IE.	15.6.0
2019-09	RP-85	RP-192166	0343	3	F	CR on MR-DC low layer coordination with an MgNB-DU	15.7.0
2019-09	RP-85	RP-192166	0344	2	F	CR on MCG PHR format in MgNB-DU	15.7.0
2019-09	RP-85	RP-192166	0388		F	CR on DC Coordination for PDCCH Blind Detection	15.7.0
2019-09	RP-85	RP-192167	0393	1	F	Rapporteur update - clarification of semantics	15.7.0
2019-09	RP-85	RP-192166	0399	1	F	Clarification for TNLA removal	15.7.0
2019-12	RP-86	RP-192915	0318	5	F	Correction about gNB-CU System Information IE	15.8.0
2019-12	RP-86	RP-192915	0447	1	F	On CellGroupConfig handling	15.8.0
2019-12	RP-86	RP-192915	0458	1	F	Correction of S-NSSAI coding	15.8.0
2019-12	RP-86	RP-192915	0459	1	F	Removal of Requested P-MaxFR2	15.8.0
2019-12	RP-86	RP-192915	0479	2	F	Addition of Message Identifier and Serial Number to PWS Cancel Request	15.8.0
2019-12	RP-86	RP-192916	0482	2	F	Clarifications on SCell lists	15.8.0
2019-12	RP-86	RP-192916	0494	-	F	RRC Container in Modification Procedure	15.8.0
2019-12	RP-86	RP-192916	0508	0	F	CR to 38.473 on applicability of the IE Selected BandCombinationIndex and Selected FeatureSetEntryIndex	15.8.0

2019-12	RP-86	RP-192916	0509	1	F	CR to 38.473 on MeasGapSharingConfig and gNB-CU System Information	15.8.0
2019-12	RP-86	RP-192916	0510	1	F	CR to 38.473 on cause values over F1	15.8.0
2019-12	RP-86	RP-192916	0515	2	F	Clarification on Initial UL RRC Message Transfer procedure	15.8.0
2019-12	RP-86	RP-192913	0280	7	F	Trace function support for F1AP	16.0.0
2019-12	RP-86	RP-192908	0287	7	B	Support for CLI	16.0.0
2019-12	RP-86	RP-192913	0314	5	B	Introduction of Additional RRM Policy Index (ARPI)	16.0.0
2019-12	RP-86	RP-192908	0339	6	B	CR to F1-AP for RIM new message	16.0.0
2019-12	RP-86	RP-192915	0460		F	Removal of unused IEs	16.0.0
2019-12	RP-86	RP-192913	0463	1	C	Extending the MDBV Range	16.0.0
2019-12	RP-86	RP-192910	0514	3	B	CR for TS38.473 on supporting SN Resume during the RRCResume procedure	16.0.0
2019-12	RP-86	RP-192914	0518	2	F	Support for setting up IPSec a priori in F1	16.0.0