LTE;
Evolved Universal Terrestrial Radio Access Network (E-UTRAN);
X2 Application Protocol (X2AP)
(3GPP TS 36.423 version 15.2.0 Release 15)
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Modal verbs terminology

In the present document "shall", "shall not", "should", "should not", "may", "need not", "will", "will not", "can" and "cannot" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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10 Handling of unknown, unforeseen and erroneous protocol data

Annex A (informative): Change history
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 radio network layer signalling procedures of the control plane between eNBs in E-UTRAN. X2AP supports the functions of X2 interface by signalling procedures defined in this document. X2AP is developed in accordance to the general principles stated in TS 36.401 [2] and TS 36.420 [3].

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".
[4] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".
[6] 3GPP TS 32.422: "Telecommunication Management; Subscriber and Equipment Trace; Trace Control and Configuration Management".
[7] 3GPP TS 32.421: "Telecommunication Management; Subscriber and Equipment Trace; Trace concepts and requirements".
[10] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation".
[13] 3GPP TS 23.203: "Policy and charging control architecture".
[16] 3GPP TS 36.104: "Base Station (BS) radio transmission and reception".
3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].
Elementary Procedure: X2AP protocol consists of Elementary Procedures (EPs). An X2AP Elementary Procedure is a unit of interaction between two eNBs. 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 or failure).
- **Class 2**: Elementary Procedures without response.

**E-RAB**: Defined in TS 36.401 [2].

**CSG Cell**: as defined in TS 36.300 [15].

**Dual Connectivity**: as defined in TS 36.300 [15].

**E-UTRA-NR Dual Connectivity**: as defined in TS 37.340 [32].

**Hybrid cell**: as defined in TS 36.300 [15].

**Master eNB**: as defined in TS 36.300 [15].

**Secondary Cell Group**: as defined in TS 36.300 [15].

**Secondary eNB**: as defined in TS 36.300 [15].

**en-gNB**: as defined in TS 37.340 [32].

### 3.2 Symbols

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;symbol&gt;</td>
<td>&lt;Explanation&gt;</td>
</tr>
</tbody>
</table>

### 3.3 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].

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Almost Blank Subframe</td>
</tr>
<tr>
<td>BBF</td>
<td>Broadband Forum</td>
</tr>
<tr>
<td>BL</td>
<td>Bandwidth reduced Low complexity</td>
</tr>
<tr>
<td>CCO</td>
<td>Cell Change Order</td>
</tr>
<tr>
<td>CE</td>
<td>Coverage Enhancement</td>
</tr>
<tr>
<td>CoMP</td>
<td>Coordinated Multi Point</td>
</tr>
<tr>
<td>DC</td>
<td>Dual Connectivity</td>
</tr>
<tr>
<td>DL</td>
<td>Downlink</td>
</tr>
<tr>
<td>E-ARFCN</td>
<td>E-UTRA Absolute Radio Frequency Channel Number</td>
</tr>
<tr>
<td>E-CID</td>
<td>Enhanced Cell-ID (positioning method)</td>
</tr>
<tr>
<td>eNB</td>
<td>E-UTRAN NodeB</td>
</tr>
<tr>
<td>EN-DC</td>
<td>E-UTRA-NR Dual Connectivity</td>
</tr>
<tr>
<td>EP</td>
<td>Elementary Procedure</td>
</tr>
<tr>
<td>EPC</td>
<td>Evolved Packet Core</td>
</tr>
<tr>
<td>E-RAB</td>
<td>E-UTRAN Radio Access Bearer</td>
</tr>
<tr>
<td>E-UTRAN</td>
<td>Evolved UTRAN</td>
</tr>
<tr>
<td>GNSS</td>
<td>Global Navigation Satellite System</td>
</tr>
<tr>
<td>GUMMEI</td>
<td>Globally Unique MME Identifier</td>
</tr>
<tr>
<td>HFN</td>
<td>Hyper Frame Number</td>
</tr>
<tr>
<td>IE</td>
<td>Information Element</td>
</tr>
<tr>
<td>L-GW</td>
<td>Local GateWay</td>
</tr>
<tr>
<td>LWA</td>
<td>LTE-WLAN Aggregation</td>
</tr>
<tr>
<td>MCG</td>
<td>Master Cell Group</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 eNB exactly and completely. Any rule that specifies the behaviour of the originating eNB 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 initiating 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 section 10.

4.2 Forwards and backwards compatibility

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

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

- **Procedure**: When referring to an elementary procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Handover Preparation procedure.

- **Message**: When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. HANDOVER REQUEST message.

- **IE**: When referring to an information element (IE) in the specification the Information Element Name is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. E-RAB ID IE.

- **Value of an IE**: When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in sub clause 9.2 enclosed by quotation marks, e.g. "Value".

5 **X2AP services**

The present clause describes the services an eNB offers to its neighbours.

5.1 **X2AP procedure modules**

The X2 interface X2AP procedures are divided into two modules as follows:

1. **X2AP Basic Mobility Procedures**;
2. **X2AP Global Procedures**;

The X2AP Basic Mobility Procedures module contains procedures used to handle the UE mobility within E-UTRAN.

The Global Procedures module contains procedures that are not related to a specific UE. The procedures in this module are in contrast to the above module involving two peer eNBs.

5.2 **Parallel transactions**

Unless explicitly indicated in the procedure specification, at any instance in time one protocol peer shall have a maximum of one ongoing X2AP procedure related to a certain UE.

6 **Services expected from signalling transport**

The signalling connection shall provide in sequence delivery of X2AP messages. X2AP shall be notified if the signalling connection breaks.

X2 signalling transport is described in TS 36.422 [21].

7 **Functions of X2AP**

The X2AP protocol provides the following functions:

- **Mobility Management.** This function allows the eNB to move the responsibility of a certain UE to another eNB. Forwarding of user plane data, Status Transfer and UE Context Release function are parts of the mobility management.

- **Dual Connectivity.** This function allows the eNB to request another eNB to provide radio resources for a certain UE while keeping responsibility for that UE.

- **E-UTRA-NR Dual Connectivity.** This function allows the eNB to request another en-gNB to provide radio resources for a certain UE while keeping responsibility for that UE.
- Load Management. This function is used by eNBs to indicate resource status, overload and traffic load to each other.

- Reporting of General Error Situations. This function allows reporting of general error situations, for which function specific error messages have not been defined.

- Resetting the X2. This function is used to reset the X2 interface.

- Setting up the X2. This function is used to exchange necessary data for the eNB or en-gNB for setup the X2 interface and implicitly perform an X2 Reset.

- eNB Configuration Update. This function allows updating of application level data needed for two eNBs to interoperate correctly over the X2 interface.

- Mobility Parameters Management. This function allows the eNB to coordinate adaptation of mobility parameter settings with a peer eNB.

- Mobility Robustness Optimisation. This function allows reporting of information related to mobility failure events.

- Energy Saving. This function allows decreasing energy consumption by enabling indication of cell activation/deactivation over the X2 interface.

- X2 Release. This function allows an eNB to be aware that the signalling connection to a peer eNB is unavailable.

- Message Transfer. This function allows indirect transport of X2AP messages to a peer eNB.

- Registration. This function allows registration of eNB in case indirect transport of X2AP messages is supported.

- Removing the X2. This function allows removing the signalling connection between two eNBs or between eNB and en-gNB in a controlled manner.

- Inter-eNB UE Context Resume. This function allows retrieval of a suspended UE context.

- Secondary RAT Data Usage Report. This function allows eNB to get the uplink and downlink data volumes for the Secondary RAT on a per E-RAB basis.

- E-UTRA - NR Spectrum Sharing. This function allows uplink and downlink spectrum sharing between a number of E-UTRA and a number of NR cells with overlapping coverage.

