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

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

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

Version x.y.z

where:

- x  the first digit:
  - 1  presented to TSG for information;
  - 2  presented to TSG for approval;
  - 3  or greater indicates TSG approved document under change control.

- y  the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

- z  the third digit is incremented when editorial only changes have been incorporated in the document.
1 Scope

The present document specifies the 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".
[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".
[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)".
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].

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<tr>
<td>GTP</td>
<td>GPRS Tunnelling Protocol</td>
</tr>
<tr>
<td>EN-DC</td>
<td>E-UTRA-NR Dual Connectivity</td>
</tr>
<tr>
<td>IE</td>
<td>Information Element</td>
</tr>
<tr>
<td>NR CGI</td>
<td>NR Cell Global Identifier</td>
</tr>
<tr>
<td>RRC</td>
<td>Radio Resource Control</td>
</tr>
<tr>
<td>SCTP</td>
<td>Stream Control Transmission Protocol</td>
</tr>
<tr>
<td>SUL</td>
<td>Supplementary Uplink</td>
</tr>
<tr>
<td>TEID</td>
<td>Tunnel Endpoint Identifier</td>
</tr>
<tr>
<td>UE</td>
<td>User Equipment</td>
</tr>
<tr>
<td>UL</td>
<td>Uplink</td>
</tr>
</tbody>
</table>

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, 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):
### 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.

---

**Table 1: Class 1 procedures**

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

**Table 2: Class 2 procedures**

<table>
<thead>
<tr>
<th>Elementary Procedure</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error Indication</td>
<td>ERROR INDICATION</td>
</tr>
<tr>
<td>UE Context Release Request (gNB-DU initiated)</td>
<td>UE CONTEXT RELEASE REQUEST</td>
</tr>
<tr>
<td>Initial UL RRC Message Transfer</td>
<td>INITIAL UL RRC MESSAGE TRANSFER</td>
</tr>
<tr>
<td>DL RRC Message Transfer</td>
<td>DL RRC MESSAGE TRANSFER</td>
</tr>
<tr>
<td>UL RRC Message Transfer</td>
<td>UL RRC MESSAGE TRANSFER</td>
</tr>
<tr>
<td>UE Inactivity Notification</td>
<td>UE INACTIVITY NOTIFICATION</td>
</tr>
<tr>
<td>System Information Delivery</td>
<td>SYSTEM INFORMATION DELIVERY COMMAND</td>
</tr>
<tr>
<td>Paging</td>
<td>PAGING</td>
</tr>
<tr>
<td>Notify</td>
<td>NOTIFY</td>
</tr>
<tr>
<td>PWS Restart Indication</td>
<td>PWS RESTART INDICATION</td>
</tr>
<tr>
<td>PWS Failure Indication</td>
<td>PWS FAILURE INDICATION</td>
</tr>
</tbody>
</table>
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

![Diagram of Reset procedure initiated from the gNB-CU. Successful operation](image)

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

![Diagram](image)

**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**s, 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

![Diagram: Error Indication procedure, gNB-CU 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

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

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

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

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

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](Diagram)

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

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

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 the 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 activating/deactivating 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 SETUP REQUEST message contains the RRC-Container IE, the gNB-DU shall send the corresponding RRC message to the UE via SRB1.

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

8.3.1.3 Unsuccessful Operation

![Figure 8.3.1.3-1: UE Context Setup Request procedure: unsuccessful Operation](image)

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

![Diagram of UE Context Release Request (gNB-DU initiated) procedure]

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

![Diagram of UE Context Release (gNB-CU initiated) procedure]

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](image)

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 UL Configured** 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 activating/deactivating 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 MODIFICATION 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](image)

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

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

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 be fulfilled anymore or that it can be fulfilled again. The procedure uses UE-associated signalling.

8.3.7.2 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 anymore 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

![Initial UL RRC Message Transfer procedure](image)

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

![DL RRC Message Transfer procedure](image)

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 FIAP 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

![UL RRC Message Transfer procedure](image)

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

![Write-Replace Warning procedure: successful operation](image)
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](image)

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

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

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

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

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.3.1.2</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHOICE Reset Type</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;F1 interface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Reset All</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(Reset all,...)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Part of F1 interface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UE-associated logical F1-connection list</td>
<td>1</td>
<td></td>
<td></td>
<td>-</td>
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</tr>
<tr>
<td>&gt;&gt;&gt;UE-associated logical F1-connection Item</td>
<td>1 ..</td>
<td>maxnoofIndividually reset F1ConnectionsToReset</td>
<td>EACH</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt; gNB-CU UE F1AP ID</td>
<td>O</td>
<td>9.3.1.4</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt; gNB-DU UE F1AP ID</td>
<td>O</td>
<td>9.3.1.5</td>
<td></td>
<td>-</td>
<td></td>
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</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>UE-associated logical F1-connection list</td>
<td></td>
<td>0..1</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>O</td>
<td></td>
<td>9.3.1.4</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>O</td>
<td></td>
<td>9.3.1.5</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Cause</td>
<td>O</td>
<td></td>
<td>9.3.1.2</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.3.1.3</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

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..50,…)) | 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> | Information about the cells configured in the gNB-DU | EACH | reject
>>Served Cell Information | M | | 9.3.1.10 | | - | -
>>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 | List of cells to be activated | YES | reject
>Cells to be Activated List Item | | | 1..<maxCellingNBDU> | | - | -
>> 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
### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Message Type</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Transaction ID</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Cause</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.2</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td><strong>Time to wait</strong></td>
<td>O</td>
<td></td>
<td>9.3.1.13</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td><strong>Criticality Diagnostics</strong></td>
<td>O</td>
<td></td>
<td>9.3.1.3</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

#### Served Cells To Add List

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Message Type</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Transaction ID</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Served Cells To Add List</strong></td>
<td></td>
<td>0..1</td>
<td>9.3.1.10</td>
<td>Complete list</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>of added cells</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>served by the</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>gNB-DU</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Served Cells To Modify List

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Message Type</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Transaction ID</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Served Cells To Modify List</strong></td>
<td></td>
<td>0..1</td>
<td>9.3.1.10</td>
<td>Complete list</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>of modified cells</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>served by the</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>gNB-DU</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Served Cells To Delete List

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Message Type</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Transaction ID</strong></td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Served Cells To Delete List</strong></td>
<td></td>
<td>0..1</td>
<td>9.3.1.10</td>
<td>Complete list</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>of deleted cells</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>served by the</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>gNB-DU</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cells to be Activated</td>
<td>0..1</td>
<td>9.3.1.12</td>
<td>List of cells to be activated</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>List Item</td>
<td>EACH</td>
<td>maxCellingNBDU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; NR PCI</td>
<td>O</td>
<td>INTEGER (0..1007)</td>
<td>Physical Cell ID</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; gNB-CU System Information</td>
<td>O</td>
<td>9.3.1.42</td>
<td>RRC container with system information owned by gNB-CU</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES reject</td>
<td></td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
<td>YES reject</td>
<td></td>
</tr>
<tr>
<td>Cells to be Activated List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>List of cells to be activated or modified</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cells to be Activated List Item</td>
<td></td>
<td>1..&lt;maxCellingNBD U&gt;</td>
<td></td>
<td>EACH</td>
<td>YES reject</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; NR CGI</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt; NR PCI</td>
<td>O</td>
<td></td>
<td>INTEGER (0..1007)</td>
<td>Physical Cell ID</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt; gNB-CU System Information</td>
<td>O</td>
<td></td>
<td>9.3.1.42</td>
<td>RRC container with system information owned by gNB-CU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cells to be Deactivated List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>List of cells to be deactivated</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cells to be Deactivated List Item</td>
<td></td>
<td>1..&lt;maxCellingNBD U&gt;</td>
<td></td>
<td>EACH</td>
<td>YES reject</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; NR CGI</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>gNB-CU TNL Association To Add List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;gNB-CU TNL Association To Add Item IEs</td>
<td></td>
<td>1..&lt;maxnoofTNLA associations&gt;</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TNL Association Transport Layer Information</td>
<td>M</td>
<td></td>
<td>CP Transport Layer Address 9.3.2.4</td>
<td>Transport Layer Address of the gNB-CU.</td>
<td>YES ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TNL Association Usage</td>
<td>M</td>
<td></td>
<td>ENUMERATED (ue, non-ue, both, …)</td>
<td>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].</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>gNB-CU TNL Association To Remove List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;gNB-CU TNL Association To Remove Item IEs</td>
<td></td>
<td>1..&lt;maxnoofTNLA associations&gt;</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TNL Association Transport Layer Address</td>
<td>M</td>
<td></td>
<td>CP Transport Layer Address 9.3.2.4</td>
<td>Transport Layer Address of the gNB-CU.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>gNB-CU TNL Association To Update List</td>
<td>0..1</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>--------------------------------------</td>
<td>------</td>
<td>-----</td>
<td>--------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;gNB-CU TNL Association To Update Item IEs</td>
<td>1..&lt;maxnoofTNLAsociations&gt;</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TNL Association Transport Layer Address</td>
<td>M</td>
<td>CP Transport Layer Address 9.3.2.4</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TNL Association Usage</td>
<td>O</td>
<td>ENUMERATED (ue, non-ue, both, ...)</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cells to be barred List</th>
<th>0..1</th>
<th>List of cells to be barred.</th>
<th>YES</th>
<th>ignore</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;&gt;Cells to be barred List Item</td>
<td>1..&lt;maxCellingNBDU&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Protected E-UTRA Resources List</th>
<th>0..1</th>
<th>List of Protected E-UTRA Resources.</th>
<th>YES</th>
<th>reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;&gt;Protected E-UTRA Resources List Item</td>
<td>0.. &lt;maxCellineNB&gt;</td>
<td>EACH</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Spectrum Sharing Group ID</td>
<td>M</td>
<td>INTEGER (1..maxCellineNB)</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;List of E-UTRA Cells</td>
<td>0..&lt;maxCellineNB&gt;</td>
<td>List of applicable E-UTRA cells.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;EUTRA Cell ID</td>
<td>M</td>
<td>OCTET STRING</td>
<td>Indicates the E-UTRAN Cell Global Identifier as defined in subclause 9.2.14 in TS 36.423 [9].</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Served E-UTRA Cell Information</td>
<td>M</td>
<td>9.3.1.64</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td>9.3.1.23</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cells Failed to be Activated List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>List of cells which are failed to be activated</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;Cells Failed to be Activated Item</td>
<td></td>
<td>1..&lt;maxCellingNBDU&gt;</td>
<td></td>
<td></td>
<td>EACH</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt; NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;Cause</td>
<td>M</td>
<td>9.3.1.2</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.3.1.3</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

