ETSI TS 138 473 V15.2.1 (2018-07)

5G;
NG-RAN;
F1 Application Protocol (F1AP)
(3GPP TS 38.473 version 15.2.1 Release 15)

Reference
DTS/TSGR-0338473vf21

Keywords
5G

ETSI

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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".

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].

CN	Core Network
GTP	GPRS Tunnelling Protocol
EN-DC	E-UTRA-NR Dual Connectivity
IE	Information Element
NR CGI	NR Cell Global Identifier
RRC	Radio Resource Control
SCTP	Stream Control Transmission Protocol
SUL	Supplementary Uplink
TEID	Tunnel Endpoint Identifier
UE	User Equipment
UL	Uplink

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	
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

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

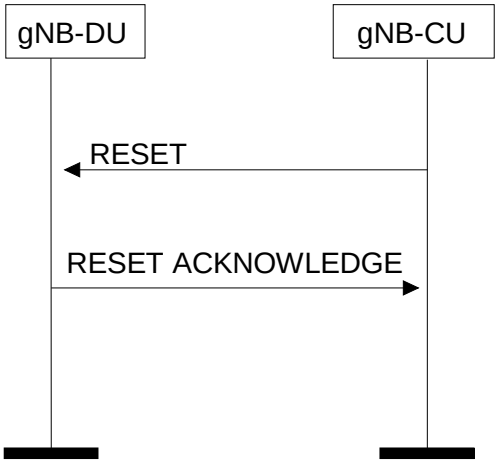

Figure 8.2.1.2.1-1: Reset procedure initiated from the gNB-CU. Successful operation

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

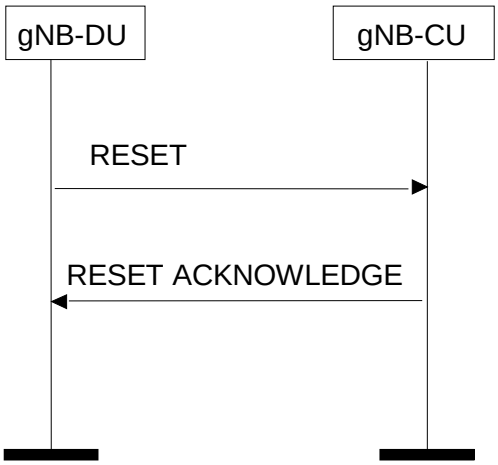

Figure 8.2.1.2.2-1: Reset procedure initiated from the gNB-DU. Successful operation

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

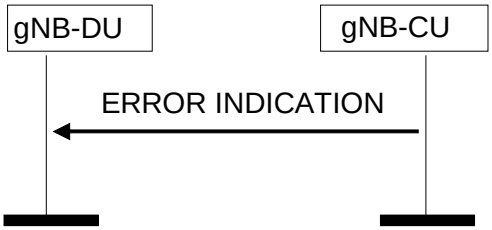

Figure 8.2.2.2-1: Error Indication procedure, gNB-CU originated. Successful operation

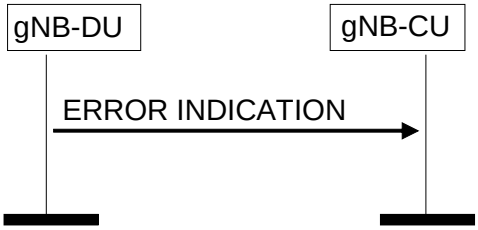

Figure 8.2.2.2-2: Error Indication procedure, gNB-DU originated. Successful operation

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 after a 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

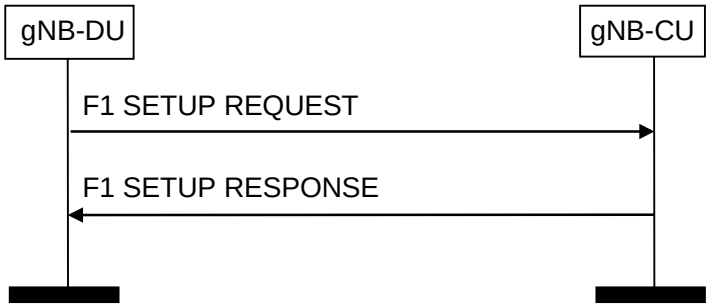

Figure 8.2.3.2-1: F1 Setup procedure: Successful Operation

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.

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.

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.

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.

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].

8.2.3.3 Unsuccessful Operation

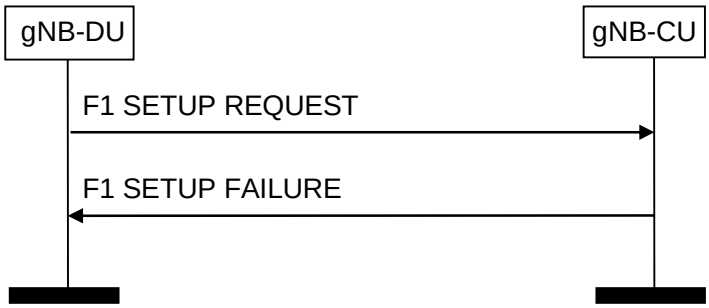

Figure 8.2.3.3-1: F1 Setup procedure: Unsuccessful Operation

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

If the gNB-DU cannot activate cell(s) indicated by *Cells to be Activated List Item* IE in the F1 SETUP RESPONSE message, the gNB-DU shall initiate gNB-DU Configuration Update procedure to indicate the cell(s) that are currently active.

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

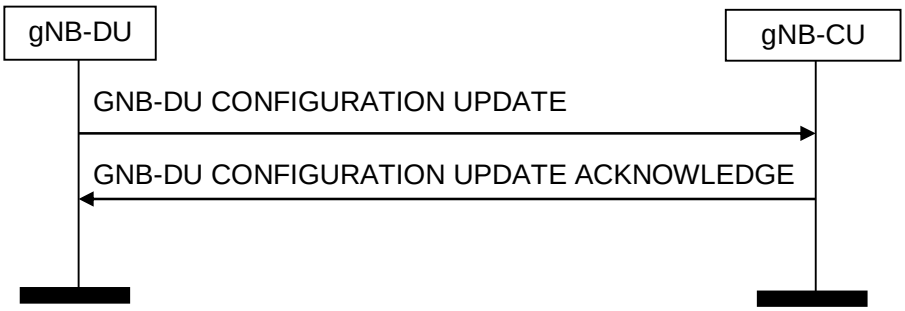

Figure 8.2.4.2-1: gNB-DU Configuration Update procedure: Successful Operation

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.

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 *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 Information* IE. 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 *Active Cells Item* IE is contained in the GNB-DU CONFIGURATION UPDATE message, the gNB-CU shall update the information about the cells that are currently active. If the *Active Cells List* is present and does not contain any cells, the gNB-CU shall assume that there are currently no active cells.

If *Cells to be Activated 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.

For NG-RAN, the gNB-CU shall include the *gNB-CU System Information* IE in the GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message.

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.

8.2.4.3 Unsuccessful Operation

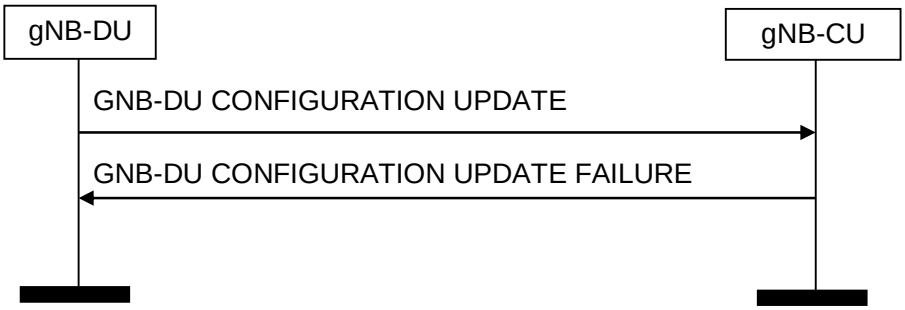

Figure 8.2.4.3-1: gNB-DU Configuration Update procedure: Unsuccessful Operation

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

If the gNB-DU cannot activate cell(s) indicated by *Cells to be Activated List Item* IE in the GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE message, the gNB-DU shall initiate gNB-DU Configuration Update procedure to indicate the cell(s) that are currently active.