The mapping between the above functions and X2 EPs is shown in the table below.
### Table 7-1: Mapping between X2AP functions and X2AP EPs

<table>
<thead>
<tr>
<th>Function</th>
<th>Elementary Procedure(s)</th>
</tr>
</thead>
</table>
| Mobility Management               | a) Handover Preparation  
b) SN Status Transfer  
c) UE Context Release  
d) Handover Cancel |
| Dual Connectivity                 | a) SeNB Addition Preparation  
b) SeNB Reconfiguration Completion  
c) MeNB initiated SeNB Modification Preparation  
d) SeNB initiated SeNB Modification  
e) MeNB initiated SeNB Release  
f) SeNB initiated SeNB Release  
g) SeNB Counter Check           |
| E-UTRA-NR Dual Connectivity       | a) SgNB Addition Preparation  
b) SgNB Reconfiguration Completion  
c) MeNB initiated SgNB Modification Preparation  
d) SgNB initiated SgNB Modification  
e) SgNB change  
f) MeNB initiated SgNB Release  
g) SgNB initiated SgNB Release  
h) SgNB Counter Check  
i) RRC transfer  
j) EN-DC X2 Setup  
k) EN-DC Configuration Update  
l) EN-DC Cell Activation  
m) SgNB Activity Notification  
n) EN-DC X2 Removal                  |
| Load Management                   | a) Load Indication  
b) Resource Status Reporting Initiation  
c) Resource Status Reporting              |
| Reporting of General Error Situations | Error Indication                                                                 |
| Resetting the X2                  | Reset                                                                 |
| Setting up the X2                 | X2 Setup                                                                 |
| eNB Configuration Update          | a) eNB Configuration Update  
b) Cell Activation                                      |
| Mobility Parameters Management    | Mobility Settings Change                                                                 |
| Mobility Robustness Optimisation  | a) Radio Link Failure Indication  
b) Handover Report                                        |
| Energy Saving                     | a) eNB Configuration Update  
b) Cell Activation                                      |
| X2 Release                        | X2 Release                                                                 |
| Message Transfer Registration     | X2AP Message Transfer                                                                 |
| Removing the X2                   | X2 Removal                                                                 |
| Inter-eNB UE Context Resume       | Retrieve UE Context                                                                 |
| Secondary RAT Data Usage Report   | Secondary RAT Data Usage Report                                                                 |
| E-UTRA – NR Spectrum Sharing      | E-UTRA - NR Cell Resource Coordination                                                                 |

8 X2AP procedures

8.1 Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs.
Table 8.1-1: Class 1 Elementary 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></td>
<td>Response message</td>
<td>Response message</td>
</tr>
<tr>
<td>Handover Preparation</td>
<td>HANDOVER REQUEST</td>
<td>HANDOVER REQUEST</td>
<td>HANDOVER PREPARATION FAILURE</td>
</tr>
<tr>
<td>Reset</td>
<td>RESET REQUEST</td>
<td>RESET RESPONSE</td>
<td></td>
</tr>
<tr>
<td>X2 Setup</td>
<td>X2 SETUP REQUEST</td>
<td>X2 SETUP RESPONSE</td>
<td>X2 SETUP FAILURE</td>
</tr>
<tr>
<td>eNB Configuration Update</td>
<td>ENB CONFIGURATION REQUEST</td>
<td>ENB CONFIGURATION</td>
<td>ENB CONFIGURATION</td>
</tr>
<tr>
<td>Resource Status Reporting Initiation</td>
<td>RESOURCE STATUS REQUEST</td>
<td>RESOURCE STATUS</td>
<td>RESOURCE STATUS</td>
</tr>
<tr>
<td>Mobility Settings Change</td>
<td>MOBILITY CHANGE REQUEST</td>
<td>MOBILITY CHANGE</td>
<td>MOBILITY CHANGE</td>
</tr>
<tr>
<td>Cell Activation</td>
<td>CELL ACTIVATION REQUEST</td>
<td>CELL ACTIVATION</td>
<td>CELL ACTIVATION</td>
</tr>
<tr>
<td>SeNB Addition Preparation</td>
<td>SENB ADDITION REQUEST</td>
<td>SENB ADDITION</td>
<td>SENB ADDITION</td>
</tr>
<tr>
<td>MeNB initiated SeNB Modification Preparation</td>
<td>SENB MODIFICATION REQUEST</td>
<td>SENB MODIFICATION</td>
<td>SENB MODIFICATION</td>
</tr>
<tr>
<td>SeNB initiated SeNB Modification</td>
<td>SENB MODIFICATION REQUEST</td>
<td>SENB MODIFICATION</td>
<td>SENB MODIFICATION</td>
</tr>
<tr>
<td>SeNB initiated SeNB Release</td>
<td>SENB RELEASE REQUEST</td>
<td>SENB RELEASE CONFIRM</td>
<td></td>
</tr>
<tr>
<td>X2 Removal</td>
<td>X2 REMOVAL REQUEST</td>
<td>X2 REMOVAL RESPONSE</td>
<td>X2 REMOVAL FAILURE</td>
</tr>
<tr>
<td>Retrieve UE Context</td>
<td>RETRIEVE UE CONTEXT REQUEST</td>
<td>RETRIEVE UE CONTEXT</td>
<td>RETRIEVE UE CONTEXT</td>
</tr>
<tr>
<td>SgNB Addition Preparation</td>
<td>SGNB ADDITION REQUEST</td>
<td>SGNB ADDITION</td>
<td>SGNB ADDITION</td>
</tr>
<tr>
<td>MeNB initiated SgNB Modification Preparation</td>
<td>SGNB MODIFICATION REQUEST</td>
<td>SGNB MODIFICATION</td>
<td>SGNB MODIFICATION</td>
</tr>
<tr>
<td>SgNB initiated SgNB Modification</td>
<td>SGNB MODIFICATION REQUEST</td>
<td>SGNB MODIFICATION</td>
<td>SGNB MODIFICATION</td>
</tr>
<tr>
<td>SgNB change</td>
<td>SGNB CHANGE REQUEST</td>
<td>SGNB CHANGE CONFIRM</td>
<td>SGNB CHANGE REFUSE</td>
</tr>
<tr>
<td>MeNB initiated SgNB Release</td>
<td>SGNB RELEASE REQUEST</td>
<td>SGNB RELEASE</td>
<td>SGNB RELEASE</td>
</tr>
<tr>
<td>SgNB initiated SgNB Release</td>
<td>SGNB RELEASE REQUEST</td>
<td>SGNB RELEASE CONFIRM</td>
<td></td>
</tr>
<tr>
<td>EN-DC X2 Setup</td>
<td>EN-DC X2 SETUP REQUEST</td>
<td>EN-DC X2 SETUP</td>
<td>EN-DC X2 SETUP</td>
</tr>
<tr>
<td>EN-DC Configuration Update</td>
<td>EN-DC CONFIGURATION REQUEST</td>
<td>EN-DC CONFIGURATION</td>
<td>EN-DC CONFIGURATION</td>
</tr>
<tr>
<td>EN-DC Cell Activation</td>
<td>EN-DC CELL ACTIVATION REQUEST</td>
<td>EN-DC CELL ACTIVATION</td>
<td>EN-DC CELL ACTIVATION</td>
</tr>
</tbody>
</table>

ETSI
### 8.2 Basic mobility procedures

#### 8.2.1 Handover Preparation

**8.2.1.1 General**

This procedure is used to establish necessary resources in an eNB for an incoming handover.

The procedure uses UE-associated signalling.

**8.2.1.2 Successful Operation**

![Handover Preparation, successful operation](image)

The source eNB initiates the procedure by sending the HANDOVER REQUEST message to the target eNB. When the source eNB sends the HANDOVER REQUEST message, it shall start the timer $T_{REQLOC}$. The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *E-RAB Level QoS Parameters* IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [4].

---

<table>
<thead>
<tr>
<th>Elementary Procedure</th>
<th>Initiating Message</th>
<th>Successful Outcome Response message</th>
<th>Unsuccessful Outcome Response message</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN-DC X2 Removal</td>
<td>EN-DC X2 REMOVAL REQUEST</td>
<td>EN-DC X2 REMOVAL RESPONSE</td>
<td>EN-DC X2 REMOVAL FAILURE</td>
</tr>
</tbody>
</table>

Table 8.1-2: Class 2 Elementary Procedures

<table>
<thead>
<tr>
<th>Elementary Procedure</th>
<th>Initiating Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Indication</td>
<td>LOAD INFORMATION</td>
</tr>
<tr>
<td>Handover Cancel</td>
<td>HANOVER CANCEL</td>
</tr>
<tr>
<td>SN Status Transfer</td>
<td>SN STATUS TRANSFER</td>
</tr>
<tr>
<td>UE Context Release</td>
<td>UE CONTEXT RELEASE</td>
</tr>
<tr>
<td>Resource Status Reporting</td>
<td>RESOURCE STATUS UPDATE</td>
</tr>
<tr>
<td>Error Indication</td>
<td>ERROR INDICATION</td>
</tr>
<tr>
<td>Radio Link Failure Indication</td>
<td>RLF INDICATION</td>
</tr>
<tr>
<td>Handover Report</td>
<td>HANOVER REPORT</td>
</tr>
<tr>
<td>X2 Release</td>
<td>X2 RELEASE</td>
</tr>
<tr>
<td>X2AP Message Transfer</td>
<td>X2AP MESSAGE TRANSFER</td>
</tr>
<tr>
<td>SeNB Reconfiguration Completion</td>
<td>SENB RECONFIGURATION COMPLETE</td>
</tr>
<tr>
<td>MeNB initiated SeNB Release</td>
<td>SENB RELEASE REQUEST</td>
</tr>
<tr>
<td>SeNB Counter Check</td>
<td>SENB COUNTER CHECK REQUEST</td>
</tr>
<tr>
<td>SgNB Reconfiguration Completion</td>
<td>SGNB RECONFIGURATION COMPLETE</td>
</tr>
<tr>
<td>SgNB Counter Check</td>
<td>SGNB COUNTER CHECK REQUEST</td>
</tr>
<tr>
<td>RRC Transfer</td>
<td>RRC TRANSFER</td>
</tr>
<tr>
<td>Secondary RAT Data Usage Report</td>
<td>SECONDARY RAT DATA USAGE REPORT</td>
</tr>
<tr>
<td>SgNB Activity Notification</td>
<td>SGNB ACTIVITY NOTIFICATION</td>
</tr>
</tbody>
</table>
The source eNB may include in the GUMMEI IE any GUMMEI corresponding to the source MME node.