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
### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>Request type</td>
<td>M</td>
<td></td>
<td>ENUMERATED (offer, execution, ...)</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>E-UTRA – NR Cell Resource Coordination Request Container</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes the X2AP E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message as defined in subclause 9.1.4.x in TS 36.423 [9].</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td></td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 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.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.4</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>O</td>
<td></td>
<td>9.3.1.5</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SpCell ID</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td>Special Cell as defined in TS 38.321 [16]</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>ServCellIndex</td>
<td>M</td>
<td></td>
<td>INTEGER (0..31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SpCell UL Configured</td>
<td>O</td>
<td></td>
<td>Cell UL Configured 9.3.1.33</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Candidate SpCell List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;Candidate SpCell Item IEs</td>
<td>1..</td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;Candidate SpCell ID</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td>Special Cell as defined in TS 38.321 [16]</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>CU to DU RRC Information</td>
<td>M</td>
<td></td>
<td>9.3.1.25</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>DRX Cycle</td>
<td>O</td>
<td>DRX Cycle 9.3.1.24</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Resource Coordination Transfer Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the MeNB Resource Coordination Information IE as defined in subclause 9.2.116 of TS 36.423 [9].</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SCell To Be Setup List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;SCell to Be Setup Item IEs</td>
<td>1..</td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;SCell ID</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td>SCell Identifier in gNB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;SCellIndex</td>
<td>M</td>
<td></td>
<td>INTEGER (1..31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;SCell UL Configured</td>
<td>O</td>
<td></td>
<td>Cell UL Configured 9.3.1.33</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SRB to Be Setup List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;SRB to Be Setup Item IEs</td>
<td>1..</td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;SRB ID</td>
<td>M</td>
<td></td>
<td>9.3.1.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Duplication Indication</td>
<td>O</td>
<td></td>
<td>ENUMERATED (true, …)</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>DRB to Be Setup List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;DRB to Be Setup Item IEs</td>
<td>1..</td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;DRB ID</td>
<td>M</td>
<td></td>
<td>9.3.1.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CHOICE QoS Information</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;E-UTRAN QoS</td>
<td>M</td>
<td></td>
<td>9.3.1.19</td>
<td>Shall be used for EN-DC case to convey E-RAB Level QoS Parameters</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DRB Information</td>
<td>1</td>
<td></td>
<td></td>
<td>Shall be used for NG-RAN cases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DRB QoS</td>
<td>M</td>
<td></td>
<td>9.3.1.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;S-NSSAI</td>
<td>M</td>
<td></td>
<td>9.3.1.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Notification Control</td>
<td>O</td>
<td></td>
<td>9.3.1.56</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### IE/Group Name

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1 .. &lt;maxnoofQoSFlows&gt;</td>
</tr>
<tr>
<td>M</td>
<td>1</td>
</tr>
<tr>
<td>1 .. &lt;maxnoofULUPTNLInformation&gt;</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>9.3.1.63</td>
</tr>
<tr>
<td>M</td>
<td>9.3.1.45</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### Semantics description

<table>
<thead>
<tr>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP Transport Layer Information 9.3.2.1</td>
<td>gNB-CU endpoint of the F1 transport bearer. For delivery of UL PDUs.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>UL Configuraiton 9.3.1.31</td>
<td>Information about UL usage in gNB-DU.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Information on the initial state of UL PDCP duplication</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Range bound

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

### 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.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.4</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.5</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DU To CU RRC Information</td>
<td>M</td>
<td></td>
<td>9.3.1.26</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-RNTI</td>
<td>O</td>
<td></td>
<td>9.3.1.32</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Coordination Transfer Container</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Configuration</td>
<td>O</td>
<td></td>
<td>ENUMERATED</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRB Setup List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;DRB Setup Item list</td>
<td></td>
<td>1..</td>
<td>&lt;maxnoofDRBs&gt;</td>
<td>EACH ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DRB ID</td>
<td>M</td>
<td></td>
<td>9.3.1.8</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;LCID</td>
<td>O</td>
<td></td>
<td>9.3.1.35</td>
<td>LCID for the primary path if PDCP duplication is applied</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;DL UP TNL Information to be setup List</td>
<td></td>
<td>1</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt; DL UP TNL Information to Be Setup Item IEs</td>
<td></td>
<td>1..</td>
<td>&lt;maxnoofDLUPTNLInformation&gt;</td>
<td>EACH ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL UP TNL Information</td>
<td>M</td>
<td></td>
<td>UP Transport Layer Information 9.3.2.1</td>
<td>gNB-DU endpoint of the F1 transport bearer. For delivery of DL PDUs.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SRB Failed to Setup List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;SRB Failed to Setup Item</td>
<td></td>
<td>1..</td>
<td>&lt;maxnoofSRBs&gt;</td>
<td>EACH ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;SRB ID</td>
<td>M</td>
<td></td>
<td>9.3.1.7</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cause</td>
<td>O</td>
<td></td>
<td>9.3.1.2</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRB Failed to Setup List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;DRB Failed to Setup Item</td>
<td></td>
<td>1..</td>
<td>&lt;maxnoofDRBs&gt;</td>
<td>EACH ignore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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

### 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
### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.4</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.5</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td></td>
<td>9.3.1.2</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

**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

### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.4</td>
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**Criticality Diagnostics:** O  9.3.1.6  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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
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<td>maxnoofSRBs</td>
<td>Maximum no. of SRB allowed towards one UE, the maximum value is 8.</td>
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<td>maxnoofDRBs</td>
<td>Maximum no. of DRB allowed towards one UE, the maximum value is 64.</td>
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<tr>
<td>maxnoofULUPTNLInformation</td>
<td>Maximum no. of UL UP TNL Information allowed towards one DRB, the maximum value is 2.</td>
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### 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 \(\rightarrow\) gNB-CU.
<table>
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<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
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<td>LCID for primary path if PDCP duplication is applied</td>
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</tr>
<tr>
<td>&gt;&gt;&gt;DL UP TNL Information to Be Setup Item IEs</td>
<td></td>
<td>1..&lt;maxnoofDLU PTNLInformation&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL UP TNL Information</td>
<td>M</td>
<td></td>
<td>UP Transport Layer Information 9.3.2.1</td>
<td>gNB-DU endpoint of the F1 transport bearer. For delivery of DL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRB Modified List</td>
<td></td>
<td>0..1</td>
<td></td>
<td>The List of DRBs which are successfully modified.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;DRB Modified Item IEs</td>
<td></td>
<td>1..&lt;maxnoofDRB s&gt;</td>
<td></td>
<td>EACH ignore</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;DRB ID</td>
<td>M</td>
<td></td>
<td>9.3.1.8</td>
<td>LCID for primary path if PDCP duplication is applied</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;LCID</td>
<td>O</td>
<td></td>
<td>9.3.1.35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DL UP TNL Information to be setup List</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;DL UP TNL Information to Be Setup Item IEs</td>
<td></td>
<td>1..&lt;maxnoofDLU PTNLInformation&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### IE/Group Name