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

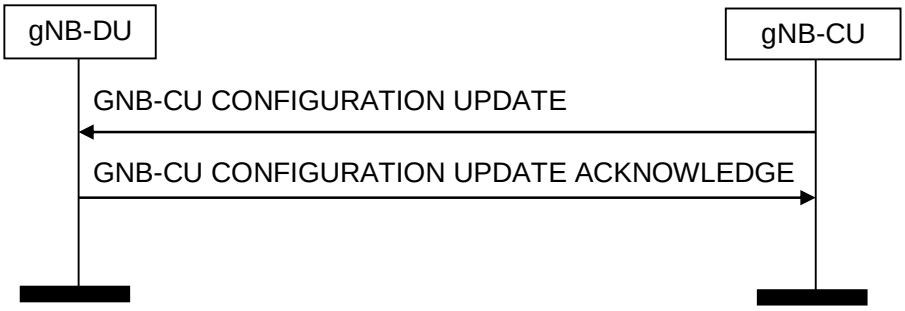

Figure 8.2.5.2-1: gNB-CU Configuration Update procedure: Successful Operation

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.

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 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 TNL Association To Remove List* IE is contained in the gNB-CU CONFIGURATION UPDATE message the gNB-DU shall, if supported, initiate removal of the TNL association(s) indicated by the received gNB-CU Transport Layer Address towards the gNB-CU.

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.

If the *TNL usage* IE or the *TNL Association Weight Factor* 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.

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 *List of E-UTRA Cells* 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.

8.2.5.3 Unsuccessful Operation

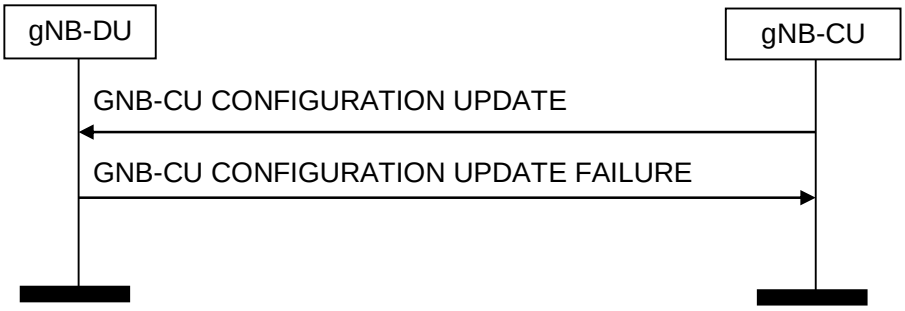

Figure 8.2.5.3-1: gNB-CU Configuration Update: Unsuccessful Operation

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

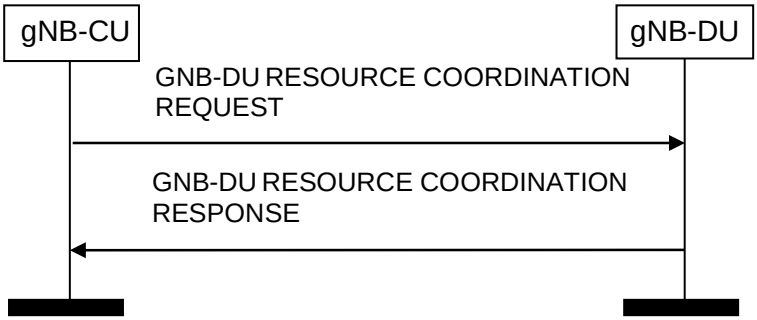

Figure 8.2.6.2-1: gNB-DU Resource Coordination, successful operation

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 E-UTRA-initiated gNB-DU Resource Coordination procedure, the *E-UTRA – NR Cell Resource Coordination Request Container* in the GNB-DU RESOURCE COORDINATION REQUEST message and the *E-UTRA – NR Cell Resource Coordination Response Container* in the GNB-DU RESOURCE COORDINATION RESPONSE message shall be included.

In case of NR-initiated gNB-DU Resource Coordination procedure, the *E-UTRA – NR Cell Resource Coordination Response Container* in the GNB-DU RESOURCE COORDINATION RESPONSE message shall be included.

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

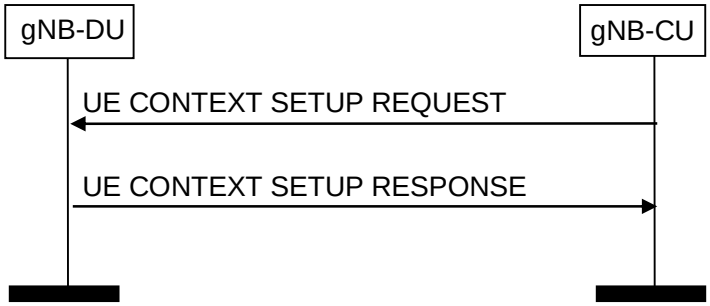

Figure 8.3.1.2-1: UE Context Setup Request procedure: Successful Operation

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 *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 act as specified in TS 38.401 [4]. 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 *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 setup two RLC entities for the indicated SRB and send the *LCID* IE for the primary path in the UE CONTEXT SETUP RESPONSE message.

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 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. 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].

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 PDCP duplication for the DRB.

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. 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].

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.

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 EN-DC operation, the CG-ConfigInfo IE shall be included in the CU to DU RRC Information IE.

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 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].

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 established 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 *Full Configuration* IE is contained in the UE CONTEXT SETUP RESPONSE message, the gNB-CU shall take this into account.

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 STEUP 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.

8.3.1.3 Unsuccessful Operation

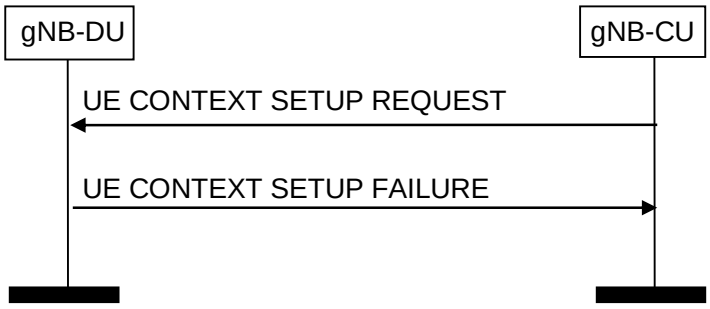

Figure 8.3.1.3-1: UE Context Setup Request procedure: unsuccessful Operation

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

Not applicable.

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

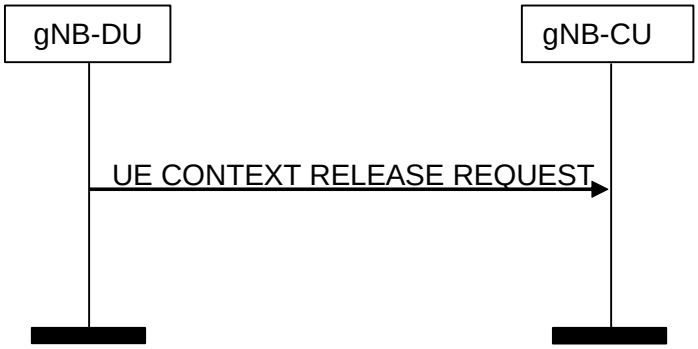

Figure 8.3.2.2-1: UE Context Release (gNB-DU initiated) procedure. Successful operation

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.