If at least one of the requested non-GBR E-RABs is admitted to the cell indicated by the Target Cell ID IE, the target eNB shall reserve necessary resources, and send the HANDOVER REQUEST ACKNOWLEDGE message back to the source eNB. The target eNB shall include the E-RABs for which resources have been prepared at the target cell in the E-RABs Admitted List IE. The target eNB shall include the E-RABs that have not been admitted in the E-RABs Not Admitted List IE with an appropriate cause value.

At reception of the HANDOVER REQUEST message the target eNB shall:

- prepare the configuration of the AS security relation between the UE and the target eNB by using the information in the UE Security Capabilities IE and the AS Security Information IE in the UE Context Information IE.

For each E-RAB for which the source eNB proposes to do forwarding of downlink data, the source eNB shall include the DL Forwarding IE within the E-RABs To be Setup Item IE of the HANDOVER REQUEST message. For each E-RAB that it has decided to admit, the target eNB may include the DL GTP Tunnel Endpoint IE within the E-RABs Admitted Item IE of the HANDOVER REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer. This GTP tunnel endpoint may be different from the corresponding GTP TEID IE in the E-RAB To Be Switched in Downlink List IE of the PATH SWITCH REQUEST message (see TS 36.413 [4]) depending on implementation choice.

For each bearer in the E-RABs Admitted List IE, the target eNB may include the UL GTP Tunnel Endpoint IE to indicate that it requests data forwarding of uplink packets to be performed for that bearer.

Upon reception of the HANDOVER REQUEST ACKNOWLEDGE message the source eNB shall stop the timer \(T_{\text{RELprep}}\), start the timer \(T_{X2\text{RELOCoverall}}\) and terminate the Handover Preparation procedure. The source eNB is then defined to have a Prepared Handover for that X2 UE-associated signalling.

If the Trace Activation IE is included in the HANDOVER REQUEST message then the target eNB shall, if supported, initiate the requested trace function as described in TS 32.422 [6]. In particular, the target eNB shall, if supported:

- if the Trace Activation IE does not include the MDT Configuration IE, initiate the requested trace session as described in TS 32.422 [6];
- if the Trace Activation IE includes the MDT Activation IE, within the MDT Configuration IE, set to “Immediate MDT and Trace” initiate the requested trace session and MDT session as described in TS 32.422 [6];
- if the Trace Activation IE includes the MDT Activation IE, within the MDT Configuration IE, set to “Immediate MDT Only” initiate the requested MDT session as described in TS 32.422 [6] and the target eNB shall ignore Interfaces To Trace IE, and Trace Depth IE;
- if the Trace Activation IE includes the MDT Location Information IE, within the MDT Configuration IE, store this information and take it into account in the requested MDT session;
- if the Trace Activation IE includes the Signalling based MDT PLMN List IE, within the MDT Configuration IE, the eNB may use it to propagate the MDT Configuration as described in TS 37.320 [31];
- if the Trace Activation IE includes the UE Application layer measurement configuration IE, initiate the requested trace session and QoE Measurement Collection function as described in TS 36.300 [15].

If the Management Based MDT Allowed IE only or the Management Based MDT Allowed IE and the Management Based MDT PLMN List IE is contained in the HANDOVER REQUEST message, the target eNB shall, if supported, store the received information in the UE context, and use this information to allow subsequent selection of the UE for management based MDT defined in TS 32.422 [6].

If the Masked IMEISV IE is contained in the HANDOVER REQUEST message the target eNB shall, if supported, use it to determine the characteristics of the UE for subsequent handling.

The source eNB shall, if supported and available in the UE context, include the Management Based MDT Allowed IE and the Management Based MDT PLMN List IE in the HANDOVER REQUEST message, except if the source eNB selects a serving PLMN in the target eNB which is not included in the Management Based MDT PLMN List. If the Management Based MDT PLMN List IE is not present, the source eNB shall, if supported, include the Management Based MDT Allowed IE, if this information is available in the UE context, in the HANDOVER REQUEST message, except if the source eNB selects a serving PLMN in the target eNB different from the serving PLMN in the source eNB.
If the **Handover Restriction List** IE is

- contained in the HANDOVER REQUEST message, the target eNB shall
  - store the information received in the **Handover Restriction List** IE in the UE context;
  - use this information to determine a target for the UE during subsequent mobility action for which the eNB provides information about the target of the mobility action towards the UE, except when one of the E-RABs has a particular ARP value (TS 23.401 [12]) in which case the information shall not apply;
  - use this information to select a proper SCG during dual connectivity operation.
- not contained in the HANDOVER REQUEST message, the target eNB shall consider that no roaming and no access restriction apply to the UE.

If the **Location Reporting Information** IE is included in the HANDOVER REQUEST message then the target eNB should initiate the requested location reporting functionality as defined in TS 36.413 [4].

If the **SRVCC Operation Possible** IE is included in the HANDOVER REQUEST message, the target eNB shall store the content of such IE in the UE context and use it as defined in TS 23.216 [20].

If the **UE Security Capabilities** IE included in the HANDOVER REQUEST message only contains the EIA0 algorithm as defined in TS 33.401 [18] and if this EIA0 algorithm is defined in the configured list of allowed integrity protection algorithms in the eNB (TS 33.401 [18]), the eNB shall take it into use and ignore the keys received in the **AS Security Information** IE.

The HANDOVER REQUEST message shall contain the **Subscriber Profile ID for RAT/Frequency priority** IE, if available.

If the **Subscriber Profile ID for RAT/Frequency priority** IE is contained in the HANDOVER REQUEST message, the target eNB shall store this information and the target eNB should use the information as defined in TS 36.300 [15].

Upon reception of **UE History Information** IE in the HANDOVER REQUEST message, the target eNB shall collect the information defined as mandatory in the **UE History Information** IE and shall, if supported, collect the information defined as optional in the **UE History Information** IE, for as long as the UE stays in one of its cells, and store the collected information to be used for future handover preparations.

Upon reception of the **UE History Information from the UE** IE in the HANDOVER REQUEST message, the target eNB shall, if supported, store the collected information to be used for future handover preparations.

If the **Mobility Information** IE is provided in the HANDOVER REQUEST message, the target eNB shall, if supported, store this information and use it as defined in TS 36.300 [15]. The target eNB shall, if supported, store the C-RNTI of the source cell received in the HANDOVER REQUEST message.

If the **Expected UE Behaviour** IE is provided in the HANDOVER REQUEST message, the target eNB shall, if supported, store this information and may use it to determine the RRC connection time.

If the **ProSe Authorized** IE is contained in the HANDOVER REQUEST message and it contains one or more IEs set to "authorized", the eNB shall, if supported, consider that the UE is authorized for the relevant ProSe service(s).

If the **V2X Services Authorized** IE is contained in the HANDOVER REQUEST message and it contains one or more IEs set to "authorized", the eNB shall, if supported, consider that the UE is authorized for the relevant service(s).

If the **UE Context Reference at the SeNB** IE is contained in the HANDOVER REQUEST message the target eNB may use it as specified in TS 36.300 [15]. In this case, the source eNB may expect the target eNB to include the **UE Context Kept Indicator** IE set to "True" in the HANDOVER REQUEST ACKNOWLEDGE message, which shall use this information as specified in TS 36.300 [15]. If the **UE Context Reference at the WT** IE is contained in the HANDOVER REQUEST message, the target eNB may use it as specified in TS 36.300 [15]. In this case, the source eNB may expect the target eNB to include the **WT UE Context Kept Indicator** IE set to "True" in the HANDOVER REQUEST ACKNOWLEDGE message; the source eNB shall use this information as specified in TS 36.300 [15].

If the **UE Context Reference at the SgNB** IE is contained in the HANDOVER REQUEST message the target eNB may use it as specified in TS 37.340 [32]. In this case, the source eNB may expect the target eNB to include the **UE Context Kept Indicator** IE set to "True" in the HANDOVER REQUEST ACKNOWLEDGE message, which shall use this information as specified in TS 37.340 [32].
If the **Bearer Type** IE is included in the **HANDOVER REQUEST** message and is set to “non IP”, then the target eNB shall not perform header compression for the concerned E-RAB. If the **UE Sidelink Aggregate Maximum Bit Rate** IE is contained in the **HANDOVER REQUEST** message, the target eNB shall, if supported, use it for the concerned UE’s sidelink communication in network scheduled mode for V2X services.

If the **NR UE Security Capabilities** IE is included in the **HANDOVER REQUEST** message, the target eNB shall, if supported, store this information in the UE context and send it to the respective peer node during subsequent handover preparations and/or EN-DC operations for the UE as defined in TS 33.401 [15].