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td></td>
<td>UP Transport Layer Information 9.3.2.1</td>
<td>gNB-DU endpoint of the F1 transport bearer. For delivery of DL PDUs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SRB Failed to be Setup List

<table>
<thead>
<tr>
<th>Range</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>The List of SRBs which are failed to be established.</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

#### >SRB Failed to be Setup Item IEs

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
<th>SEMANTICS</th>
<th>CRITICALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1. &lt;maxnoofSRBs&gt;</td>
<td>EACH ignore</td>
<td></td>
</tr>
</tbody>
</table>

#### >>SRB ID

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>9.3.1.8</td>
</tr>
</tbody>
</table>

#### >>Cause

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>9.3.1.2</td>
</tr>
</tbody>
</table>

#### DRB Failed to be Setup List

<table>
<thead>
<tr>
<th>Range</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>The List of DRBs which are failed to be setup.</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

#### >DRB Failed to be Setup Item IEs

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
<th>SEMANTICS</th>
<th>CRITICALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1. &lt;maxnoofDRBs&gt;</td>
<td>EACH ignore</td>
<td></td>
</tr>
</tbody>
</table>

#### >>DRB ID

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>9.3.1.8</td>
</tr>
</tbody>
</table>

#### >>Cause

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>9.3.1.2</td>
</tr>
</tbody>
</table>

#### DRB Failed to be Modified List

<table>
<thead>
<tr>
<th>Range</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>The List of DRBs which are failed to be modified.</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

#### >DRB Failed to be Modified Item IEs

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
<th>SEMANTICS</th>
<th>CRITICALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1. &lt;maxnoofDRBs&gt;</td>
<td>EACH ignore</td>
<td></td>
</tr>
</tbody>
</table>

#### >>DRB ID

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>9.3.1.8</td>
</tr>
</tbody>
</table>

#### >>Cause

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>9.3.1.2</td>
</tr>
</tbody>
</table>

#### SCell Failed To Setup List

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td></td>
</tr>
</tbody>
</table>

#### >SCell Failed to Setup Item

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
<th>SEMANTICS</th>
<th>CRITICALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1. &lt;maxnoofSCells&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### >>SCell ID

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>NR CGI 9.3.1.12</td>
</tr>
</tbody>
</table>

#### >>Cause

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>9.3.1.2</td>
</tr>
</tbody>
</table>

#### Inactivity Monitoring Response

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>ENUMERATE D (Not-supported, ...)</td>
</tr>
</tbody>
</table>

#### Criticality Diagnostics

<table>
<thead>
<tr>
<th>Range</th>
<th>SEMANTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>9.3.1.3</td>
</tr>
</tbody>
</table>

### Range bound

<table>
<thead>
<tr>
<th>Variable</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofSRBs</td>
<td>Maximum no. of SRB allowed towards one UE, the maximum value is 8.</td>
</tr>
<tr>
<td>maxnoofDRBs</td>
<td>Maximum no. of DRB allowed towards one UE, the maximum value is 64.</td>
</tr>
<tr>
<td>maxnoofDLUPTNLInformation</td>
<td>Maximum no. of DL UP TNL Information allowed towards one DRB, the maximum value is 2.</td>
</tr>
</tbody>
</table>

### 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
### 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.

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

#### Resource Coordination Transfer Container

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### DU To CU RRC Information

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### DRB Required to Be Modified List

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### DRB Required to Be Modified Item IEs

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### DRB ID

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SRB Required to be Released List

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SRB Required to be Released List Item IEs

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Cause

<table>
<thead>
<tr>
<th>Overall Type</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0..1</td>
<td>EACH</td>
<td>9.3.1.26</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td>9.3.1.4</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td>9.3.1.5</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Coordination Transfer Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>INCLUDES THE MeNB Resource Coordination Information IE as defined in subclause 9.2.116 of TS 36.423 [9].</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>DRB Modified List</td>
<td>0..1</td>
<td>YES ignore</td>
<td>The List of DRBs which are successfully modified.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DRB Modified Item IEs</td>
<td>1 .. &lt;maxnoofDRBs&gt;</td>
<td>EACH ignore</td>
<td>The List of DRBs which are successfully modified.</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UL UP TNL Information to be setup List</td>
<td>1</td>
<td>-</td>
<td>The UL UP TNL Information to be setup</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL UP TNL Information to Be Setup Item IEs</td>
<td>1 .. &lt;maxnoofUL UPTNLInformation&gt;</td>
<td>-</td>
<td>The UL UP TNL Information to be setup</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;UL UP TNL Information</td>
<td>M</td>
<td>UP Transport Layer Information 9.3.2.1</td>
<td>The UL UP TNL Information</td>
<td>M</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>RRC-Container</td>
<td>O</td>
<td>9.3.1.6</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.3.1.3</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 9.2.2.12 UE INACTIVITY NOTIFICATION

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

Direction: gNB-DU → gNB-CU

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofSRBs</td>
<td>Maximum no. of SRB allowed towards one UE, the maximum value is 8.</td>
</tr>
<tr>
<td>maxnoofDRBs</td>
<td>Maximum no. of DRB allowed towards one UE, the maximum value is 64.</td>
</tr>
<tr>
<td>maxnoofULUPTNLInformation</td>
<td>Maximum no. of UL UP TNL Information allowed towards one DRB, the maximum value is 2.</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td>9.3.1.4</td>
<td>YES</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td>9.3.1.5</td>
<td>YES</td>
<td>YES</td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>DRB Notify List</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;DRB ID</td>
<td>M</td>
<td>9.3.1.8</td>
<td></td>
<td></td>
<td>reject</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;Notification Cause</td>
<td>M</td>
<td>ENUMERATED</td>
<td></td>
<td></td>
<td>reject</td>
<td>reject</td>
</tr>
</tbody>
</table>

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
### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.5</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>NR CGI</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td>NG-RAN Cell Global Identifier (NR CGI)</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>C-RNTI</td>
<td>M</td>
<td></td>
<td>9.3.1.32</td>
<td>C-RNTI allocated at the gNB-DU</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>RRC-Container</td>
<td>M</td>
<td></td>
<td>9.3.1.6</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>DU to CU RRC Container</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>CellGroupConfig IE as defined in subclause 6.3.2 in TS 38.331. Required at least to carry SRB1 configuration</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.4</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.5</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>old gNB-DU UE F1AP ID</td>
<td>O</td>
<td></td>
<td>9.3.1.5</td>
<td>Include it if RRCConnectionRestablishment is included in RRC-Container</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SRB ID</td>
<td>M</td>
<td></td>
<td>9.3.1.7</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Execute Duplication</td>
<td>O</td>
<td></td>
<td>ENUMERATE D (true, ...)</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>RRC-Container</td>
<td>M</td>
<td></td>
<td>9.3.1.6</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>RAT-Frequency Priority Information</td>
<td>O</td>
<td></td>
<td>9.3.1.34</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>9.3.1.1</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.4</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td></td>
<td>9.3.1.5</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SRB ID</td>
<td>M</td>
<td></td>
<td>9.3.1.7</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>RRC-Container</td>
<td>M</td>
<td></td>
<td>9.3.1.6</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PWS System Information</td>
<td>M</td>
<td>9.3.1.58</td>
<td>This IE includes the system information for public warning, as defined in TS 38.331 [8].</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Cell To Be Broadcast List</td>
<td>0..1</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell to Be Broadcast Item IEs</td>
<td></td>
<td>1..&lt;maxCellingNBDU&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition Period</td>
<td>M</td>
<td>9.3.1.59</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Broadcasts Requested</td>
<td>M</td>
<td>9.3.1.60</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concurrent Warning Message Indicator</td>
<td>O</td>
<td>9.3.1.61</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellingNBDU</td>
<td>Maximum no. cells that can be served by a gNB-DU. Value is 512.</td>
</tr>
</tbody>
</table>

### PWS CANCEL REQUEST

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Broadcast Completed List</td>
<td>0..1</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell Broadcast Completed Item IEs</td>
<td></td>
<td>1..&lt;maxCellingNBDU&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.3.1.3</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellingNBDU</td>
<td>Maximum no. cells that can be served by a gNB-DU. Value is 512.</td>
</tr>
</tbody>
</table>
Direction: gNB-CU → gNB-DU