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

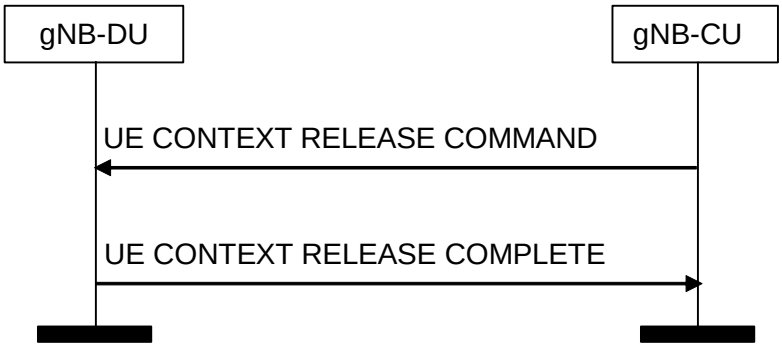

Figure 8.3.3.2-1: UE Context Release (gNB-CU initiated) procedure. Successful operation

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.

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.

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

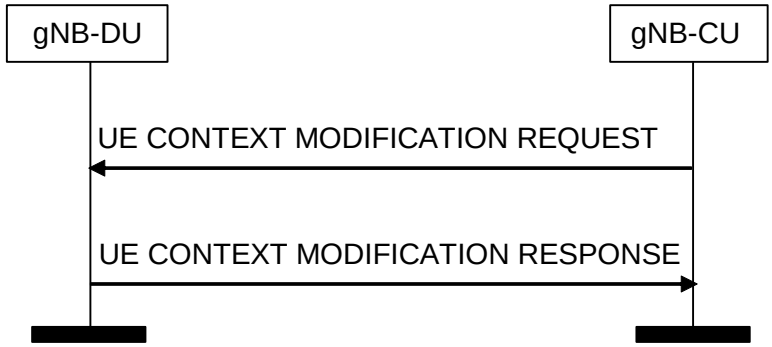

Figure 8.3.4.2-1: UE Context Modification procedure. Successful operation

The F1AP UE CONTEXT MODIFICATION REQUEST message is initiated by the gNB-CU.

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

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, gNB-DU shall include two *DL UP TNL Information* IEs in UE CONTEXT MODIFICATION RESPONSE message. 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].

If *Duplication Activation* IE is included in the UE CONTEXT MODIFICATION REQUEST message for a DRB, gNB-DU should take it into account when activing/deactiving PDCP duplication for the 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. The gNB-CU may include the *RRC Reconfiguration Complete Indicator* IE in the UE CONTEXT MODIFICATION REQUEST message to inform the gNB-DU that the ongoing reconfiguration procedure has been successfully performed by the UE. The gNB-DU does not need to wait for this confirmation for using the new UE configuration or taking other actions towards the UE. It is up to gNB-DU implementation when to use the new UE configuration configured.

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

If the UE CONTEXT MODIFICATION REQUEST message contains the *Transmission Stop Indicator* IE, the gNB-DU shall stop data transmission for the UE. It is up to gNB-DU implementation when to stop 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 [3]. For NG-RAN operation, the gNB-CU shall include the *DRB Information* IE in the UE CONTEXT MODIFICATION REQUEST message.

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].

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. 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].

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.

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.

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 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 Setup List IE.

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].

If the UE CONTEXT MODIFICATION RESPONSE message contains the *DU To CU RRC Information* IE, the gNB-CU shall take this into account.

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 established with an appropriate cause value for each SCell failed to setup.

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 Setup 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.

8.3.4.3 Unsuccessful Operation

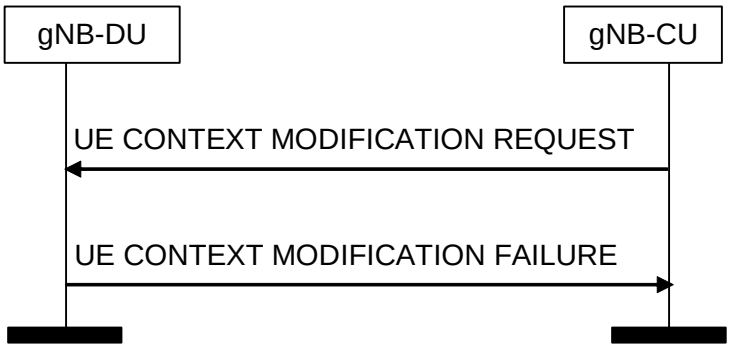

Figure 8.3.4.3-1: UE Context Modification procedure. Unsuccessful operation

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

Not applicable.

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

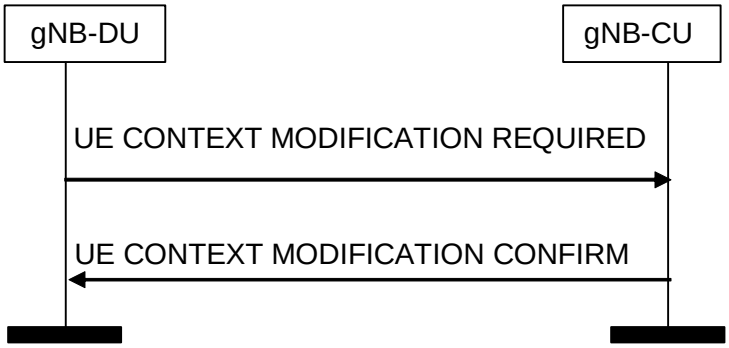

Figure 8.3.5.2-1: UE Context Modification Required procedure. Successful operation

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.

If two *DL UP TNL Information* IEs are included in UE CONTEXT MODIFICATION REQUIRED message for a DRB, gNB-CU shall include two *UL UP TNL Information* IEs in UE CONTEXT MODIFICATION CONFIRM message. 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].

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].

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 UE CONTEXT MODIFICATION REQUIRED message contains the *DU To CU RRC Information* IE, the gNB-CU shall take this into account.

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.

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

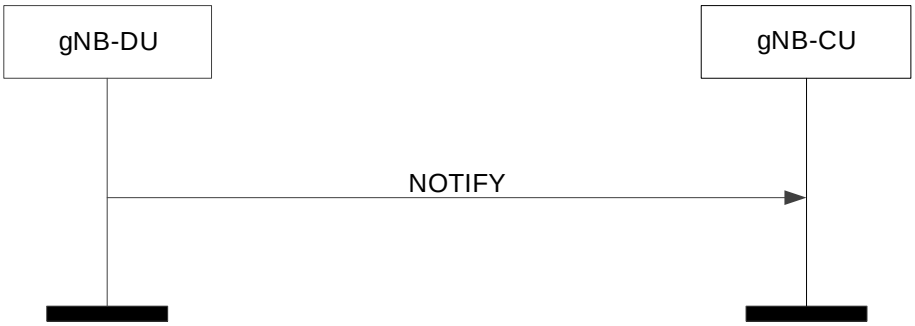

Figure 8.3.7.2-1: Notify procedure. Successful operation.

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.

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 Information* 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 Information* IE.

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.

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.

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.

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.

8.4.3.3 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

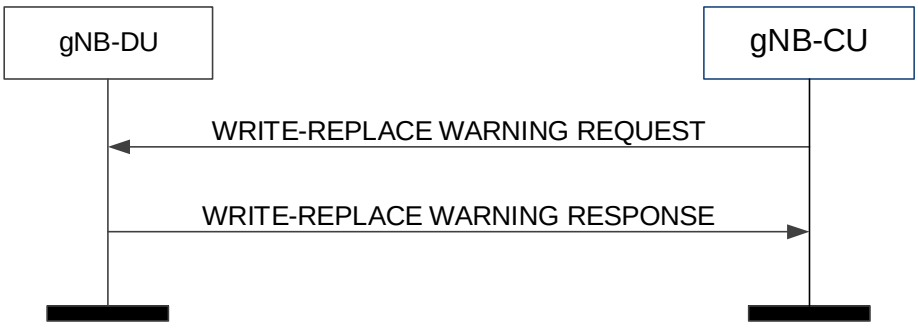

Figure 8.5.1.2-1: Write-Replace Warning procedure: successful operation

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.