If the **Aerial UE subscription information** IE is included in the **HANDOVER REQUEST** message, the target eNB shall, if supported, store this information in the UE context and use it as defined in TS 36.300 [15].

### 8.2.1.3 Unsuccessful Operation

![Figure 8.2.1.3-1: Handover Preparation, unsuccessful operation](image)

If the target eNB does not admit at least one non-GBR E-RAB, or a failure occurs during the Handover Preparation, the target eNB shall send the **HANDOVER PREPARATION FAILURE** message to the source eNB. The message shall contain the **Cause** IE with an appropriate value.

If the target eNB receives a **HANDOVER REQUEST** message containing **RRC Context** IE that does not include required information as specified in TS 36.331 [9], the target eNB shall send the **HANDOVER PREPARATION FAILURE** message to the source eNB.

**Interactions with Handover Cancel procedure:**

If there is no response from the target eNB to the **HANDOVER REQUEST** message before timer T\_RELOC\_prep expires in the source eNB, the source eNB should cancel the Handover Preparation procedure towards the target eNB by initiating the Handover Cancel procedure with the appropriate value for the **Cause** IE. The source eNB shall ignore any **HANDOVER REQUEST ACKNOWLEDGE** or **HANDOVER PREPARATION FAILURE** message received after the initiation of the Handover Cancel procedure and remove any reference and release any resources related to the concerned X2 UE-associated signalling.

### 8.2.1.4 Abnormal Conditions

If the target eNB receives a **HANDOVER REQUEST** message containing multiple **E-RAB ID** IEs (in the **E-RABs To Be Setup List** IE) set to the same value, the target eNB shall not admit the corresponding E-RABs.

If the target eNB receives a **HANDOVER REQUEST** message containing a **E-RAB Level QoS Parameters** IE which contains a **QCI** IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the **GBR QoS Information** IE, the target eNB shall not admit the corresponding E-RAB.

If the supported algorithms for encryption defined in the **Encryption Algorithms** IE in the **UE Security Capabilities** IE in the **UE Context Information** IE, plus the mandated support of EEA0 in all UEs (TS 33.401 [18]), do not match any algorithms defined in the configured list of allowed encryption algorithms in the target eNB (TS 33.401 [18]), the target eNB shall reject the procedure using the **HANDOVER PREPARATION FAILURE** message.

If the supported algorithms for integrity defined in the **Integrity Protection Algorithms** IE in the **UE Security Capabilities** IE in the **UE Context Information** IE, plus the mandated support of the EIA0 algorithm in all UEs (TS 33.401 [18]), do not match any algorithms defined in the configured list of allowed integrity protection algorithms in the eNB (TS 33.401 [18]), the eNB shall reject the procedure using the **HANDOVER PREPARATION FAILURE** message.
If the target eNB receives a HANDOVER REQUEST message which does not contain the *Handover Restriction List* IE, and the PLMN to be used cannot be determined otherwise, the target eNB shall reject the procedure using the HANDOVER PREPARATION FAILURE message.

If the target eNB receives a HANDOVER REQUEST message containing the *Handover Restriction List* IE, and the serving PLMN is not supported by the target cell, the target eNB shall reject the procedure using the HANDOVER PREPARATION FAILURE message.

If the target eNB receives a HANDOVER REQUEST message which does not contain the *CSG Membership Status* IE, and the target cell is a hybrid cell, the target eNB shall reject the procedure using the HANDOVER PREPARATION FAILURE message.

If the target cell is a CSG cell and the target eNB has not received any CSG ID of the source cell, the target eNB shall reject the procedure using the HANDOVER PREPARATION FAILURE message.

If the target cell is a CSG cell with a different CSG from the source cell, the target eNB shall reject the procedure using the HANDOVER PREPARATION FAILURE message.

### 8.2.2 SN Status Transfer

#### 8.2.2.1 General

The purpose of the SN Status Transfer procedure is to transfer the uplink PDCP SN and HFN receiver status and the downlink PDCP SN and HFN transmitter status either, from the source to the target eNB during an X2 handover, between the eNBs involved in dual connectivity and/or LWA, or between eNB and en-gNB involved in EN-DC, for each respective E-RAB for which PDCP SN and HFN status preservation applies.

If the SN Status Transfer procedure is applied in the course of dual connectivity, LWA, or EN-DC, in the subsequent specification text

- the behaviour of the eNB from which the E-RAB context is transferred, i.e., the eNB involved in dual connectivity, LWA, or EN-DC from which data forwarding, is specified by the behaviour of the "source eNB",

- the behaviour of the eNB to which the E-RAB context is transferred, i.e., the eNB involved in dual connectivity, LWA, or EN-DC to which data is forwarded, is specified by the behaviour of the "target eNB",

- the behaviour of the en-gNB from which the E-RAB context is transferred, i.e., the en-gNB involved in EN-DC from which data forwarding, is specified by the behaviour of the "source en-gNB",

- the behaviour of the en-gNB to which the E-RAB context is transferred, i.e., the en-gNB involved in EN-DC to which data is forwarded, is specified by the behaviour of the "target en-gNB".

The procedure uses UE-associated signalling.

#### 8.2.2.2 Successful Operation

![Figure 8.2.2.2-1: SN Status Transfer, successful operation](image-url)
The source eNB initiates the procedure by stop assigning PDCP SNs to downlink SDUs and stop delivering UL SDUs towards the EPC and sending the SN STATUS TRANSFER message to the target eNB at the time point when it considers the transmitter/receiver status to be frozen. The target eNB using Full Configuration for this handover as per TS 36.300 [15] shall ignore the information received in this message.

The E-RABs Subject To Status Transfer List IE included in the SN STATUS TRANSFER message contains the E-RAB ID(s) corresponding to the E-RAB(s) for which PDCP SN and HFN status preservation shall be applied.

If the source eNB includes in the SN STATUS TRANSFER message, the information on the missing and received uplink SDUs in the Receive Status Of UL PDCP SDUs IE or Receive Status Of UL PDCP SDUs Extended IE or Receive Status Of UL PDCP SDUs for PDCP SN Length 18 IE for each E-RAB for which the source eNB has accepted the request from the target eNB for uplink forwarding, then the target eNB may use it in a Status Report message sent to the UE over the radio.

For each E-RAB for which the DL COUNT Value IE is received in the SN STATUS TRANSFER message, the target eNB shall use it to mark with the value contained in the PDCP-SN IE of this IE the first downlink packet for which there is no PDCP SN yet assigned. If the DL COUNT Value Extended IE or DL COUNT Value for PDCP SN Length 18 IE is included in the E-RABs Subject To Status Transfer Item IE, the target eNB shall, if supported, use the value contained in the PDCP-SN Extended IE of the DL COUNT Value Extended IE or PDCP-SN Length 18 IE of the DL COUNT Value for PDCP SN Length 18 IE instead of the value contained in the PDCP-SN IE of the DL COUNT Value IE.

For each E-RAB for which the UL COUNT Value IE is received in the SN STATUS TRANSFER message, the target eNB shall not deliver any uplink packet which has a PDCP SN lower than the value contained in the PDCP-SN IE of this IE. If the UL COUNT Value Extended IE or UL COUNT Value for PDCP SN Length 18 IE is included in the E-RABs Subject To Status Transfer Item IE, the target eNB shall, if supported, use the value contained in the PDCP-SN Extended IE of the UL COUNT Value Extended IE or PDCP-SN Length 18 IE of the UL COUNT Value for PDCP SN Length 18 IE instead of the value contained in the PDCP-SN IE of the UL COUNT Value IE.

**EN-DC**

If the en-gNB sends the message to the MeNB, then the SgNB UE X2AP ID IE shall be included in the SN STATUS TRANSFER message, while the Old eNB UE X2AP ID IE is ignored. The SgNB UE X2AP ID IE is used as the old UE ID.
If the MeNB sends the message to the en-gNB, then the \textit{SgNB UE X2AP ID} IE shall be included in the SN STATUS TRANSFER message, while the \textit{New eNB UE X2AP ID} IE is ignored. The \textit{SgNB UE X2AP ID} IE is used as the new UE ID.

\subsection*{8.2.2.3 Abnormal Conditions}

If the target eNB receives this message for a UE for which no prepared handover exists at the target eNB, the target eNB shall ignore the message.

\subsection*{8.2.3 UE Context Release}

\subsubsection*{8.2.3.1 General}

For handover, the UE Context Release procedure is initiated by the target eNB to indicate to the source eNB that radio and control plane resources for the associated UE context are allowed to be released.

For dual connectivity, UE Context Release procedure is initiated by the MeNB to finally release the UE context at the SeNB. For dual connectivity specific mobility scenarios specified in TS 36.300 [15] only resources related to the UE-associated signalling connection between the MeNB and the SeNB are released. For EN-DC, the UE Context Release procedure is initiated by the MeNB to finally release the UE context at the en-gNB. For EN-DC specific mobility scenarios specified in TS 37.340 [32] where SCG radio resources in the en-gNB are kept, only resources related to the UE-associated signalling connection between the MeNB and the en-gNB are released.