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Broadcast To Be Cancelled List</td>
<td></td>
<td>0..1</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell Broadcast to Be Cancelled Item IEs</td>
<td></td>
<td>1..</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancel-all Warning Messages Indicator</td>
<td>O</td>
<td>9.3.1.55</td>
<td>ENUMERATED (true, ...)</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellingNB-DU</td>
<td>Maximum no. cells that can be served by a gNB-DU. Value is 512.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td>9.3.1.23</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Broadcast Cancelled List</td>
<td></td>
<td>0..1</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell Broadcast Cancelled Item IEs</td>
<td></td>
<td>1..</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Number of Broadcasts of Broadcasts</td>
<td>M</td>
<td>INTEGER (0..65535)</td>
<td>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.</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.3.1.3</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td>ignore</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PWS failed NR CGI List</td>
<td>1..&lt;maxnoofCellsingNBDU&gt;</td>
<td>EACH</td>
<td>reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NR CGI</td>
<td>M</td>
<td>9.3.1.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIBType List</td>
<td>M</td>
<td>9.3.1.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirmed UE ID</td>
<td>M</td>
<td>gNB-DU UE F1AP ID 9.3.1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td>9.3.1.1</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>UE Identity Index value</td>
<td>M</td>
<td>9.3.1.39</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Choice Paging Identity</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; RAN UE Paging identity</td>
<td></td>
<td></td>
<td>9.3.1.43</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt; CN UE paging identity</td>
<td></td>
<td></td>
<td>9.3.1.44</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Paging DRX</td>
<td>O</td>
<td></td>
<td>9.3.1.40</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Paging Priority</td>
<td>O</td>
<td></td>
<td>9.3.1.41</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Paging Cell List</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt; NR CGI</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Range bound

| 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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Type</td>
<td>M</td>
<td></td>
<td>INTEGER (0..255)</td>
<td></td>
</tr>
<tr>
<td>&gt; Procedure Code</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Type of Message</td>
<td>M</td>
<td></td>
<td>CHOICE (Initiating Message, Successful Outcome, Unsuccessful Outcome, …)</td>
<td></td>
</tr>
</tbody>
</table>

##### 9.3.1.2 Cause

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

<table>
<thead>
<tr>
<th>Radio Network Layer cause</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unspecified</td>
<td>Sent for radio network layer cause when none of the specified cause values applies.</td>
</tr>
<tr>
<td>RL Failure</td>
<td>The action is due to an RL failure caused by e.g. exceeding the maximum number of ARQ retransmissions.</td>
</tr>
<tr>
<td>Unknown or already allocated gNB-CU UE F1AP ID</td>
<td>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.</td>
</tr>
<tr>
<td>Unknown or already allocated gNB-DU UE F1AP ID</td>
<td>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.</td>
</tr>
<tr>
<td>Unknown or inconsistent pair of UE F1AP ID</td>
<td>The action failed because both UE F1AP IDs are unknown, or are known but do not define a single UE context.</td>
</tr>
<tr>
<td>Interaction with other procedure</td>
<td>The action is due to an ongoing interaction with another procedure.</td>
</tr>
<tr>
<td>Not supported QCI Value</td>
<td>The action failed because the requested QCI is not supported.</td>
</tr>
<tr>
<td>Action Desirable for Radio Reasons</td>
<td>The reason for requesting the action is radio related.</td>
</tr>
<tr>
<td>No Radio Resources Available</td>
<td>The cell(s) in the requested node don’t have sufficient radio resources available.</td>
</tr>
<tr>
<td>Procedure cancelled</td>
<td>The sending node cancelled the procedure due to other urgent actions to be performed.</td>
</tr>
<tr>
<td>Normal Release</td>
<td>The action is due to a normal release of the UE (e.g. because of mobility) and does not indicate an error.</td>
</tr>
</tbody>
</table>
### Transport Layer cause

<table>
<thead>
<tr>
<th>Cause</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unspecified</td>
<td>Sent when none of the above cause values applies but still the cause is Transport Network Layer related.</td>
</tr>
<tr>
<td>Transport Resource Unavailable</td>
<td>The required transport resources are not available.</td>
</tr>
</tbody>
</table>

### Protocol cause

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

### Miscellaneous cause

<table>
<thead>
<tr>
<th>Cause</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Processing Overload</td>
<td>Control processing overload.</td>
</tr>
<tr>
<td>Not Enough User Plane Processing Resources Available</td>
<td>No enough resources are available related to user plane processing.</td>
</tr>
<tr>
<td>Hardware Failure</td>
<td>Action related to hardware failure.</td>
</tr>
<tr>
<td>O&amp;M Intervention</td>
<td>The action is due to O&amp;M intervention.</td>
</tr>
<tr>
<td>Unspecified Failure</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 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.
### Information Element Criticality Diagnostics

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure Code</td>
<td>O</td>
<td></td>
<td>INTEGER (0..255)</td>
<td>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.</td>
</tr>
<tr>
<td>Triggering Message</td>
<td>O</td>
<td></td>
<td>ENUMERATED (initiating message, successful outcome, unsuccessful outcome)</td>
<td>The Triggering Message is used only if the Criticality Diagnostics is part of Error Indication procedure.</td>
</tr>
<tr>
<td>Procedure Criticality</td>
<td>O</td>
<td></td>
<td>ENUMERATED (reject, ignore, notify)</td>
<td>This Procedure Criticality is used for reporting the Criticality of the Triggering message (Procedure).</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>O</td>
<td></td>
<td>9.3.1.23</td>
<td></td>
</tr>
<tr>
<td>Information Element Criticality Diagnostics</td>
<td></td>
<td>0 .. &lt;maxnoof Errors&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;IE Criticality</td>
<td>M</td>
<td></td>
<td>ENUMERATED (reject, ignore, notify)</td>
<td>The IE Criticality is used for reporting the criticality of the triggering IE. The value ‘ignore’ shall not be used.</td>
</tr>
<tr>
<td>&gt;IE ID</td>
<td>M</td>
<td></td>
<td>INTEGER (0..65535)</td>
<td>The IE ID of the not understood or missing IE.</td>
</tr>
<tr>
<td>&gt;Type of Error</td>
<td>M</td>
<td></td>
<td>ENUMERATED (not understood, missing, ...)</td>
<td></td>
</tr>
</tbody>
</table>

#### Range bound

| 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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>gNB-CU UE F1AP ID</td>
<td>M</td>
<td>INTEGER (0 .. 2^32 - 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>gNB-DU UE F1AP ID</td>
<td>M</td>
<td>INTEGER (0 .. 2^32 - 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRC-Container</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td></td>
</tr>
</tbody>
</table>

9.3.1.7 SRB ID

This IE uniquely identifies a SRB for a UE.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRB ID</td>
<td>M</td>
<td></td>
<td>INTEGER (0..3, ...)</td>
<td>Corresponds to the SRB-Identity defined in TS 38.331 [8].</td>
</tr>
</tbody>
</table>

9.3.1.8 DRB ID

This IE uniquely identifies a DRB for a UE.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRB ID</td>
<td>M</td>
<td></td>
<td>INTEGER (1..32, ...)</td>
<td>Corresponds to the DRB-Identity defined in TS 38.331 [8].</td>
</tr>
</tbody>
</table>

9.3.1.9 gNB-DU ID

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>gNB-DU ID</td>
<td>M</td>
<td></td>
<td>INTEGER (0..2^{35}-1)</td>
<td>The gNB-DU ID is independently configured from cell identifiers, i.e. no connection between gNB-DU ID and cell identifiers.</td>
</tr>
</tbody>
</table>

9.3.1.10 Served Cell Information

This IE contains cell configuration information of a cell in the gNB-DU.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR CGI</td>
<td>M</td>
<td></td>
<td>9.3.1.12</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NR PCI</td>
<td>M</td>
<td></td>
<td>INTEGER</td>
<td>Physical Cell ID</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5GS TAC</td>
<td>M</td>
<td></td>
<td>9.3.1.29</td>
<td>5GS Tracking Area Code</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Configured EPS TAC</td>
<td>O</td>
<td></td>
<td>9.3.1.29a</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Served PLMNs</strong></td>
<td></td>
<td></td>
<td>1..&lt;maxnoofBPLMNsn&gt;</td>
<td>Broadcast PLMNs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;PLMN Identity</td>
<td>M</td>
<td></td>
<td>9.3.1.14</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;TAI Slice Support List</td>
<td>O</td>
<td></td>
<td>Slice Support List</td>
<td>Supported S-NSSAIs per TA.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>CHOICE NR-Mode-Info</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;FDD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL FreqInfo</td>
<td>M</td>
<td></td>
<td>NR Frequency Info</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;DL FreqInfo</td>
<td>M</td>
<td></td>
<td>NR Frequency Info</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL Transmission Bandwidth</td>
<td>M</td>
<td></td>
<td>NR Transmission Bandwidth</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;DL Transmission Bandwidth</td>
<td>M</td>
<td></td>
<td>NR Transmission Bandwidth</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;TDD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;TDD Info</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt; NR FreqInfo</td>
<td>M</td>
<td></td>
<td>NR Frequency Info</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt; Transmission Bandwidth</td>
<td>M</td>
<td></td>
<td>NR Transmission Bandwidth</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Measurement Timing Configuration</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>Contains the MeasurementTiming gConfiguration inter-node message defined in TS 38.331 [8].</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RANAC</td>
<td>O</td>
<td></td>
<td>9.3.1.57</td>
<td>RAN Area Code</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofBPLMNsn</td>
<td>Maximum no. of Broadcast PLMN Ids. Value is 6.</td>
</tr>
</tbody>
</table>