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

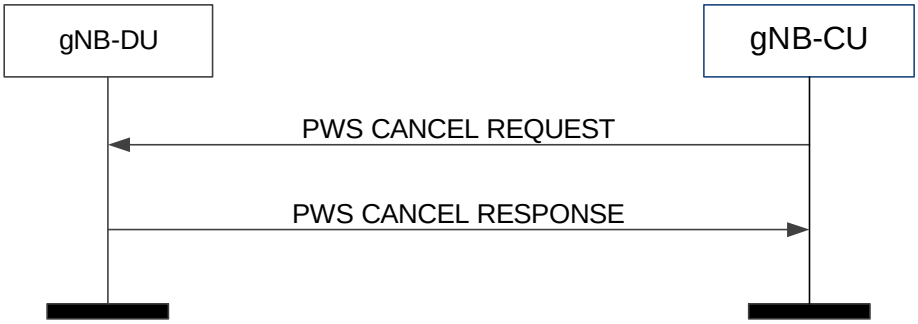

Figure 8.5.2.2-1: PWS Cancel procedure: successful operation

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.

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

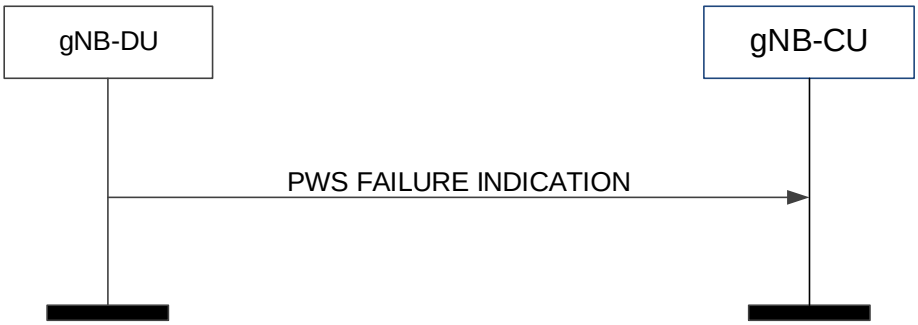

Figure 8.5.4.2-1: PWS failure indication

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.

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 gNB-DU to page a UE. The procedure uses non-UE associated signalling.

8.7.1.2 Successful Operation

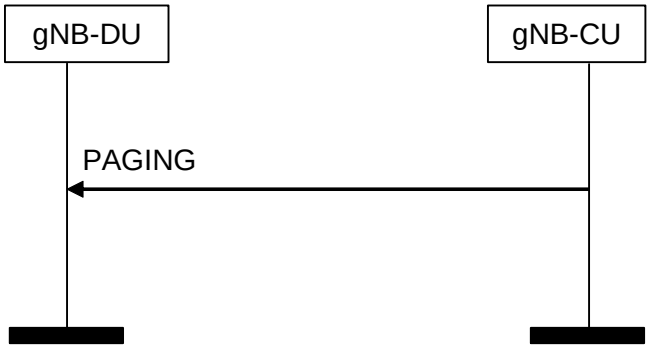

Figure 8.7.1.2-1: Paging procedure. Successful operation.

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.

8.7.1.3 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		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 for a TNL association.

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		*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	-	-

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 for a TNL association.

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*				
>Cells to be Activated List Item		*1.. <maxCellingNBDU>*		List of cells to be activated	YES	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	-	-

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 for a TNL association.

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		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		9.3.1.12		-	-
Active Cells List		*0..1*		Complete list of active cells	YES	reject
>Active Cells Item		*0 .. <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.

9.2.1.8 GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a gNB-CU to a gNB-DU to acknowledge update of information for a TNL association.

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	-	-
Criticality Diagnostics	O		9.3.1.3		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 for a TNL association.

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		
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>*			YES	ignore
>>TNL Association Transport Layer Information	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU.	YES	ignore
>>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].	YES	ignore
gNB-CU TNL Association To Remove List		*0..1*			YES	ignore
>gNB-CU TNL Association To Remove Item IEs		*1..<maxnoofTNLAssociation>*			YES	ignore
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU.	YES	ignore

gNB-CU TNL Association To Update List		*0..1*			YES	ignore
>gNB-CU TNL Association To Update Item IEs		*1..<maxnoofTNLAssociations>*			YES	ignore
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU.	YES	ignore
>>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].	YES	ignore
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		-	-
Protected E-UTRA Resources List		*0..1*		List of Protected E-UTRA Resources.	YES	reject
>Protected E-UTRA Resources List Item		*0 .. <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.	YES	reject
>>List of E-UTRA Cells		*0 .. <maxCellineNB>*		List of applicable E-UTRA cells.	YES	reject
>>>EUTRA Cell ID	M		OCTET STRING	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		–	–

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-CU. 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 for a TNL association.

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 Activated Item		*1.. <maxCellingNBDU>*			EACH	reject
>> 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>			YES	ignore
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU	YES	ignore
gNB-CU TNL Association Failed to Setup Lis		0..1			YES	ignore
>gNB-CU TNL Association Failed To Setup Item IEs		1..<maxnoofTNLAssociations>				
>>TNL Association Transport Layer Address	M		CP Transport Layer Address 9.3.2.4	Transport Layer Address of the gNB-CU	YES	ignore
>>Cause	M		9.3.1.2			

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-CU. Value is 32.

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	O		OCTET STRING	Includes the X2AP E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message as defined in subclause 9.1.4.x in TS 36.423 [9].	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.Y in TS 36.423 [9].	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]	YES	reject
ServCellIndex	M		INTEGER (0..31)			
SpCell UL Configured	O		Cell UL Configured 9.3.1.33		YES	ignore
Candidate SpCell List		*0..1*			YES	ignore
>Candidate SpCell Item IEs		*1 .. <maxnoofCandidateSpCells>*				
>>Candidate SpCell ID	M		NR CGI 9.3.1.12	Special Cell as defined in TS 38.321 [16]		
CU to DU RRC Information	M		9.3.1.25		YES	reject
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].	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			
SRB to Be Setup List		*0..1*				
>SRB to Be Setup Item IEs		*1 .. <maxnoofSRBs>*				
>>SRB ID	M		9.3.1.7			
>>Duplication Indication	O		ENUMERATED (true, …)		YES	ignore
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				YES	reject
>>>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		
>>>>DRB QoS	M		9.3.1.45			
>>>>S-NSSAI	M		9.3.1.38			
>>>>Notification Control	O		9.3.1.56		-	-

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>>>Flows Mapped to DRB Item		*1 .. <maxnoofQoSFlows>*				
>>>>>QoS Flow Indicator	M		9.3.1.63			
>>>>>QoS Flow Level QoS Parameters	M		9.3.1.45			
>>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 UL PDCP duplication		
Inactivity Monitoring Request	O		ENUMERATED (true, …)		YES	reject
RAT-Frequency Priority Information	O		9.3.1.34		YES	reject
RRC-Container	O		9.3.1.6		YES	ignore
Masked IMEISV	O		9.3.1.55		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.

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].	YES	ignore
Full Configuration	O		ENUMERATED (full, …)	For EN-DC operation, this IE may be provided when gNB-DU doesn't understand the *CellGroupConfig* of *sourceConfigSCG.*	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		YES	ignore
DRB Failed to Setup List		*0..1*			YES	ignore
>DRB Failed to Setup Item		*1 .. <maxnoofDRBs>*			EACH	ignore

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>DRB ID	M		9.3.1.8		-	-
>>Cause	O		9.3.1.2		YES	ignore
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

Range bound	Explanation
maxnoofSCells	Maximum no. of SCells allowed towards one UE, the maximum value is 64.
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>*				
>>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	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

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		YES	Ignore

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]	YES	Ignore
ServCellIndex	M		INTEGER (0..31)			
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 Stop 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].	YES	ignore
RRC Reconfiguration Complete Indicator	O		9.3.1.30		YES	ignore
RRC-Container	O		9.3.1.6	Includes the RRCConnectionReconfiguration message as defined in TS 38.331 [8].	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			
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	-	-
SRB to Be Setup List		*0..1*				
>SRB to Be Setup Item IEs		*1..<maxnoofSRBs>*				
>>SRB ID	M		9.3.1.7			
>>Duplication Indication	O		ENUMERATED (true, …)		YES	ignore
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				YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>>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		
>>>>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 Indicator	M		9.3.1.63			
>>>>>QoS Flow Level QoS Parameters	M		9.3.1.45			
>>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 UL PDCP duplication		
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	M				YES	reject
>>>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		
>>>>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 Indicator	M		9.3.1.63			
>>>>>QoS Flow Level QoS Parameters	M		9.3.1.45			

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>> 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.		
SRB TO Be Released List		*0..1*				
>SRB To Be Released Item IEs		*1.. <maxnoofSRBs>*				
>>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

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.