The procedure uses UE-associated signalling.

\subsubsection*{8.2.3.2 Successful Operation}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{handover_context_release.png}
\caption{UE Context Release, successful operation for handover}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{dual_connectivity_context_release.png}
\caption{UE Context Release, successful operation for dual connectivity}
\end{figure}
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Handover

The UE Context Release procedure is initiated by the target eNB. By sending the UE CONTEXT RELEASE message the target eNB informs the source eNB of Handover success and triggers the release of resources.

Upon reception of the UE CONTEXT RELEASE message, the source eNB may release radio and control plane related resources associated to the UE context. For E-RABs for which data forwarding has been performed, the source eNB should continue forwarding of U-plane data as long as packets are received at the source eNB from the EPC or the source eNB buffer has not been emptied (an implementation dependent mechanism decides that data forwarding can be stopped). When the eNB supporting L-GW function for SIPTO@LN operation releases radio and control plane related resources associated to the UE context, it shall also request using intra-node signalling the collocated L-GW to release the SIPTO@LN PDN connection as defined in TS 23.401 [12].

Dual Connectivity

The UE Context Release procedure is initiated by the MeNB. By sending the UE CONTEXT RELEASE message the MeNB informs the SeNB that the UE Context can be removed.

Upon reception of the UE CONTEXT RELEASE message, the SeNB may release radio and control plane related resources associated to the UE context. For E-RABs for which data forwarding has been performed, the SeNB should continue forwarding of U-plane data as long as packets are received at the SeNB from the EPC or the SeNB buffer has not been emptied (an implementation dependent mechanism decides that data forwarding can be stopped). The SeNB supporting L-GW function for LIPA operation shall also request using intra-node signalling the collocated L-GW to release the LIPA PDN connection as defined in TS 23.401 [12]. If the SIPTO Bearer Deactivation Indication IE is received in the UE CONTEXT RELEASE message, the SeNB supporting L-GW function for SIPTO@LN operation shall also request using intra-node signalling the collocated L-GW to release the SIPTO@LN PDN connection as defined in TS 23.401 [12].

EN-DC

The UE Context Release procedure is initiated by the MeNB. By sending the UE CONTEXT RELEASE message the MeNB informs the en-gNB that the UE Context can be removed.

Upon reception of the UE CONTEXT RELEASE message, the en-gNB may release radio and control plane related resources associated to the UE context. For E-RABs for which data forwarding has been performed, the en-gNB should continue forwarding of U-plane data as long as packets are received at the en-gNB from the EPC or the en-gNB buffer has not been emptied (an implementation dependent mechanism decides that data forwarding can be stopped).

In the course of signalling for EN-DC, the SgNB UE X2AP ID IE shall be included in the UE CONTEXT RELEASE message, while the Old eNB UE X2AP ID IE is ignored. The SgNB UE X2AP ID IE is used as the new UE ID.

Interaction with the MeNB initiated SeNB Release procedure:

The SeNB may receive the SENB RELEASE REQUEST message including the UE Context Kept Indicator IE set to “True”, upon which the SeNB shall, if supported, only release the resources related to the UE-associated signalling connection between the MeNB and the SeNB, as specified in TS 36.300 [15].

Interaction with the MeNB initiated SgNB Release procedure:
The en-gNB may receive the SGNB RELEASE REQUEST message including the UE Context Kept Indicator IE set to “True”, upon which the en-gNB shall, if supported, only release the resources related to the UE-associated signalling connection between the MeNB and the en-gNB, as specified in TS 37.340 [32].

8.2.3.3 Unsuccessful Operation

Not applicable.

8.2.3.4 Abnormal Conditions

If the UE Context Release procedure is not initiated towards the source eNB from any prepared eNB before the expiry of the timer TX2RELOCoverall, the source eNB shall request the MME to release the UE context.

If the UE returns to source eNB before the reception of the UE CONTEXT RELEASE message or the expiry of the timer TX2RELOCoverall, the source eNB shall stop the TX2RELOCoverall and continue to serve the UE.

8.2.4 Handover Cancel

8.2.4.1 General

The Handover Cancel procedure is used to enable a source eNB to cancel an ongoing handover preparation or an already prepared handover.

The procedure uses UE-associated signalling.

8.2.4.2 Successful Operation

![Handover Cancel Diagram]

The source eNB initiates the procedure by sending the HANDOVER CANCEL message to the target eNB. The source eNB shall indicate the reason for cancelling the handover by means of an appropriate cause value.

At the reception of the HANDOVER CANCEL message, the target eNB shall remove any reference to, and release any resources previously reserved to the concerned UE context.

The New eNB UE X2AP ID IE and, if available, the New eNB UE X2AP ID Extension IE shall be included if it has been obtained from the target eNB.

8.2.4.3 Unsuccessful Operation

Not applicable.

8.2.4.4 Abnormal Conditions

Should the HANDOVER CANCEL message refer to a context that does not exist, the target eNB shall ignore the message.
8.3 Global Procedures

8.3.1 Load Indication

8.3.1.1 General

The purpose of the Load Indication procedure is to transfer load and interference co-ordination information between eNBs controlling intra-frequency neighboring cells, and additionally between eNBs controlling inter-frequency neighboring cells for TDD.

The procedure uses non UE-associated signalling.

8.3.1.2 Successful Operation

An eNB1 initiates the procedure by sending LOAD INFORMATION message to a peer eNB2.

If the UL Interference Overload Indication IE is received in the LOAD INFORMATION message, it indicates the interference level experienced by the indicated cell on all resource blocks, per PRB. If the Extended UL Interference Overload Info IE is received in the LOAD INFORMATION message, the UL Interference Overload Indication IE indicates the interference level experienced by the indicated cell ignoring the UL subframe(s) represented as value “1” in the Associated Subframes IE. The receiving eNB may take such information into account when setting its scheduling policy and shall consider the received UL Interference Overload Indication IE value valid until reception of a new LOAD INFORMATION message carrying an update of the same IE.

If the UL High Interference Indication IE is received in the LOAD INFORMATION message, it indicates, per PRB, the occurrence of high interference sensitivity, as seen from the sending eNB. The receiving eNB should try to avoid scheduling cell edge UEs in its cells for the concerned PRBs. The Target Cell ID IE received within the UL High Interference Information IE group in the LOAD INFORMATION message indicates the cell for which the corresponding UL High Interference Indication is meant. The receiving eNB shall consider the value of the UL High Interference Information IE group valid until reception of a new LOAD INFORMATION message carrying an update.

If the Relative Narrowband Tx Power (RNTP) IE is received in the LOAD INFORMATION message, it indicates, per PRB or per subframe per PRB (Enhanced RNTP), whether downlink transmission power is lower than the value indicated by the RNTP Threshold IE. If the Enhanced RNTP IE is included in the Relative Narrowband Tx Power (RNTP) IE, it additionally indicates whether the downlink transmission power is lower than the value specified by the RNTP High Power Threshold IE. The receiving eNB may take such information into account when setting its scheduling policy and shall consider the received Relative Narrowband Tx Power (RNTP) IE value valid until reception of a new LOAD INFORMATION message carrying an update. If the Enhanced RNTP IE included in the Relative Narrowband Tx Power (RNTP) IE is present, the receiving eNB shall consider the received Enhanced RNTP IE value valid starting from the subframe indicated by the Start SFN IE and Start Subframe Number IE, if present.

If the ABS Information IE is included in the LOAD INFORMATION message, the ABS Pattern Info IE indicates the subframes designated as almost blank subframes by the sending eNB for the purpose of interference coordination. The receiving eNB may take such information into consideration when scheduling UEs.

The receiving eNB may use the Measurement Subset IE received in the LOAD INFORMATION message, for the configuration of specific measurements towards the UE.
The receiving eNB shall consider the received information as immediately applicable. The receiving eNB shall consider the value of the ABS Information IE valid until reception of a new LOAD INFORMATION message carrying an update.

If an ABS indicated in the ABS pattern info IE coincides with a MBSFN subframe, the receiving eNB shall consider that the subframe is designated as almost blank subframe by the sending eNB.

If the Invoke Indication IE is included in the LOAD INFORMATION message, it indicates which type of information the sending eNB would like the receiving eNB to send back. The receiving eNB may take such request into account.

If the Invoke Indication IE is set to "ABS Information", it indicates the sending eNB would like the receiving eNB to initiate the Load Indication procedure, with the LOAD INFORMATION message containing the ABS Information IE indicating non-zero ABS patterns in the relevant cells. If the Invoke Indication IE is set to "Start NAICS Information", it indicates the sending eNB would like the receiving eNB to initiate the Load Indication procedure with the LOAD INFORMATION message containing the Dynamic DL transmission information IE. The first time the Dynamic DL transmission information IE is signalled after receiving the Invoke Indication IE set to "Start NAICS Information", all the NAICS parameters in the NAICS Information IE shall be included. If the Invoke Indication IE is set to "Stop NAICS Information", it indicates the sending eNB does not need NAICS information and therefore the receiving eNB should stop signalling NAICS parameters for the concerned cell.