### 9.3.1.11 Transmission Stop Indicator

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission Stop Indicator</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(true, ...)</td>
</tr>
</tbody>
</table>

### 9.3.1.12 NR CGI

The NR Cell Global Identifier (NR CGI) is used to globally identify a cell.
### 9.3.1.13 Time To wait

This IE defines the minimum allowed waiting times.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to wait</td>
<td>M</td>
<td></td>
<td>ENUMERATED(1s, 2s, 5s, 10s, 20s, 60s)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.3.1.14 PLMN Identity

This information element indicates the PLMN Identity.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLMN Identity</td>
<td>M</td>
<td>OCTET STRING (3)</td>
<td></td>
<td>- 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).</td>
</tr>
</tbody>
</table>

### 9.3.1.15 Transmission Bandwidth

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE Type and Reference</th>
<th>Semantics Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR SCS</td>
<td>M</td>
<td>ENUMERATED (scs15, scs30, scs60, scs120, ...)</td>
<td>The values scs15, scs30, scs60 and scs120 corresponds to the sub carrier spacing in TS 38.104 [17].</td>
<td></td>
</tr>
<tr>
<td>NRB</td>
<td>M</td>
<td>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, ...)</td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE Type and Reference</th>
<th>Semantics Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR ARFCN</td>
<td>M</td>
<td>0..maxNRARFCN</td>
<td>INTEGER</td>
<td>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.</td>
</tr>
</tbody>
</table>

SUL Information O  9.3.1.28

Frequency Band List 1

> Frequency Band Item 1..<maxNoOfNrCellBands>

>> NR Frequency Band M  1..1024 ... | INTEGER | 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  1..1024, ... | INTEGER | 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. |

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxNRARFCN</td>
<td>Maximum value of NR ARFCNs. Value is 3279165.</td>
</tr>
<tr>
<td>maxNoOfNrCellBands</td>
<td>Maximum no. of frequency bands supported for a NR cell. Value is 32.</td>
</tr>
</tbody>
</table>

9.3.1.18  gNB-DU System Information

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIB message</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>MIB message, as defined in TS 38.331 [8].</td>
</tr>
<tr>
<td>SIB1 message</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>SIB1 message, as defined in TS 38.331 [8].</td>
</tr>
</tbody>
</table>

9.3.1.19  E-UTRAN QoS

This IE defines the QoS to be applied to a DRB for EN-DC case.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>QCI</td>
<td>M</td>
<td></td>
<td>INTEGER (0..255)</td>
<td>QoS Class Identifier defined in TS 23.401[10]. Logical range and coding specified in TS 23.203 [11].</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Allocation and Retention Priority</td>
<td>M</td>
<td>9.3.1.20</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>GBR QoS Information</td>
<td>O</td>
<td>9.3.1.21</td>
<td></td>
<td>This IE applies to GBR bearers only and shall be ignored otherwise.</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### 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 AccessBearer.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority Level</td>
<td>M</td>
<td></td>
<td>INTEGER (0..15)</td>
<td>Desc.: This IE should be understood as &quot;priority of allocation and retention&quot; (see TS 23.401 [10]). Usage: Value 15 means &quot;no priority&quot;. 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.</td>
</tr>
<tr>
<td>Pre-emption Capability</td>
<td>M</td>
<td></td>
<td>ENUMERATED(shall not trigger pre-emption, may trigger pre-emption)</td>
<td>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.</td>
</tr>
<tr>
<td>Pre-emption Vulnerability</td>
<td>M</td>
<td></td>
<td>ENUMERATED(not pre-emptable, pre-emptable)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 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.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-RAB Maximum Bit Rate Downlink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.3.1.22</td>
<td>Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [10].</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>E-RAB Maximum Bit Rate Uplink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.3.1.22</td>
<td>Maximum Bit Rate in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [10].</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>E-RAB Guaranteed Bit Rate Downlink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.3.1.22</td>
<td>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].</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>E-RAB Guaranteed Bit Rate Uplink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.3.1.22</td>
<td>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].</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit Rate</td>
<td>M</td>
<td></td>
<td>INTEGER (0..4,000,000,000,000,...)</td>
<td>The unit is: bit/s</td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction ID</td>
<td>M</td>
<td></td>
<td>INTEGER (0..255, ...)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.3.1.24 DRX Cycle

The DRX Cycle IE is to indicate the desired DRX cycle.
### 9.3.1.25 CU to DU RRC Information

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE Type and Reference</th>
<th>Semantics Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG-ConfigInfo</td>
<td>O</td>
<td>OCTET</td>
<td>STRING</td>
<td>CG-ConfigInfo, as defined in TS 38.331 [8]</td>
</tr>
<tr>
<td>UE-CapabilityRAT-ContainerList</td>
<td>O</td>
<td>OCTET</td>
<td>STRING</td>
<td>UE-CapabilityRAT-ContainerList, as defined in TS 38.331 [8].</td>
</tr>
<tr>
<td>MeasConfig</td>
<td>O</td>
<td>OCTET</td>
<td>STRING</td>
<td>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.</td>
</tr>
<tr>
<td>Handover Preparation Information</td>
<td>O</td>
<td>OCTET</td>
<td>STRING</td>
<td>HandoverPreparationInformation, as defined in TS 38.331 [8].</td>
</tr>
</tbody>
</table>

### 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**
--- | --- | --- | --- | ---
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]
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CellGroupConfig</td>
<td>M</td>
<td></td>
<td>OCTET</td>
<td>CellGroupConfig, as defined in TS 38.331 [8].</td>
</tr>
<tr>
<td>MeasGapConfig</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>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.</td>
</tr>
<tr>
<td>Requested P-MaxFR1</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>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.</td>
</tr>
</tbody>
</table>

9.3.1.27 RLC Mode

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE Type and Reference</th>
<th>Semantics Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLC Mode</td>
<td></td>
<td></td>
<td>ENUMERATED (RLC-AM, RLC-UM,...)</td>
<td></td>
</tr>
</tbody>
</table>

9.3.1.28 SUL Information

This IE provides information about the SUL carrier.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUL ARFCN</td>
<td>M</td>
<td></td>
<td>INTEGER (0..maxNRARFCN)</td>
<td>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.</td>
</tr>
<tr>
<td>SUL Transmission Bandwidth</td>
<td>M</td>
<td></td>
<td>NR Transmission Bandwidth 9.3.1.15</td>
<td></td>
</tr>
</tbody>
</table>

Range bound

<table>
<thead>
<tr>
<th>maxNRARFCN</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum value of NR ARFCNs. Value is 3279165.</td>
</tr>
</tbody>
</table>
9.3.1.29 5GS TAC

This information element is used to identify Tracking Area Code.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5GS TAC</td>
<td>M</td>
<td></td>
<td>OCTET STRING (SIZE (3))</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configured EPS TAC</td>
<td>M</td>
<td></td>
<td>OCTET STRING (SIZE (2))</td>
<td></td>
</tr>
</tbody>
</table>

9.3.1.30 RRC Reconfiguration Complete Indicator

This IE indicates the successful reconfiguration performed in the UE.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRC Reconfiguration Complete Indicator</td>
<td>M</td>
<td></td>
<td>ENUMERATED (true, ...)</td>
<td></td>
</tr>
</tbody>
</table>

9.3.1.31 UL Configuration

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL UE Configuration</td>
<td>M</td>
<td></td>
<td>ENUMERATED (no-data, shared, only, ..)</td>
<td>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.</td>
</tr>
</tbody>
</table>

9.3.1.32 C-RNTI

This IE contains the C-RNTI information.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-RNTI</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(16))</td>
<td>C-RNTI as defined in TS 38.331 [8].</td>
</tr>
</tbody>
</table>

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.
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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOICE RAT-Frequency Priority Information</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td></td>
</tr>
<tr>
<td>&gt;EN-DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Subscriber Profile ID for RAT/Frequency priority</td>
<td>O</td>
<td></td>
<td>INTEGER (1..256, ...)</td>
<td></td>
</tr>
<tr>
<td>&gt;NG-RAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Index to RAT/Frequency Selection Priority</td>
<td>O</td>
<td></td>
<td>INTEGER (1..256, ...)</td>
<td></td>
</tr>
</tbody>
</table>