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].	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		
>>DL UP TNL Information to be setup List		*1*				
>>>DL UP TNL Information to Be Setup Item IEs		*1 .. <maxnoofDLUPTNLInformation>*				

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>>>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 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		9.3.1.8		-	
>>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		-	-
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		-	-
SCell Failed To Setup List		*0..1*				
>SCell Failed to Setup Item		*1 .. <maxnoofSCells>*				
>>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

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.

9.2.2.9 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].	YES	ignore
DU To CU RRC Information	O		9.3.1.26		YES	reject
DRB Required to Be Modified List		*0..1*			EACH	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.	-	-
SRB Required to be Released List		*0..1*			EACH	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*			EACH	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].	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		YES	ignore
Criticality Diagnostics	O		9.3.1.3		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.

9.2.2.12 UE INACTIVITY NOTIFCATION

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	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
DRB Activity List		*1*			YES	reject
>DRB Activity Item		*1 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	-
>>DRB Activity	M		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, …)		-	-

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		YES	reject
DU to CU RRC Container	O		OCTET STRING	*CellGroupConfig* IE as defined in subclause 6.3.2 in TS 38.331. Required at least to carry SRB1 configuration	YES	reject

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		YES	reject
RAT-Frequency Priority Information	O		9.3.1.34		YES	reject

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		YES	reject

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
Cell To Be Broadcast List		*0..1*			YES	ignore
>Cell to Be Broadcast Item IEs		*1.. <maxCellingNBDU>*			EACH	ignore
>>NR CGI	M		9.3.1.12		-	-
Repetition Period	M		9.3.1.59		YES	reject
Number of Broadcasts Requested	M		9.3.1.60		YES	reject
Concurrent Warning Message Indicator	O		9.3.1.61		YES	reject

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	ignore
>Cell Broadcast Completed Item IEs		*1.. <maxCellingNBDU>*			EACH	ignore
>>NR CGI	M		9.3.1.12		-	-
Criticality Diagnostics	O		9.3.1.3		YES	ignore

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

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
Cell Broadcast To Be Cancelled List		*0..1*			YES	ignore
>Cell Broadcast to Be Cancelled Item IEs		*1.. <maxCellingNB-DU>*			EACH	ignore
>>NR CGI	M		9.3.1.12		-	-
Cancel-all Warning Messages Indicator	O		9.3.1.55	ENUMERATED (true, …)	YES	reject

Range bound	Explanation
maxCellingNB-DU	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	ignore
>Cell Broadcast Cancelled Item IEs		*1.. <maxnoofCellsinGNBDU>*			EACH	ignore
>>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

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
NR CGI List for Restart		*1..<maxnoofCellsingNBDU>*			EACH	reject
>NR CGI	M		9.3.1.12		-	-

Range bound	Explanation
maxnoofCellsingNBDU	Maximum no. of cells that can be served by an 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
PWS failed NR CGI List		*1..<maxnoofCellsingNBDU>*			EACH	reject
>NR CGI	M		9.3.1.12		-	-

Range bound	Explanation
maxnoofCellsingNBDU	Maximum no. of cells that can be served by an 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	reject
NR CGI	M		9.3.1.12	NR cell identifier	-	
SIBType List	M		9.3.1.62			
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	reject
UE Identity Index value	M		9.3.1.39		YES	reject
Choice Paging Identity	M					
>RAN UE Paging identity			9.3.1.43		YES	reject
>CN UE paging identity			9.3.1.44		YES	reject
Paging DRX	O		9.3.1.40		YES	ignore
Paging Priority	O		9.3.1.41		YES	ignore
Paging Cell List		*1*				
>Paging Cell Item IEs		*1 .. <maxnoofPagingCells>*			EACH	ignore
>>NR CGI	M		9.3.1.12		-	

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

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, 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, …)	
>*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	The action is due to an RL failure caused by e.g. 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.

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.
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, NAS 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' shall not be used.
>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.

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.

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	M		9.3.1.29	5GS Tracking Area Code	YES	reject
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		NR Transmission Bandwidth 9.3.1.15		–	–
>>>DL Transmission Bandwidth	M		NR Transmission Bandwidth 9.3.1.15		–	–
>*TDD*					-	-
>>TDD Info		*1*			-	-
>>> NR FreqInfo	M		NR Frequency Info 9.3.1.17		–	–
>>> Transmission Bandwidth	M		NR Transmission Bandwidth 9.3.1.15		–	–
Measurement Timing Configuration	M		OCTET STRING	Contains the *MeasurementTimingConfiguration* inter-node message defined in TS 38.331 [8].	–	–
RANAC	O		9.3.1.57	RAN Area Code	YES	ignore

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

9.3.1.11 Transmission Stop Indicator

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transmission Stop Indicator	M		ENUMERATED (true, …)	

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 (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 (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 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	Criticality	Assigned Criticality
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 applies to GBR bearers only and shall be 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 **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. **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	Criticality	Assigned Criticality
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 shall use the same Transaction ID. The Transaction ID is determined by the initiating peer of a procedure.

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
CG-ConfigInfo	O		OCTET STRING	CG-ConfigInfo, as defined in TS 38.331 [8].
UE-CapabilityRAT-ContainerList	O		OCTET STRING	UE-CapabilityRAT-ContainerList, as defined in TS 38.331 [8].
MeasConfig	O		OCTET STRING	MeasConfig, as defined in TS 38.331 (without MeasGapConfig). For EN-DC operation, includes the list of FR2 frequencies for which the gNB-CU requests the gNB-DU to generate gaps. This IE may need to be refined.
Handover Preparation Information	O		OCTET STRING	HandoverPreparationInformation, as defined in TS 38.331 [8].

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
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 operation, includes the gap for FR2, as requested by the gNB-CU via MeasConfig IE. For NG-RAN, 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). This IE may need to be refined.
Requested P-MaxFR1	O		OCTET STRING	requestedP-MaxFR1, as defined in TS 38.331 [8]. For EN-DC operation, this IE should be included, as requested by the gNB-CU via CG-ConfigInfo IE.

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,…)	

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		NR 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 successful reconfiguration performed in the UE.

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

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		BIT STRING (SIZE(16))	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	O		INTEGER (1.. 256, …)	
>NG-RAN				
>> *Index to RAT/Frequency Selection Priority*	O		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	Criticality	Assigned Criticality
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.

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
UE Identity Index Value	M		INTEGER (0..63)	This IE may need to be refined.

9.3.1.40 Paging DRX

This IE indicates the Paging DRX.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Paging DRX	M		INTEGER (0..63)	This IE may need to be refined.

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
SI message	M		OCTET STRING	SI message containing all SIBs other than SIB1, as defined in TS 38.331 [8]. This IE shall not contain the SIBs for public warning. This IE may need to be refined.

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				YES	reject
>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.	-	
Reflective QoS Attribute	O		ENUMERATED (subject to, …)	Details in TS 23.501 [21]. This IE applies to non-GBR flows only and shall be ignored otherwise.	-	

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	Criticality	Assigned Criticality
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].
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].