If the NAICS Information IE is set to "NAICS Active", the receiving eNB may use it for the configuration of DL interference mitigation assistance information towards the UE. Information included in the NAICS Information IE shall replace corresponding NAICS information existing at the receiver. If the NAICS Information IE is set to "NAICS Inactive", the receiving eNB shall consider the existing NAICS information as invalid.

If the Intended UL-DL Configuration IE is included in the LOAD INFORMATION message, it indicates the UL-DL configuration intended to be used by the indicated cell. The receiving eNB may take such information into account when setting its scheduling policy and shall consider the received Intended UL-DL Configuration IE value valid until reception of a new LOAD INFORMATION message carrying an update of the same IE.

If the Extended UL Interference Overload Info IE is received in the LOAD INFORMATION message, the Extended UL Interference Overload Indication IE indicates the interference level experienced by the indicated cell on all resource blocks, per PRB, in the UL subframe(s) which is represented as value “1” in the Associated Subframes IE. The receiving eNB may take such information into account when setting its scheduling policy and shall consider the received Extended UL Interference Overload Info IE value valid until reception of a new LOAD INFORMATION message carrying an update of the same IE.

If the CoMP Information IE is received in the LOAD INFORMATION message, the receiving eNB may take the IE into account for RRM. The receiving eNB shall consider the CoMP Information IE valid starting in the subframe indicated by the Start SFN IE and Start Subframe Number IE, if present. If the Start SFN IE and Start Subframe Number IE are not present, then the receiving eNB shall consider the CoMP Information IE as immediately valid. The receiving eNB shall consider the CoMP Information IE valid until an update of the same IE, received in a new LOAD INFORMATION message, is considered valid.

8.3.1.3 Unsuccessful Operation

Not applicable.

8.3.1.4 Abnormal Conditions

Void.

8.3.2 Error Indication

8.3.2.1 General

The Error Indication procedure is initiated by an eNB 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.
8.3.2.2 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 node detecting the error situation.

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 UE associated signalling, in the course of handover signalling and signalling for dual connectivity, the Old eNB UE X2AP ID IE and the New eNB UE X2AP ID IE shall be included in the ERROR INDICATION message. In case the Error Indication procedure is triggered by UE associated signalling, in the course of signalling for EN-DC, the Old en-gNB UE X2AP ID IE and the New eNB UE X2AP ID IE shall be included in the ERROR INDICATION message. If any of Old eNB UE X2AP ID IE, Old en-gNB UE X2AP ID IE and New eNB UE X2AP ID IE is not correct, the cause shall be set to appropriate value e.g. "unknown Old eNB UE X2AP ID", "unknown Old en-gNB UE X2AP ID", "unknown New eNB UE X2AP ID" or "unknown pair of UE X2AP ID".

If the UE-associated signalling connection is identified by extended eNB UE X2AP IDs the specification text above is applicable for the UE X2AP ID Extension accordingly.

Figure 8.3.2.2-1: Error Indication, successful operation.

Figure 8.3.2.2-2: eNB initiated Error Indication for EN-DC, successful operation.

Figure 8.3.2.2-3: en-gNB initiated Error Indication for EN-DC, successful operation.
8.3.2.3 Unsuccessful Operation

Not applicable.

8.3.2.4 Abnormal Conditions

Not applicable.

8.3.3 X2 Setup

8.3.3.1 General

The purpose of the X2 Setup procedure is to exchange application level configuration data needed for two eNBs to interoperate correctly over the X2 interface. This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also resets the X2 interface like a Reset procedure would do.

The procedure uses non UE-associated signalling.

8.3.3.2 Successful Operation

An eNB1 initiates the procedure by sending the X2 SETUP REQUEST message to a candidate eNB2. The candidate eNB2 replies with the X2 SETUP RESPONSE message. The initiating eNB1 shall transfer the complete list of its served cells and, if available, a list of supported GU Group Ids to the candidate eNB2. The candidate eNB2 shall reply with the complete list of its served cells and shall include, if available, a list of supported GU Group Ids in the reply.

If a cell is switched off for energy savings reasons, it should be activated before initiating or responding to the X2 Setup procedure and shall still be included in the list of served cells.

The initiating eNB1 may include the Neighbour Information IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include the Neighbour Information IE in the X2 SETUP RESPONSE message. The Neighbour Information IE shall only include E-UTRAN cells that are direct neighbours of cells in the reporting eNB. A direct neighbour of one cell of a given eNB may be any cell belonging to an eNB that is a neighbour of that given eNB cell e.g. even if the cell has not been reported by a UE. The initiating eNB1 may include the TAC IE with the Neighbour Information IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include the TAC IE with the Neighbour Information IE in the X2 SETUP RESPONSE message. The eNB receiving the IE may use it according to TS 36.300 [15].

The initiating eNB1 may include the Number of Antenna Ports IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include the Number of Antenna Ports IE in the X2 SETUP RESPONSE message. The eNB receiving the IE may use it according to TS 36.331 [9].

The initiating eNB1 may include the PRACH Configuration IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include the PRACH Configuration IE in the X2 SETUP RESPONSE message. The eNB receiving the IE may use this information for RACH optimisation.

The initiating eNB1 may include the MBSFN Subframe Info IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include the MBSFN Subframe Info IE in the X2 SETUP RESPONSE message. The eNB receiving the IE may use it according to TS 36.331 [9].
For each CSG cell or hybrid cell served by the initiating eNB1 the X2 SETUP REQUEST message shall contain the CSG ID IE. For each CSG cell or hybrid cell served by the candidate eNB2 the X2 SETUP RESPONSE message shall contain the CSG ID IE. The eNB receiving the IE shall take this information into account when further deciding whether X2 handover between the source cell and the target cell may be performed.

The initiating eNB1 may include the MBMS Service Area Identity List IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include the MBMS Service Area Identity List IE in the X2 SETUP RESPONSE message. The eNB receiving the IE may use it according to TS 36.300 [15].

For each cell served by the initiating eNB1 the X2 SETUP REQUEST message may contain the MultibandInfoList IE and may also contain the FreqBandIndicatorPriority IE. For each cell served by the candidate eNB2 the X2 SETUP RESPONSE message may contain the MultibandInfoList IE and may also contain the FreqBandIndicatorPriority IE. The eNB receiving the MultibandInfoList IE shall, if supported, take this information into account when further deciding whether subsequent mobility actions between the source cell and the target cell may be performed, and use this IE and the FreqBandIndicatorPriority IE, if received, as specified in TS 36.331 [9].

The initiating eNB1 may include the LHN ID IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include LHN ID IE in the X2 SETUP RESPONSE message. The eNB receiving the IE may use it according to TS 36.300 [15].

The initiating eNB1 may include the BandwidthReducedSI IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include BandwidthReducedSI IE in the X2 SETUP RESPONSE message. The eNB receiving the IE may use it to determine a suitable target in case of subsequent outgoing mobility involving BL UEs or UEs requiring CE.

8.3.3.3 Unsuccessful Operation

![X2 Setup, unsuccessful operation](image)

If the candidate eNB2 cannot accept the setup it shall respond with an X2 SETUP FAILURE message with appropriate cause value.

If the X2 SETUP FAILURE message includes the Time To Wait IE the initiating eNB1 shall wait at least for the indicated time before reinitiating the X2 Setup procedure towards the same eNB2.

8.3.3.4 Abnormal Conditions

If the first message received for a specific TNL association is not an X2 SETUP REQUEST, X2 SETUP RESPONSE, or X2 SETUP FAILURE message then this shall be treated as a logical error.

If the initiating eNB1 does not receive either X2 SETUP RESPONSE message or X2 SETUP FAILURE message, the eNB1 may reinitiate the X2 Setup procedure towards the same eNB, provided that the content of the new X2 SETUP REQUEST message is identical to the content of the previously unacknowledged X2 SETUP REQUEST message.

If the initiating eNB1 receives an X2 SETUP REQUEST message from the peer entity on the same X2 interface:

- In case the eNB1 answers with an X2 SETUP RESPONSE message and receives a subsequent X2 SETUP FAILURE message, the eNB1 shall consider the X2 interface as non operational and the procedure as unsuccessfully terminated according to sub clause 8.3.3.3.

- In case the eNB1 answers with an X2 SETUP FAILURE message and receives a subsequent X2 SETUP RESPONSE message, the eNB1 shall ignore the X2 SETUP RESPONSE message and consider the X2 interface as non operational.
8.3.4 Reset

8.3.4.1 General

The purpose of the Reset procedure is to align the resources in eNB1 and eNB2, or the resources in eNB and en-gNB involved in the EN-DC in the event of an abnormal failure. The procedure resets the X2 interface. This procedure doesn’t affect the application level configuration data exchanged during, e.g., the X2 Setup procedure, EN-DC X2 Setup procedure.