9.3.1.35 LCID

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCID</td>
<td>M</td>
<td></td>
<td>INTEGER (1..32, ...)</td>
<td>Corresponds to the LogicalChannelIdentity defined in TS 38.331 [8].</td>
</tr>
</tbody>
</table>

9.3.1.36 Duplication activation

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE Type and Reference</th>
<th>Semantics Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplication Activation</td>
<td>M</td>
<td></td>
<td>ENUMERATED (Active, Inactive, ...)</td>
<td></td>
</tr>
</tbody>
</table>

9.3.1.37 Slice Support List

This IE indicates the list of supported slices.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slice Support Item IEs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;S-NSSAI</td>
<td>M</td>
<td>9.3.1.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofSliceItems</td>
<td>Maximum no. of signalled slice support items. Value is 1024.</td>
</tr>
</tbody>
</table>

9.3.1.38 S-NSSAI

This IE indicates the S-NSSAI.
### 9.3.1.39 UE Identity Index value

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UE Identity Index Value</td>
<td>M</td>
<td></td>
<td>INTEGER (0..63)</td>
<td>This IE may need to be refined.</td>
</tr>
</tbody>
</table>

### 9.3.1.40 Paging DRX

This IE indicates the Paging DRX.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paging DRX</td>
<td>M</td>
<td></td>
<td>INTEGER (0..63)</td>
<td>This IE may need to be refined.</td>
</tr>
</tbody>
</table>

### 9.3.1.41 Paging Priority

This IE indicates the paging priority for paging a UE.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paging Priority</td>
<td>M</td>
<td></td>
<td>ENUMERATED (PrioLevel1, PrioLevel2, PrioLevel3, PrioLevel4, PrioLevel5, PrioLevel6, PrioLevel7, PrioLevel8, …)</td>
<td>Lower value codepoint indicates higher priority.</td>
</tr>
</tbody>
</table>

### 9.3.1.42 gNB-CU System Information

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI message</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 9.3.1.43 RAN UE Paging identity

This IE indicates the RAN UE Paging identity.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-RNTI</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(40))</td>
<td></td>
</tr>
</tbody>
</table>
9.3.1.44 CN UE Paging Identity

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOICE CN UE paging identity</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;5G-S-TMSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;5G-S-TMSI</td>
<td>M</td>
<td></td>
<td>BIT (SIZE(48))</td>
<td>Details defined in TS 38.413 [3]</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOICE QoS Characteristics</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;Non-dynamic 5QI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Non Dynamic 5QI Descriptor</td>
<td>M</td>
<td>9.3.1.49</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;Dynamic 5QI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Dynamic 5QI Descriptor</td>
<td>M</td>
<td>9.3.1.47</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>NG-RAN Allocation and Retention Priority</td>
<td>M</td>
<td>9.3.1.48</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>GBR QoS Flow Information</td>
<td>O</td>
<td>9.3.1.46</td>
<td></td>
<td>This IE shall be present for GBR QoS Flows only.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Reflective QoS Attribute</td>
<td>O</td>
<td>ENUMERATED (subject to, …)</td>
<td>Details in TS 23.501 [21]. This IE applies to non-GBR flows only and shall be ignored otherwise.</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Bit Rate 9.3.1.22</td>
<td>Maximum Bit Rate in DL. Details in TS 23.501 [21].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Bit Rate 9.3.1.22</td>
<td>Maximum Bit Rate in UL. Details in TS 23.501 [21].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Bit Rate 9.3.1.22</td>
<td>Guaranteed Bit Rate (provided there is data to deliver). Details in TS 23.501 [21].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Bit Rate 9.3.1.22</td>
<td>Guaranteed Bit Rate (provided there is data to deliver). Details in TS 23.501 [21].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Maximum Packet Loss Rate 9.3.1.50</td>
<td>Indicates the maximum rate for lost packets that can be tolerated in the downlink direction. Details in TS 23.501 [21].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Maximum Packet Loss Rate 9.3.1.50</td>
<td>Indicates the maximum rate for lost packets that can be tolerated in the uplink direction. Details in TS 23.501 [21].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### 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.

#### Condition

- **if GBRflow**

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>QoS Priority Level</td>
<td>M</td>
<td>INTEGER (1..127)</td>
<td>For details see TS 23.501 [21].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packet Delay Budget</td>
<td>M</td>
<td>9.3.1.51</td>
<td>For details see TS 23.501 [21].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packet Error Rate</td>
<td>M</td>
<td>9.3.1.52</td>
<td>For details see TS 23.501 [21].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay Critical</td>
<td>C-GBRflow</td>
<td>ENUMERATED (delay critical, non-delay critical)</td>
<td>For details see TS 23.501 [21].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Averaging Window</td>
<td>C-GBRflow</td>
<td>9.3.1.53</td>
<td>For details see TS 23.501 [21].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Data Burst Volume</td>
<td>O</td>
<td>9.3.1.54</td>
<td>For details see TS 23.501 [21].</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG-RAN Allocation and Retention Priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Priority Level</td>
<td>M</td>
<td>INTEGER (1..15)</td>
<td></td>
<td>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].</td>
</tr>
<tr>
<td>&gt;Pre-emption Capability</td>
<td>M</td>
<td>ENUMERATED (shall not trigger pre-emption, may trigger pre-emption)</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>&gt;Pre-emption Vulnerability</td>
<td>M</td>
<td>ENUMERATED (not pre-emptable, pre-emptable)</td>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

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.
### 9.3.1.50 Maximum Packet Loss Rate

This IE indicates the Maximum Packet Loss Rate.

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

### 9.3.1.51 Packet Delay Budget

This IE indicates the Packet Delay Budget.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packet Delay Budget</td>
<td>M</td>
<td></td>
<td>INTEGER (0..63)</td>
<td>This IE may need to be refined</td>
</tr>
</tbody>
</table>

### 9.3.1.52 Packet Error Rate

This IE indicates the Packet Error Rate.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packet Error Rate</td>
<td>M</td>
<td></td>
<td>INTEGER (0..63)</td>
<td>This IE may need to be refined</td>
</tr>
</tbody>
</table>

### 9.3.1.53 Averaging Window

This IE indicates the Averaging Window.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Averaging Window</td>
<td>M</td>
<td></td>
<td>INTEGER (0..63)</td>
<td>This IE may need to be refined</td>
</tr>
</tbody>
</table>

### 9.3.1.54 Maximum Data Burst Volume

This IE indicates the Maximum Data Burst Volume.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Data Burst Volume</td>
<td>M</td>
<td></td>
<td>INTEGER (0..63)</td>
<td>This IE may need to be refined</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masked IMEISV</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE (64))</td>
<td>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.</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notification Control</td>
<td>M</td>
<td></td>
<td>ENUMERATED(Active, Not-Active, …)</td>
<td></td>
</tr>
</tbody>
</table>

9.3.1.57 RAN Area Code

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RANAC</td>
<td>M</td>
<td></td>
<td>INTEGER (0..64)</td>
<td>RAN Area Code</td>
</tr>
</tbody>
</table>

9.3.1.58 PWS System Information

This IE contains the system information used for public warning.

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

9.3.1.59 Repetition Period

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition Period</td>
<td>M</td>
<td></td>
<td>INTEGER (0..2^17-1)</td>
<td>The unit of value 1 to 2^17-1 is [second].</td>
</tr>
</tbody>
</table>

9.3.1.60 Number of Broadcasts Requested

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

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

### 9.3.1.62 SIBType List

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

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIB type item IEs</td>
<td>1..&lt;maxnoofSIBTypes&gt;</td>
<td></td>
<td>ENUMERATED(sibType2, sibType3, sibType4, sibType5, sibType6, sibType7, sibType8, sibType9,...)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofSIBTypes</td>
<td>Maximum no. of SIB types, the maximum value is 32.</td>
</tr>
</tbody>
</table>

### 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].

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QoS Flow Indicator</td>
<td>M</td>
<td></td>
<td>INTEGER (0..63)</td>
<td></td>
</tr>
</tbody>
</table>

### 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.
### 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.

#### 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.

#### 9.3.2.3 Transport Layer Address

This **Transport Layer Address** IE is an IP address.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Layer Address</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(1..160, ...))</td>
<td>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].</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>CHOICE CP Transport Layer Information</th>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endpoint-IP-address</td>
<td>M</td>
<td></td>
<td>Transport Layer Address</td>
<td>9.3.2.3</td>
</tr>
</tbody>
</table>