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
NG-RAN Allocation and Retention Priority				
>Priority Level	M		INTEGER (1..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. **Usage**: The QoS flow shall not pre-empt other QoS flows or, the QoS flow may pre-empt other QoS flows. 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. **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. 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)	For details see 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	This IE applies to GBR QoS Flows only. 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.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Packet Delay Budget	M		INTEGER (0..63)	This IE may need to be refined

9.3.1.52 Packet Error Rate

This IE indicates the Packet Error Rate.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Packet Error Rate	M		INTEGER (0..63)	This IE may need to be refined

9.3.1.53 Averaging Window

This IE indicates the Averaging Window.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Averaging Window	M		INTEGER (0..63)	This IE may need to be refined

9.3.1.54 Maximum Data Burst Volume

This IE indicates the Maximum Data Burst Volume.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Maximum Data Burst Volume	M		INTEGER (0..63)	This IE may need to be refined

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. If the notification control is set to active, the gNB-DU shall, if supported, monitor the QoS of the DRB and notify the gNB-CU.

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..64)	RAN Area Code

9.3.1.58 PWS System Information

This IE contains the system information used for pubic warning.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SI message	M		OCTET STRING	SI message containing only the SIBs for public warning, as defined in TS 38.331 [8]. This IE may be re-defined.

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 Concurrent Warning Message Indicator

This IE indicates to the gNB-DU node that the received warning message is a new message to be scheduled for concurrent broadcast with any other ongoing broadcast of warning messages.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Concurrent Warning Message Indicator	M		ENUMERATED (true)	This IE is used to identify a PWS type warning system which allows the broadcast of multiple concurrent warning messages over the radio.

9.3.1.62 SIBType List

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SIB type item IEs		*1.. <maxnoofSIBTypes>*		
>SIB Type	M		ENUMERATED(sibType2, sibType3, sibType4, sibType5, sibType6, sibType7, sibType8, sibType9,…)	

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

9.3.1.63 QoS Flow Indicator

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QoS Flow Indicator	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	Criticality	Assigned Criticality
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.W of TS 36.423 [9].	YES	ignore

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 NG control plane transport layer information associated with an NG-RAN node – AMF pair.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *CP Transport Layer Information*				
>Endpoint-IP-address				
>> Endpoint IP address	M		Transport Layer Address 9.3.2.3	

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

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-- **************************************************************
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-- 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

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


FROM F1AP-Constants;


-- ************************************************************
--
-- 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,
    ...
}

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       ,
    ...}

 F1AP-ELEMENTARY-PROCEDURES-CLASS-2 F1AP-ELEMENTARY-PROCEDURE ::= {
    errorIndication                 |
    uEContextReleaseRequest         |
    dLRRCMessageTransfer            |
    uLRRCMessageTransfer            |
    uEInactivityNotification        |
    privateMessage                  |
    initialULRRCMessageTransfer     |
    systemInformationDelivery       |
    paging                          |
    notify                          |
    pWSRestartIndication                |
    pWSFailureIndication            ,
    ...
}
-- **************************************************************
--
-- 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
    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
}

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
}


END
```

9.4.4 PDU Definitions

```
-- **************************************************************
--
-- 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
    Active-Cells-Item,
    Candidate-SpCell-Item,
    Cause,
    Cells-Failed-to-be-Activated-List-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,
    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,
    NotificationControl,
    NRCGI,
    NRPCI,
    Potential-SpCell-Item,
    RAT-FrequencyPriorityInformation,
    ResourceCoordinationTransferContainer,
    RRCContainer,
    RRCRconfigurationCompleteIndicator,
    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,
    SRBID,
    SRBs-FailedToBeSetup-Item,
    SRBs-FailedToBeSetupMod-Item,
    SRBs-Required-ToBeReleased-Item,
    SRBs-ToBeReleased-Item,
    SRBs-ToBeSetup-Item,
    SRBs-ToBeSetupMod-Item,
    TimeToWait,
    TransactionID,
    TransmissionStopIndicator,
    UE-associatedLogicalF1-ConnectionItem,
    DUtoCURRCContainer,
    PagingCell-Item,
    SIBtype-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,
    ConcurrentWarningMessageIndicator,
    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,
    ListofEUTRACellsinGNBDUCoordination,
    SpectrumSharingGroupID,
    RequestType

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-Active-Cells-Item,
    id-Active-Cells-List,
    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-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-oldgNB-DU-UE-F1AP-ID,
    id-Potential-SpCell-Item,
    id-Potential-SpCell-List,
    id-RAT-FrequencyPriorityInformation,
    id-ResetType,
    id-ResourceCoordinationTransferContainer,
    id-RRCContainer,
    id-RRCRconfigurationCompleteIndicator,
    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-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-ServCellndex,
    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-TimeToWait,
    id-TransactionID,
    id-TransmissionStopIndicator,
    id-UE-associatedLogicalF1-ConnectionItem,
    id-UE-associatedLogicalF1-ConnectionListResAck,
    id-DUtoCURRCContainer,
    id-NRCGI,
    id-PagingCell-Item,
    id-PagingCell-List,
    id-PagingDRX,
    id-PagingPriority,
    id-SIBtype-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-ConcurrentWarningMessageIndicator,
    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-SpectrumSharingGroupID,
    id-ListofEUTRACellsinGNBDUCoordination,
    id-Protected-EUTRA-Resources-List,
    id-RequestType,
    maxCellingNBDU,
    maxnoofCandidateSpCells,
    maxnoofDRBs,
    maxnoofErrors,
```

```
    maxnoofIndividualF1ConnectionsToReset,
    maxnoofPotentialSpCells,
    maxnoofSCells,
    maxnoofSRBs,
    maxnoofPagingCells,
    maxnoofTNLAssociations,
    maxCellineNB

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,
    ...
}


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 mandatory },
    ...
}


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  },
    ...
}
```

```
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-Active-Cells-List               CRITICALITY reject  TYPE     Active-Cells-List                  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 } }
Active-Cells-List   ::= SEQUENCE (SIZE(0.. maxCellingNBDU)) OF ProtocolIE-SingleContainer { { Active-Cells-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   },
...
}

Active-Cells-ItemIEs F1AP-PROTOCOL-IES  ::= {
    { ID id-Active-Cells-Item               CRITICALITY reject  TYPE        Active-Cells-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 },
    ...
}

-- **************************************************************
--
-- 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 },
    ...
}

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 reject  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 reject  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 reject  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-SpectrumSharingGroupID                  CRITICALITY reject  TYPE SpectrumSharingGroupID                   PRESENCE mandatory}|
    { ID id-ListofEUTRACellsinGNBDUCoordination     CRITICALITY reject  TYPE ListofEUTRACellsinGNBDUCoordination      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   },
    ...
}

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 reject  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 reject  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},
    ...
}


-- **************************************************************
--
-- 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-ServCellndex                            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 },
  ...
}

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 },
    ...
}

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} }

DRBs-Setup-ItemIEs F1AP-PROTOCOL-IES ::= {
    { ID id-DRBs-Setup-Item                     CRITICALITY ignore  TYPE DRBs-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 },
    ...
}

-- **************************************************************
--
-- 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-ServCellndex                            CRITICALITY reject  TYPE ServCellIndex                        PRESENCE mandatory   }|
    { 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-TransmissionStopIndicator               CRITICALITY ignore  TYPE TransmissionStopIndicator            PRESENCE optional }|
    { ID id-ResourceCoordinationTransferContainer   CRITICALITY ignore  TYPE ResourceCoordinationTransferContainer PRESENCE optional }|
    { ID id-RRCRconfigurationCompleteIndicator      CRITICALITY ignore  TYPE RRCRconfigurationCompleteIndicator    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 },
    ...
}

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 },
    ...
}


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 } }
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} }

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-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},
    ...
}

-- **************************************************************
--
-- 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 },
```

```
    ...
}

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},
    ...
}



-- **************************************************************
--
-- 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-ConcurrentWarningMessageIndicator   CRITICALITY reject  TYPE ConcurrentWarningMessageIndicator    PRESENCE optional }|
{ 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 },
...
}
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 }
,
...
}
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  },
    ...
}


-- **************************************************************
--
-- 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 },
    ...
}
-- **************************************************************
--
-- 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   },
    ...
}

-- **************************************************************
--
-- 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-NRCGI               CRITICALITY reject  TYPE NRCGI                  PRESENCE mandatory   }|
    { ID id-SIBtype-List            CRITICALITY reject  TYPE SIBtype-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 optional  }|
    { 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 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)) 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},
    ...
}