The procedure uses non UE-associated signalling.

8.3.4.2 Successful Operation

![Diagram of Reset, successful operation](image)

The procedure is initiated with a RESET REQUEST message sent from the eNB1 to the eNB2. Upon receipt of this message, eNB2 shall abort any other ongoing procedures over X2 between eNB1 and eNB2. The eNB2 shall delete all the context information related to the eNB1, except the application level configuration data exchanged during the X2 Setup or eNB Configuration Update procedures, and release the corresponding resources. After completion of release of the resources, the eNB2 shall respond with a RESET RESPONSE message.

![Diagram of Reset, successful operation for EN-DC](image)

The procedure is initiated with a RESET REQUEST message sent from the eNB1/en-gNB1 to en-gNB2/eNB2. Upon receipt of this message, en-gNB2/eNB2 shall abort any other ongoing procedures over X2 between both nodes. en-gNB2/en-gNB2 shall delete all the context information related to eNB1/en-gNB1, except the application level configuration data exchanged during the EN-DC X2 Setup or EN-DC Configuration Update procedures, and release the corresponding resources. After completion of release of the resources, en-gNB2/en-gNB2 shall respond with a RESET RESPONSE message.

8.3.4.3 Unsuccessful Operation

Void.

8.3.4.4 Abnormal Conditions

If the RESET REQUEST message is received, any other ongoing procedure (except another Reset procedure) on the same X2 interface shall be aborted.

If Reset procedure is ongoing and the responding node receives the RESET REQUEST message from the peer entity on the same X2 interface, it shall respond with the RESET RESPONSE message as described in 8.3.4.2.
If the initiating node does not receive RESET RESPONSE message, the initiating node may reinitiate the Reset procedure towards the same eNB/en-gNB, provided that the content of the new RESET REQUEST message is identical to the content of the previously unacknowledged RESET REQUEST message.

8.3.5 eNB Configuration Update

8.3.5.1 General

The purpose of the eNB Configuration Update procedure is to update application level configuration data needed for two eNBs to interoperate correctly over the X2 interface.

The procedure uses non UE-associated signalling.

8.3.5.2 Successful Operation

An eNB1 initiates the procedure by sending an ENB CONFIGURATION UPDATE message to a peer eNB2. Such message shall include an appropriate set of up-to-date configuration data, including, but not limited to, the complete lists of added, modified and deleted served cells, that eNB1 has just taken into operational use.

Upon reception of an ENB CONFIGURATION UPDATE message, eNB2 shall update the information for eNB1 as follows:

Update of Served Cell Information:

- If Served Cells To Add IE is contained in the ENB CONFIGURATION UPDATE message, eNB2 shall add cell information according to the information in the Served Cell Information IE.

- If Number of Antenna Ports IE is contained in the Served Cell Information IE in the ENB CONFIGURATION UPDATE message, eNB2 may use this information according to TS 36.331 [9].

- If the PRACH Configuration IE is contained in the Served Cell Information IE in the ENB CONFIGURATION UPDATE message, the eNB receiving the IE may use this information for RACH optimisation.

- If Served Cells To Modify IE is contained in the ENB CONFIGURATION UPDATE message, eNB2 shall modify information of cell indicated by Old ECGI IE according to the information in the Served Cell Information IE.

- If MBSFN Subframe Info IE is contained in the Served Cell Information IE in the ENB CONFIGURATION UPDATE message, eNB2 may use this information according to TS 36.331 [9]. If a MBSFN subframe indicated in the MBSFN Subframe Info IE coincides with an ABS, the eNB2 shall consider that the subframe is designated as ABS by the sending eNB.

- If BandwidthReducedSI IE is contained in the Served Cell Information IE in the ENB CONFIGURATION UPDATE message, eNB2 may use this information to determine a suitable target in case of subsequent outgoing mobility involving BL UEs or UEs requiring CE.

When either served cell information or neighbour information of an existing served cell in eNB1 need to be updated, the whole list of neighbouring cells, if any, shall be contained in the Neighbour Information IE.
If the Deactivation Indication IE is contained in Served Cells To Modify IE, it indicates that the concerned cell was switched off to lower energy consumption.

The eNB₂ shall overwrite the served cell information and the whole list of neighbour cell information for the affected served cell.

- If Served Cells To Delete IE is contained in the ENB CONFIGURATION UPDATE message, eNB₂ shall delete information of cell indicated by Old ECGI IE.

- If MBMS Service Area Identity List IE is contained in the Served Cell Information IE in the ENB CONFIGURATION UPDATE message, the eNB receiving the IE may use it according to TS 36.300 [15].

When the MBMS Service Area Identities of a cell in eNB₁ need to be updated, the whole list of MBMS Service Area Identities of the affected cell shall be contained in the Served Cell Information IE.

Update of GU Group Id List:

- If GU Group Id To Add List IE is contained in the ENB CONFIGURATION UPDATE message, eNB₂ shall add the GU Group Id to its GU Group Id List.

- If GU Group Id To Delete List IE is contained in the ENB CONFIGURATION UPDATE message, eNB₂ shall remove the GU Group Id from its GU Group Id List.

If Neighbour Information IE is contained in the ENB CONFIGURATION UPDATE message, eNB₂ may use this information to update its neighbour cell relations, or use it for other functions, like PCI selection. The Neighbour Information IE shall only include E-UTRAN cells that are direct neighbours of cells in the reporting eNB. A direct neighbour of one cell of a given eNB may be any cell belonging to an eNB that is a neighbour of that given eNB cell e.g. even if that cell has not been reported by a UE. The Neighbour Information IE may contain the TAC IE of the included cells. The receiving eNB may use TAC IE, as described in TS 36.300 [15].

After successful update of requested information, eNB₂ shall reply with the ENB CONFIGURATION UPDATE ACKNOWLEDGE message to inform the initiating eNB₁ that the requested update of application data was performed successfully. In case the peer eNB receives an ENB CONFIGURATION UPDATE without any IE except for MessageType IE it shall reply with ENB CONFIGURATION UPDATE ACKNOWLEDGE message without performing any updates to the existing configuration.

The eNB₁ may initiate a further eNB Configuration Update procedure only after a previous eNB Configuration Update procedure has been completed.

For each cell served by the initiating eNB₁ the ENB CONFIGURATION UPDATE message may contain the MultibandInfoList IE and may also contain the FreqBandIndicatorPriority IE. The eNB receiving the MultibandInfoList IE shall, if supported, take this information into account when further deciding whether subsequent mobility actions between the source cell and the target cell may be performed, and use this IE and the FreqBandIndicatorPriority IE, if received, as specified in TS 36.331 [9].

If the Coverage Modification List IE is present, eNB₂ may use the information in the Cell Coverage State IE to identify the cell deployment configuration enabled by eNB₁ and for configuring the mobility towards the cell(s) indicated by the ECGI IE, as described in TS 36.300 [15]. If the Cell Deployment Status Indicator IE is present in the Coverage Modification List IE, the eNB₂ shall consider the cell deployment configuration of the cell to be modified as the next planned configuration and shall remove any planned configuration stored for this cell. If the Cell Deployment Status Indicator IE is present and the Cell Replacing Info IE contains non-empty cell list, the eNB₂ may use this list to avoid connection or re-establishment failures during the reconfiguration, e.g. consider the cells in the list as possible alternative handover targets. If the Cell Deployment Status Indicator IE is not present, the eNB₂ shall consider the cell deployment configuration of cell to be modified as activated and replace any previous configuration for the cells indicated in the Coverage Modification List IE.

Interaction with the eNB Configuration Update procedure:

If an eNB₂ which has not stored a FreqBandIndicatorPriority IE received from eNB₁, but has signaled a FreqBandIndicatorPriority IE to eNB₁ after the TNL association has become available, receives an ENB CONFIGURATION UPDATE message from eNB₁ containing the FreqBandIndicatorPriority IE, the eNB₂ shall initiate the eNB Configuration Update procedure towards eNB₁ including the FreqBandIndicatorPriority IE.
8.3.5.3 Unsuccessful Operation

If the eNB2 can not accept the update it shall respond with an ENB CONFIGURATION UPDATE FAILURE message and appropriate cause value.

If the ENB CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE the eNB1 shall wait at least for the indicated time before reinitiating the eNB Configuration Update procedure towards the same eNB2. Both nodes shall continue to operate the X2 with their existing configuration data.

8.3.5.4 Abnormal Conditions

If the eNB1 after initiating eNB Configuration Update procedure receives neither ENB CONFIGURATION UPDATE ACKNOWLEDGE message nor ENB CONFIGURATION UPDATE FAILURE message, the eNB1 may reinitiate the eNB Configuration Update procedure towards the same eNB2, provided that the content of the new ENB CONFIGURATION UPDATE message is identical to the content of the previously unacknowledged ENB CONFIGURATION UPDATE message.