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

9.4.1 General


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

-- **************************************************
-- 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,
  GNBCUCConfigurationUpdate,
  GNBCUCConfigurationUpdateAcknowledge,
  GNBCUCConfigurationUpdateFailure,
  UEContextSetupRequest,
  UEContextSetupResponse,
  UEContextSetupFailure,
  UEContextReleaseCommand,
  UEContextReleaseComplete,
  UEContextModificationRequest,
  UEContextModificationResponse,
  UEContextModificationFailure,
  UEContextModificationRequired,
  UEContextModificationConfirm,
  ErrorIndication,
  UEContextReleaseRequest,
  DLRRCMessageTransfer,
  ULRRCMessageTransfer,
  GNBDUResourceCoordinationRequest,
GNBDUResourceCoordinationResponse,
PrivateMessage,
UEInactivityNotification,
InitialULRRCMessageTransfer,
SystemInformationDeliveryCommand,
Paging,
Notify,
WriteReplaceWarningRequest,
WriteReplaceWarningResponse,
PWS CancelRequest,
PWS CancelResponse,
PWS RestartIndication,
PWS FailureIndication

FROM F1AP-PDU-Contents
  id-Reset,
id-F1Setup,
id-gNBDDUConfigurationUpdate,
id-gNBCUConfigurationUpdate,
id-UEContextSetup,
id-UEContextRelease,
id-UEContextModification,
id-UEContextModificationRequired,
id-ErrorIndication,
id-UEContextReleaseRequest,
id-DL RRCMessageTransfer,
id-UL RRCMessageTransfer,
id-GNBDUResourceCoordination,
id-privateMessage,
id-UEInactivityNotification,
id-InitialULRRCMessageTransfer,
id-SystemInformationDeliveryCommand,
id-Paging,
id-Notify,
id-WriteReplaceWarning,
id-PWS Cancel,
id-PWS RestartIndication,
id-PWS FailureIndication

FROM F1AP-Constants;

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

F1AP-ELEMENTARY-PROCEDURE ::= CLASS {
  &InitiatingMessage
  &SuccessfulOutcome OPTIONAL,
  &UnsuccessfulOutcome OPTIONAL,
  &procedureCode ProcedureCode UNIQUE,
--- ************************************************************
-- 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
  gNBDCUConfigurationUpdate
  gNBCUCUConfigurationUpdate
  uEContextSetup
  uEContextRelease
  uEContextModification
  uEContextModificationRequired
  writeReplaceWarning
  pWSCancel
  gNBDRUResourceCoordination,
  ...
}

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
}

gNBDCUConfigurationUpdate F1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE  gNBDCUConfigurationUpdate
  SUCCESSFUL OUTCOME  gNBDCUConfigurationUpdateAcknowledge
  UNSUCCESSFUL OUTCOME  gNBDCUConfigurationUpdateFailure
}
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
}

gNBUDUResourceCoordination F1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE GNBUDUResourceCoordinationRequest
  SUCCESSFUL OUTCOME GNBUDUResourceCoordinationResponse
  PROCEDURE CODE id-GNBUDUResourceCoordination
  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

-- ******************************************************************************
-- 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,
CUtoDUURRCInformation,
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-FLAP-ID,
GNB-DU-UE-FLAP-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,
RRCconfigurationCompleteIndicator,
SCellIndex,
SCell-ToBeRemoved-Item,
SCell-ToBeSetup-Item,
SCell-ToBeSetupMod-Item,
SCell-FailedToSetup-Item,
SCell-FailedToBeSetupMod-Item,
ServedCellIndex,
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,
ListofEUTRACellsinGNBDOUCoordination,
SpectrumSharingGroupID,
RequestType

FROM F1AP-IEs

PrivateIE-Container{},
ProtocolExtensionContainer{},

ETSI

FROM FIAP-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-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-CUCdURRcInformation, 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-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-DUtoCUConfiguration,
id-ExecuteDuplication,
id-FullConfiguration,
id-gNB-CU-UE-FLAP-ID,
id-gNB-DU-UE-FLAP-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-FLAP-ID,
id-Potential-SpCell-Item,
id-Potential-SpCell-List,
id-RAT-FrequencyPriorityInformation,
id-ResetType,
id-ResourceCoordinationTransferContainer,
id-RRCContainer,
id-RRCConfigurationCompleteIndicator,
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-ServCellIndex,
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-UEtoCURRCContainer,
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-Cells-Broadcast-To-Be-Cancelled-List,
id-Cells-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-PWSS-Failed-NR-CGI-List,
id-PWSS-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,
maxCeilingNBDO,
maxnoofCandidateSpCells,
maxnoofDRBs,
maxnoofErrors,
maxnoofIndividualF1ConnectionsToReset,
maxnoofPotentialSpCells,
maxnoofSCells,
maxnoofSRBs,
maxnoofPagingCells,
maxnoofTNLAssociations,
maxCellineNB

FROM F1AP-Constants;

-- ***************************************************************
-- RESET ELEMENTARY PROCEDURE
-- ***************************************************************

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

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
-- ************************************************************
GNBConfigurationUpdate::= SEQUENCE {
  protocolIEs ProtocolIE-Container ( GNBConfigurationUpdateIEs ),
  ...
}

GNBConfigurationUpdateIEs 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 ::= {
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 } }

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 ::= { { 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 ::= { { 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 ::= { { 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 ::= { { id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }, { id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }, { id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional }, { id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }, ... }

-- ************************************************************
-- GNB-DU RESOURCE COORDINATION REQUEST
-- ************************************************************

GNBDUResourceCoordinationRequest ::= SEQUENCE { protocolIEs ProtocolIE-Container { {GNBDUResourceCoordinationRequest-IEs} }, ... }

GNBDUResourceCoordinationRequest-IEs ::= { { id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }, { id-Cause CRITICALITY ignore TYPE Cause PRESENCE optional }, { id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional }, { id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }, ... }

ETS1
-- ************************************************************
-- GNB-DU RESOURCE COORDINATION RESPONSE
-- ************************************************************

GNBDUResourceCoordinationResponse ::= SEQUENCE {
    protocolIEs   ProtocolIE-Container   {{GNBDUResourceCoordinationResponse-IEs}},
    ...}

-- ****************************
-- 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 reject TYPE GNB-DU-UE-F1AP-ID    PRESENCE optional },
    { ID id-SpCell-ID    CRITICALITY reject TYPE NRCGI    PRESENCE mandatory },
    { ID id-SrvCellIndex    CRITICALITY reject TYPE SrvCellIndex    PRESENCE mandatory },
    { ID id-CellULConfigured    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 ignore 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 },
  ...,
}

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 },
}
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{ 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},
  ...
}

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-Potential-SpCell-Item CRITICALITY ignore TYPE Potential-SpCell-Item PRESENCE mandatory },
  ...
}

-- ************************************************************
-- UE Context Release Request ELEMENTARY PROCEDURE
-- ************************************************************

UEContextReleaseRequest ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{ UEContextReleaseRequestIEs}},
  ...
}

UEContextReleaseRequestIEs F1AP-PROTOCOL-IES ::= {
  { id-gNB-CU-UE-F1AP-ID CRITICALITY reject TYPE GNB-CU-UE-F1AP-ID PRESENCE mandatory }|
  { id-gNB-DU-UE-F1AP-ID CRITICALITY reject TYPE GNB-DU-UE-F1AP-ID PRESENCE mandatory }|
  { id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory },
  ...
}

-- ************************************************************
-- UE Context Release (gNB-CU initiated) ELEMENTARY PROCEDURE
-- ************************************************************

UEContextReleaseCommand ::= SEQUENCE {
  protocolIEs ProtocolIE-Container { { UEContextReleaseCommandIEs} },
  ...
}

UEContextReleaseCommandIEs F1AP-PROTOCOL-IES ::= {
  { id-gNB-CU-UE-F1AP-ID CRITICALITY reject TYPE GNB-CU-UE-F1AP-ID PRESENCE mandatory }|
  ...
}
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
-- **************************************************************

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-RRCConfigurationCompleteIndicator       CRITICALITY ignore TYPE RRCConfigurationCompleteIndicator     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-ToBeRemoved-List      CRITICALITY reject TYPE DRBs-ToBeRemoved-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} }|
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},
  ...
}

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},
  ...
}
UEContextModificationResponse ::= SEQUENCE {
  protocolIEs       ProtocolIE-Container { { UEContextModificationResponseIEs} },
  ...}

-- ***************************************************************
-- UE CONTEXT MODIFICATION RESPONSE
-- ***************************************************************

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} }
SCell-FailedtoSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF ProtocolIE-SingleContainer { { SCell-FailedtoSetupMod-ItemIEs} }

SRBs-FailedToBeSetupMod-ItemIEs F1AP-PROTOCOL-IES ::= {
  { ID id-SRBs-FailedToBeSetupMod-Item   CRITICALITY ignore TYPE SRBs-FailedToBeSetupMod-Item  PRESENCE optional },
  ...}

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

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 },
  ...
}

UEContextModificationRequired ::= SEQUENCE {
  protocolIEs   ProtocolIE-Container       { { UEContextModificationRequiredIEs} },
  ...
}
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-ItemIReS }

DRBs-ModifiedConf-ItemIReS 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-ItemIReS }