-- **************************************************************
--
-- PWS RESTART INDICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- PWS Restart Indication
--
-- **************************************************************

PWSRestartIndication ::= SEQUENCE {
protocolIEs ProtocolIE-Container { { PWSRestartIndicationIEs} },
...
}
PWSRestartIndicationIEs F1AP-PROTOCOL-IES ::= {
{ ID id-NR-CGI-List-For-Restart-List    CRITICALITY reject  TYPE     NR-CGI-List-For-Restart-List PRESENCE optional },
...
}
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-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 },
    ...
}

END
```

9.4.5 Information Element Definitions

```
-- **************************************************************
--
-- 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,
    maxNRARFCN,
    maxnoofErrors,
    maxnoofBPLMNs,
    maxnoofDLUPTNLInformation,
    maxnoofNrCellBands,
    maxnoofULUPTNLInformation,
    maxnoofQoSFlows,
    maxnoofSliceItems,
    maxnoofSIBTypes,
    maxCellineNB

FROM F1AP-Constants

    Criticality,
```

```
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage

FROM F1AP-CommonDataTypes

    ProtocolExtensionContainer{},
    F1AP-PROTOCOL-EXTENSION,
    ProtocolIE-SingleContainer{},
    F1AP-PROTOCOL-IES

FROM F1AP-Containers;

-- A

Active-Cells-Item ::= SEQUENCE {
    nRCGI       NRCGI   ,
    iE-Extensions               ProtocolExtensionContainer { { Active-Cells-ItemExtIEs } }  OPTIONAL,
    ...
}

Active-Cells-ItemExtIEs     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 ::= {
    ...
}
AveragingWindow  ::= INTEGER (0..63) -- this IE may need to be refined

-- B

BitRate ::= INTEGER (0..4000000000000,...)

BroadcastPLMNs-List ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF BroadcastPLMNs-Item

BroadcastPLMNs-Item ::= SEQUENCE {
    pLMN-Identity               PLMN-Identity,
    iE-Extensions               ProtocolExtensionContainer { { BroadcastPLMNs-ItemExtIEs} } OPTIONAL,
    ...
}

BroadcastPLMNs-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,
    ...
}

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,
    unknown-or-already-allocated-gnb-cu-ue-f1ap-id,
    unknown-or-already-allocated-gnd-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,
    ...
}

CauseTransport ::= ENUMERATED {
    unspecified,
    transport-resource-unavailable,
    ...
}



CellGroupConfig ::= OCTET STRING

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-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 },
    ...
}

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, ...}

CellULConfigured ::=  ENUMERATED {none, ul, sul, ul-and-sul, ...}

CNUEPagingIdentity ::= CHOICE {
    fiveG-S-TMSI            BIT STRING (SIZE(48)),
    choice-extension            ProtocolExtensionContainer { { CNUEPagingIdentity-ExtIEs } },
```

```
    ...
}

CNUEPagingIdentity-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}


ConcurrentWarningMessageIndicator ::= ENUMERATED {true, ...}

CP-TransportLayerAddress ::= CHOICE {
    endpoint-IP-address             TransportLayerAddress,
    endpoint-IP-address-and-port    Endpoint-IP-address-and-port,
    choice-extension            ProtocolExtensionContainer { { CP-TransportLayerAddress-ExtIEs } },
    ...
}

CP-TransportLayerAddress-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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 ::= BIT STRING (SIZE (16))

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 },
    ...
}

-- D

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 ::= {
    ...
}

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 ::= {
    ...
}

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,
    uLUPTNLInformation-ToBeSetup-List   ULUPTNLInformation-ToBeSetup-List   ,
    uLConfiguration             ULConfiguration OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-ToBeModified-ItemExtIEs } } OPTIONAL,
    ...
}

DRBs-ToBeModified-ItemExtIEs    F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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 ::= {
    ...
}


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 ::= {
```

```
    ...
}

DRXCycle    ::= SEQUENCE {
    longDRXCycleLength  LongDRXCycleLength,
    shortDRXCycleLength     ShortDRXCycleLength OPTIONAL,
    shortDRXCycleTimer  ShortDRXCycleTimer OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { DRXCycle-ExtIEs} } OPTIONAL,
    ...
}

DRXCycle-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DUtoCURRCContainer ::= OCTET STRING

DUtoCURRCInformation ::= SEQUENCE {
    cellGroupConfig     CellGroupConfig,
    measGapConfig           MeasGapConfig   OPTIONAL,
    requestedP-MaxFR1               OCTET STRING                OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { DUtoCURRCInformation-ExtIEs} } OPTIONAL,
    ...
}

DUtoCURRCInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DuplicationActivation ::= ENUMERATED{active,inactive,... }

DuplicationIndication ::= ENUMERATED {true, ...}

Dynamic5QIDescriptor    ::= SEQUENCE {
    qoSPriorityLevel                    INTEGER (1..127),
    packetDelayBudget                   PacketDelayBudget,
    packetErrorRate                     PacketErrorRate,
    delayCritical                       ENUMERATED {delay-critical, non-delay-critical}     OPTIONAL,
    averagingWindow                     AveragingWindow                                     OPTIONAL,
    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 ::= {
    ...
}

EUTRANQoS   ::= SEQUENCE {
    qCI                             QCI,
    allocationAndRetentionPriority  AllocationAndRetentionPriority,
    gbrQosInformation               GBR-QosInformation                                  OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { { EUTRANQoS-ExtIEs} }  OPTIONAL,
    ...
}

EUTRANQoS-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ExecuteDuplication ::= ENUMERATED{true,...}

EUTRA-Mode-Info ::= CHOICE {
    eUTRAFDD        EUTRA-FDD-Info,
    eUTRATDD        EUTRA-TDD-Info,
    ...
}

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 {
    qoSFlowIndicator                            QoSFlowIndicator,
    qoSFlowLevelQoSParameters                QoSFlowLevelQoSParameters,
    iE-Extensions               ProtocolExtensionContainer { { Flows-Mapped-To-DRB-ItemExtIEs} } OPTIONAL
}

Flows-Mapped-To-DRB-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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 ::= {
    ...
}


GNB-CUSystemInformation::= SEQUENCE {
    sImessage       OCTET STRING,
    iE-Extensions                   ProtocolExtensionContainer { { GNB-CUSystemInformation-ExtIEs} } OPTIONAL,
    ...
}

GNB-CUSystemInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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 ::= {
    ...
}


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 ::= {
    ...
}

GTP-TEID                ::= OCTET STRING (SIZE (4))
```

```
GTPTunnel               ::= SEQUENCE {
    transportLayerAddress       TransportLayerAddress,
    gTP-TEID        GTP-TEID,
    iE-Extensions                   ProtocolExtensionContainer { { GTPTunnel-ExtIEs } } OPTIONAL,
    ...
}

GTPTunnel-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- H

HandoverPreparationInformation ::= OCTET STRING

-- I
InactivityMonitoringRequest ::= ENUMERATED { true,...}
InactivityMonitoringResponse ::= ENUMERATED { not-supported,...}

-- J

-- K

-- L

LCID ::= INTEGER (1..32, ...)

ListofEUTRACellsinGNBDUCoordination  ::= SEQUENCE (SIZE (0.. maxCellineNB)) OF Served-EUTRA-Cells-Information

LongDRXCycleLength ::=  ENUMERATED
{ms10, ms20, ms32, ms40, ms60, ms64, ms70, ms80, ms128, ms160, ms256, ms320, ms512, ms640, ms1024, ms1280, ms2048, ms2560, ms5120, ms10240, ...}

-- M

MaskedIMEISV ::=    BIT STRING (SIZE (64))

MaxDataBurstVolume  ::= INTEGER (0..63) -- this IE may need to be refined
MaxPacketLossRate ::= INTEGER (0..1000)

MIB-message ::= OCTET STRING

MeasConfig ::= OCTET STRING

MeasGapConfig ::= OCTET STRING

-- N

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, ...}

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            ProtocolExtensionContainer { { NR-Mode-Info-ExtIEs} },
    ...
}

NR-Mode-Info-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {   ...
}


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)

-- O

OffsetToPointA  ::= INTEGER (0..2199,...)