Cells-To-Be-Broadcast-List-ItemIReS 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
-- ************************************************************

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

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

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

PrivateMessage ::= SEQUENCE {
    privateIEs PrivateIE-Container {{PrivateMessage-IEs}},
    ...
}

PrivateMessage-IEs F1AP-PRIVATE-IES ::= {
    ...
}

SystemInformationDeliveryCommand ::= SEQUENCE {
    protocolIEs ProtocolIE-Container {{ SystemInformationDeliveryCommandIEs}},
    ...
}

SystemInformationDeliveryCommandIEs F1AP-PROTOCOL-IES ::= {
    ...
}
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 ::= SEQUENCE {
  protocolIEs   ProtocolIE-Container       {{ NotifyIEs}},
  ...
}

NotifyIEs F1AP-PROTOCOL-IES ::= {
  ...
}
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-TAI-SliceSupportList,
id-RANAC,
maxNRARFCN,
maxnooErrors,
maxnooFPLMNis,
maxnooFDLUP-TNLInformation,
maxnooFgNCellBands,
maxnooFULUP-TNLInformation,
maxnooSfQoSflows,
maxnooSfSliceItems,
maxnooSfIBTypes,
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-flap-id,
  unknown-or-already-allocated-gnd-du-ue-flap-id,
  unknown-or-inconsistent-pair-of-ue-flap-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,
CUtoDURCInformation-ExtIEs FLAP-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 UPTTransportLayerInformation,
  iE-Extensions ProtocolExtensionContainer { { DLUPTNLInformation-ToBeSetup-ItemExtIEs } } OPTIONAL,
...}
DLUPTNLInformation-ToBeSetup-ItemExtIEs FLAP-PROTOCOL-EXTENSION ::= {
...}
DRB-Activity-Item ::= SEQUENCE {
  dRBID DRBID,
  dRB-Activity DRB-Activity OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DRB-Activity-ItemExtIEs } } OPTIONAL,
...}
DRB-Activity-ItemExtIEs FLAP-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 FLAP-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,
  mNSSAI  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,
  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 ::= {
    ...
}

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..6871947673)

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 FLAP-PROTOCOL-EXTENSION ::= {
  ...}

-- H

HandoverPreparationInformation ::= OCTET STRING

-- I

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

-- J

-- K

-- L

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

ListofEUTRACellsinGNBDOCoordination ::= 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
}
NR-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 ::= {
  ...  
}

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))

NPDRB ::= ENUMERATED { nrbl1, nrbl8, nrbl24, nrbl25, nrbl31, nrbl32, nrbl38, nrbl51, nrbl52, nrbl65, nrbl66, nrbl78, nrbl79, nrbl93, nrbl106, nrbl107, nrbl121, nrbl132, nrbl133, nrbl135, nrbl160, nrbl162, nrbl189, nrbl216, nrbl245, nrbl264, nrbl270, nrbl273, ...}

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 ::= { ...

ETSI
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 FLAP-PROTOCOL-EXTENSION ::= {
...
}

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

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

-- R

RANAC ::= INTEGER (0..64)

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

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

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

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

SCell-ToBeSetupMod-Item ::= SEQUENCE {
  sCell-ID    NRCGI ,
  sCellIndex  SCellIndex ,
  sCellULConfigured  CellULConfigured  OPTIONAL ,
  iE-Extensions ProtocolExtensionContainer { { SCell-ToBeSetupMod-ItemExtIEs } } OPTIONAL, 
  ... 
}

SCell-ToBeSetupMod-ItemExtIEs  FLAP-PROTOCOL-EXTENSION ::= {
  ... 
}

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

CG-ConfigInfo ::= OCTET STRING

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

Served-Cell-Information ::= SEQUENCE {
  nRCGI     NRCGI, 
  nRPCI     NRPCI, 
  fiveGS-TAC FfiveGS-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  FLAP-PROTOCOL-EXTENSION ::= {
  ... 
}

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  FLAP-PROTOCOL-EXTENSION ::= {
  ... 
}

Served-Cells-To-Delete-Item ::= SEQUENCE {
  oldNRCGI  NRCGI ,
  iE-Extensions ProtocolExtensionContainer { { Served-Cells-To-Delete-ItemExtIEs } } OPTIONAL,
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-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 ::= {
  ...
}

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,
  nNRB, 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 ::= {
...
}
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, unsuccessful-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) }

ETS1
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
-- **************************************************************************

--
-- Extension constants
--
maxPrivateIEs INTEGER ::= 65535
maxProtocolExtensions INTEGER ::= 65535
maxProtocolIEs INTEGER ::= 65535

-- ************************************************************
-- Lists
-- ************************************************************
maxNRARFCN INTEGER ::= 3279165
maxnoofErrors INTEGER ::= 256
maxnofIndividualF1ConnectionsToReset INTEGER ::= 65536
maxCeilingNBDU INTEGER ::= 512
maxnofSCells INTEGER ::= 32
maxnofSRBs INTEGER ::= 8
maxnofDRBs INTEGER ::= 64
maxnofULUPTNLInformation INTEGER ::= 2
maxnofDULUPTNLInformation INTEGER ::= 2
maxnofBPLMNs INTEGER ::= 6
maxnofCandidateSpCells INTEGER ::= 64
maxnofPotentialSpCells INTEGER ::= 64
maxnofNrCellBands INTEGER ::= 32
maxnofSIBTypes INTEGER ::= 16
maxnofPagingCells INTEGER ::= 512
maxnofTNLAssociations INTEGER ::= 32
maxnofQoSFlows INTEGER ::= 64
maxnofSliceItems 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-RACContainer 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
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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-RRCConfigurationCompleteIndicator 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-DAR-Activity-Item        ProtocolIE-ID ::= 99
id-DAR-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-ServCellIndex            ProtocolIE-ID ::= 107
id-RAT-FrequencyPriorityInformation ProtocolIE-ID ::= 108
id-ExecuteDuplication       ProtocolIE-ID ::= 109
id-NRCGI                   ProtocolIE-ID ::= 110
id-PagingCell-Item          ProtocolIE-ID ::= 111
id-PagingCell-List          ProtocolIE-ID ::= 112
id-PagingDRX                ProtocolIE-ID ::= 113
id-PagingPriority           ProtocolIE-ID ::= 114
id-SIBtype-List             ProtocolIE-ID ::= 115
id-UEIdentityIndexValue     ProtocolIE-ID ::= 116
id-gNB-CU-SystemInformation ProtocolIE-ID ::= 117
id-HandoverPreparationInformation ProtocolIE-ID ::= 118
id-GNB-CU-TNL-Association-To-Add-Item ProtocolIE-ID ::= 119
id-GNB-CU-TNL-Association-To-Add-List ProtocolIE-ID ::= 120
id-GNB-CU-TNL-Association-To-Remove-Item ProtocolIE-ID ::= 121
id-GNB-CU-TNL-Association-To-Remove-List ProtocolIE-ID ::= 122
id-GNB-CU-TNL-Association-To-Update-Item ProtocolIE-ID ::= 123
id-GNB-CU-TNL-Association-To-Update-List ProtocolIE-ID ::= 124
id-MaskedIMEISV             ProtocolIE-ID ::= 125
id-PagingIdentity           ProtocolIE-ID ::= 126
id-DUtoCURRRCContainer      ProtocolIE-ID ::= 127
9.4.8 Container Definitions

-- ***************************************************
-- Container definitions
-- ***************************************************

FLAP-Containers {
  itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) flap (3) version1 (1) flap-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


FIAP-PROTOCOL-EXTENSION ::= CLASS {
    &id    ProtocolExtensionID   UNIQUE,
    &criticality Criticality,
    &Extension,
    &presence  Presence
}
WITH SYNTAX {
    ID    &id
    CRITICALITY  &criticality
    EXTENSION  &Extension
    PRESENCE  &presence
}

FIAP-PRIVATE-IES ::= CLASS {
    &id    PrivateIE-ID,
    &criticality Criticality,
    &Value,
    &presence  Presence
}
WITH SYNTAX {
    ID    &id
    CRITICALITY  &criticality
    TYPE   &Value
    PRESENCE  &presence
}

ProtocolIE-Container {FIAP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE (SIZE (0..maxProtocolIEs)) OF ProtocolIE-Field {{IEsSetParam}}
ProtocolIE-SingleContainer {FIAP-PROTOCOL-IES : IEsSetParam} ::= ProtocolIE-Field {{IEsSetParam}}
ProtocolIE-Field {FIAP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {
--- Container for Protocol IE Pairs
---
--- Container for Protocol Extensions
---
--- Container for Private IEs
---
--- Container for Protocol IE Pairs
---
--- Container for Protocol Extensions
---
--- Container for Private IEs
---
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/IE groups 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.
## Change History

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