-- P

PacketDelayBudget ::= INTEGER (0..63) -- this IE may need to be refined

PacketErrorRate ::= INTEGER (0..63) -- this IE may need to be refined

PagingCell-Item ::= SEQUENCE {
    nRCGI       NRCGI   ,
    iE-Extensions   ProtocolExtensionContainer { { PagingCell-ItemExtIEs } }    OPTIONAL
}

PagingCell-ItemExtIEs   F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

PagingDRX ::= INTEGER (0..63) -- this IE may need to be refined

PagingIdentity ::=  CHOICE {
    rANUEPagingIdentity RANUEPagingIdentity,
    cNUEPagingIdentity  CNUEPagingIdentity,
    choice-extension            ProtocolExtensionContainer { { PagingIdentity-ExtIEs } },
    ...
}

PagingIdentity-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
PagingPriority ::= ENUMERATED { priolevel1, priolevel2, priolevel3, priolevel4, priolevel5, priolevel6, priolevel7, priolevel8,...}

PLMN-Identity ::= OCTET STRING (SIZE(3))

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

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 ::= OCTET STRING

-- Q

QCI ::= INTEGER (0..255)

QoS-Characteristics ::= CHOICE {
    non-Dynamic-5QI             NonDynamic5QIDescriptor,
    dynamic-5QI                 Dynamic5QIDescriptor,
    choice-extension            ProtocolExtensionContainer { { QoS-Characteristics-ExtIEs } },
    ...
}

QoS-Characteristics-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
```

```
    ...
}

QoSFlowIndicator ::= 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 ::= {
    ...
}

QoSInformation  ::= CHOICE {
    eUTRANQoS                   EUTRANQoS,
    choice-extension            ProtocolExtensionContainer { { QoSInformation-ExtIEs} },
    ...
    dRB-Information             DRB-Information,
}

QoSInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- R

RANAC ::= INTEGER (0..64)

RANUEPagingIdentity ::= SEQUENCE    {
    iRNTI                       BIT STRING (SIZE(40)),
    iE-Extensions               ProtocolExtensionContainer { { RANUEPagingIdentity-ExtIEs } }   OPTIONAL}

RANUEPagingIdentity-ExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

RAT-FrequencyPriorityInformation::= CHOICE {
    subscriberProfileIDforRFP       SubscriberProfileIDforRFP,
    rAT-FrequencySelectionPriority      RAT-FrequencySelectionPriority,
    choice-extension            ProtocolExtensionContainer { { RAT-FrequencyPriorityInformation-ExtIEs} },
    ...
}

RAT-FrequencyPriorityInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

RAT-FrequencySelectionPriority::= INTEGER (1.. 256, ...)

RequestType ::= ENUMERATED {offer, execution, ...}
```

```
ResourceCoordinationTransferContainer ::= OCTET STRING

RepetitionPeriod ::= INTEGER (0..131071, ...)
RLCMode ::= ENUMERATED {
    rlc-am,
    rlc-um
}

RRCContainer ::= OCTET STRING

RRCRconfigurationCompleteIndicator  ::= ENUMERATED {true, ...}

-- 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 ::= {
    ...
}

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 ::= {
    ...
}

SCellIndex ::=INTEGER (1..31, ...)

CG-ConfigInfo ::= OCTET STRING

ServCellIndex ::= INTEGER (0..31, ...)

Served-Cell-Information ::= SEQUENCE {
    nRCGI                           NRCGI,
    nRPCI                           NRPCI,
    fiveGS-TAC                          FiveGS-TAC,
    configured-EPS-TAC              Configured-EPS-TAC      OPTIONAL,
    servedPLMNs                 BroadcastPLMNs-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},
    ...
}

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 ::= {
    ...
}

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

SIBtype ::= ENUMERATED {
    sibtype2,sibtype3, sibtype4, sibtype5, sibtype6, sibtype7, sibtype8, sibtype9,
    ...
}

SIBtype-List ::= SEQUENCE (SIZE(1.. maxnoofSIBTypes)) OF SIBtype-Item

SIBtype-Item ::= SEQUENCE {
    sIBtype     SIBtype ,
    iE-Extensions   ProtocolExtensionContainer { { SIBtype-ItemExtIEs } }   OPTIONAL
}

SIBtype-ItemExtIEs  F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SliceSupportList ::= SEQUENCE (SIZE(1.. maxnoofSliceItems)) OF SliceSupportItem
```

```
SliceSupportItem ::= SEQUENCE {
    sNSSAI  SNSSAI,
    iE-Extensions               ProtocolExtensionContainer { { SliceSupportItem-ExtIEs } }  OPTIONAL
}

SliceSupportItem-ExtIEs 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-Required-ToBeReleased-Item ::= SEQUENCE {
    sRBID   SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-Required-ToBeReleased-ItemExtIEs } }    OPTIONAL,
    ...
}

SRBs-Required-ToBeReleased-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, ...)

SupportedSULFreqBandItem ::= SEQUENCE {
    freqBandIndicatorNr             INTEGER (1..1024,...),
    iE-Extensions               ProtocolExtensionContainer { { SupportedSULFreqBandItem-ExtIEs} } OPTIONAL,
    ...
}
```

```
SupportedSULFreqBandItem-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- T

FiveGS-TAC ::= OCTET STRING (SIZE(3))

Configured-EPS-TAC ::= OCTET STRING (SIZE(2))

TDD-Info ::= SEQUENCE {
    nRFreqInfo                          NRFreqInfo,
    transmission-Bandwidth          Transmission-Bandwidth,
    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,
...
}

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 ::= {
    ...
}

TransmissionStopIndicator ::= ENUMERATED {true, ...}

TypeOfError ::= ENUMERATED {
    not-understood,
    missing,
    ...
}

-- U
```

```
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,
    ...
}

UE-associatedLogicalF1-ConnectionItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UE-CapabilityRAT-ContainerList::= OCTET STRING

UEIdentityIndexValue ::= INTEGER (0..63) --     This IE may need to be refined.

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 ::= {
    ...
}

UPTransportLayerInformation     ::= CHOICE {
    gTPTunnel       GTPTunnel,
    choice-extension            ProtocolExtensionContainer { { UPTransportLayerInformation-ExtIEs} },
    ...
}

UPTransportLayerInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {
    ...
    }
-- V

-- W

-- X
```

```
-- Y

-- Z

END
```

9.4.6 Common Definitions

```
-- **************************************************************
--
-- 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, unsuccessfull-outcome }

END
```

9.4.7 Constant Definitions

```
-- **************************************************************
--
-- 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

-- ************************************************************
--
-- 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 ::= 16
maxnoofPagingCells                      INTEGER ::= 512
maxnoofTNLAssociations                  INTEGER ::= 32
maxnoofQoSFlows                         INTEGER ::= 64
maxnoofSliceItems                       INTEGER ::= 1024
maxCellineNB                                INTEGER ::= 256


-- ************************************************************
--
-- 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-TransmissionStopIndicator                            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-RRCRconfigurationCompleteIndicator                   ProtocolIE-ID ::= 87
id-Active-Cells-Item                                    ProtocolIE-ID ::= 88
id-Active-Cells-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-SpectrumSharingGroupID                               ProtocolIE-ID ::= 103
id-ListofEUTRACellsinGNBDUCoordination                  ProtocolIE-ID ::= 104
id-Protected-EUTRA-Resources-List                       ProtocolIE-ID ::= 105
id-RequestType                                          ProtocolIE-ID ::= 106
id-ServCellndex                                 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-SIBtype-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-ConcurrentWarningMessageIndicator                ProtocolIE-ID ::= 143
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

END
```

9.4.8 Container Definitions

```
-- **************************************************************
--
-- 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
```

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

History

Document history		
V15.2.1	July 2018	Publication