8.3.6 Resource Status Reporting Initiation

8.3.6.1 General

This procedure is used by an eNB to request the reporting of load measurements to another eNB.

The procedure uses non UE-associated signalling.

8.3.6.2 Successful Operation

The procedure is initiated with a RESOURCE STATUS REQUEST message sent from eNB1 to eNB2. Upon receipt, eNB2:

- shall initiate the requested measurement according to the parameters given in the request in case the *Registration Request* IE set to "start"; or
- shall stop all cells measurements and terminate the reporting in case the *Registration Request* IE is set to “stop”; or
- if supported, stop cell measurements and terminate the reporting for cells indicated in the *Cell To Report* IE list, in case the *Registration Request* IE is set to “partial stop”; or
- if supported, add cells indicated in the Cell To Report IE list to the measurements initiated before for the given measurement IDs, in case the Registration Request IE is set to "add".

If the eNB2 received a RESOURCE STATUS REQUEST message, which includes the Registration Request IE set to "stop", the Cell To Report IE list shall be ignored.

If the Registration Request IE is set to "start" then the Report Characteristics IE shall be included in RESOURCE STATUS REQUEST message. The eNB2 shall ignore the Report Characteristics IE, if the Registration Request IE is not set to "start".

The Report Characteristics IE indicates the type of objects eNB2 shall perform measurements on. For each cell, the eNB2 shall include in the RESOURCE STATUS UPDATE message:

- the Radio Resource Status IE, if the first bit, “PRB Periodic” of the Report Characteristics IE included in the RESOURCE STATUS REQUEST message is set to 1;
- the S1 TNL Load Indicator IE, if the second bit, “TNL Load Ind Periodic” of the Report Characteristics IE included in the RESOURCE STATUS REQUEST message is set to 1;
- the Hardware Load Indicator IE, if the third bit, “HW Load Ind Periodic” of the Report Characteristics IE included in the RESOURCE STATUS REQUEST message is set to 1;
- the Composite Available Capacity Group IE, if the fourth bit, “Composite Available Capacity Periodic” of the Report Characteristics IE included in the RESOURCE STATUS REQUEST message is set to 1. If Cell Capacity Class Value IE is included within the Composite Available Capacity Group IE, this IE is used to assign weights to the available capacity indicated in the Capacity Value IE;
- the ABS Status IE, if the fifth bit, “ABS Status Periodic” of the Report Characteristics IE included in the RESOURCE STATUS REQUEST message is set to 1 and eNB1 had indicated the ABS pattern to eNB2;
- the RSRP Measurement Report List IE, if the sixth bit, “RSRP Measurement Report Periodic” of the Report Characteristics IE included in the RESOURCE STATUS REQUEST message is set to 1;
- the CSI Report IE, if the seventh bit, “CSI Report Periodic” of the Report Characteristics IE included in the RESOURCE STATUS REQUEST message is set to 1.

If the Reporting Periodicity IE is included in the RESOURCE STATUS REQUEST message, eNB2 shall use its value as the time interval between two subsequent RESOURCE STATUS UPDATE messages that include the Radio Resource Status IE, S1 TNL Load Indicator IE, Hardware Load Indicator IE, Composite Available Capacity Group IE, or ABS Status IE.

If the Reporting Periodicity of RSRP Measurement Report IE is included in the RESOURCE STATUS REQUEST message, eNB2 shall use its value as the minimum time interval between two subsequent RESOURCE STATUS UPDATE messages that include the RSRP Measurement Report List IE.

If the Reporting Periodicity of CSI Report IE is included in the RESOURCE STATUS REQUEST message, eNB2 shall use its value as the minimum time interval between two subsequent RESOURCE STATUS UPDATE messages that include the CSI Report IE.

If eNB2 is capable to provide all requested resource status information, it shall initiate the measurement as requested by eNB1, and respond with the RESOURCE STATUS RESPONSE message.

If eNB2 is capable to provide some but not all of the requested resource status information and the Partial Success Indicator IE is present in the RESOURCE STATUS REQUEST message, it shall initiate the measurement for the admitted measurement objects and include the Measurement Initiation Result IE in the RESOURCE STATUS RESPONSE message.
8.3.6.3 Unsuccessful Operation

If none of the requested measurements can be initiated, eNB2 shall send a RESOURCE STATUS FAILURE message. The Cause IE shall be set to an appropriate value e.g. "Measurement Temporarily not Available" or "Measurement not Supported For The Object" for each requested measurement object. The eNB may use the Complete Failure Cause Information IE to enhance the failure cause information per measurement in the RESOURCE STATUS FAILURE message.

8.3.6.4 Abnormal Conditions

If the initiating eNB1 does not receive either RESOURCE STATUS RESPONSE message or RESOURCE STATUS FAILURE message, the eNB1 may reinitiate the Resource Status Reporting Initiation procedure towards the same eNB, provided that the content of the new RESOURCE STATUS REQUEST message is identical to the content of the previously unacknowledged RESOURCE STATUS REQUEST message.

If the initiating eNB1 receives the RESOURCE STATUS RESPONSE message including the Measurement Initiation Result IE containing no admitted measurements, the eNB1 shall consider the procedure as failed.

If the Report Characteristics IE bitmap is set to "0" (all bits are set to "0") in the RESOURCE STATUS REQUEST message then eNB2 shall initiate a RESOURCE STATUS FAILURE message, the cause shall be set to appropriate value e.g. "ReportCharacteristicsEmpty".

If the Reporting Periodicity IE value is not specified when at least one of the bits of the Report Characteristics IE, for which semantics is specified, other than the sixth or seventh bit, is set to 1 then eNB2 shall initiate a RESOURCE STATUS FAILURE message, the cause shall be set to appropriate value e.g. "NoReportPeriodicity".

If the Reporting Periodicity of RSRP Measurement Report IE value is not specified when the sixth bit of the Report Characteristics IE is set to 1, then eNB2 shall initiate the RESOURCE STATUS FAILURE message and the cause shall be set to appropriate value e.g. "NoReportPeriodicity".

If the Reporting Periodicity of CSI Report IE value is not specified when the seventh bit of the Report Characteristics IE is set to 1, then eNB2 shall initiate the RESOURCE STATUS FAILURE message and the cause shall be set to appropriate value e.g. "NoReportPeriodicity".

If the eNB2 received a RESOURCE STATUS REQUEST message which includes the Registration Request IE set to "start" and the eNB1Measurement ID IE corresponding to an existing on-going load measurement reporting, then eNB2 shall initiate a RESOURCE STATUS FAILURE message, the cause shall be set to appropriate value e.g. "ExistingMeasurementID".

If the Registration Request IE is set to "stop", "partial stop" or "add" and the RESOURCE STATUS REQUEST message does not contain eNB2 Measurement ID IE, eNB2 shall consider the procedure as failed and respond with the RESOURCE STATUS FAILURE message, the cause shall be set to appropriate value e.g. "Unknown eNB Measurement ID".

If the Registration Request IE is set to "partial stop" and the Cell To Report IE contains cells that have not been initiated for the reporting before, eNB2 shall consider the procedure as failed and respond with the RESOURCE STATUS FAILURE message, the cause shall be set to appropriate value e.g. "Cell not Available". If the Registration Request IE is set to "add" and the Cell To Report IE contains cells that have been initiated for the reporting before, eNB2 shall consider the procedure as failed and respond with the RESOURCE STATUS FAILURE message, the cause shall be set to appropriate value e.g. "Cell not Available".
8.3.7 Resource Status Reporting

8.3.7.1 General

This procedure is initiated by eNB₂ to report the result of measurements admitted by eNB₂ following a successful Resource Status Reporting Initiation procedure.

The procedure uses non UE-associated signalling.

8.3.7.2 Successful Operation

![Figure 8.3.7.2-1: Resource Status Reporting, successful operation](image)

The eNB₂ shall report the results of the admitted measurements in RESOURCE STATUS UPDATE message. The admitted measurements are the measurements that were successfully initiated during the preceding Resource Status Reporting Initiation procedure, and thus not reported in the Measurement Failed Report Characteristics IE for the concerned cell in the RESOURCE STATUS RESPONSE message.

If the eNB₁ receives the RESOURCE STATUS UPDATE message which includes the UE ID IE in the RSRP Measurement Report List IE, the eNB₁ may use the UE ID IE to link the associated RSRP measurement report with other measurement results (e.g. CSI reports, RSRP measurement reports) of the same UE.

If the CSI Report IE including the CSI Process Configuration Index IE is received, eNB₁ shall interpret this IE as an index identifying one of the CSI process configurations that can be configured for all UEs within the cell where the CSI measurements were collected. For all UEs within the cell, the maximum number of CSI process configurations is given by the maximum value of the CSI Process Configuration Index IE.

If the eNB₁ receives the RESOURCE STATUS UPDATE message, which includes the Cell Reporting Indicator IE set to "stop request" in one or more items of the Cell Measurement Result IE, the eNB₁ should initialise the Resource Status Reporting Initiation procedure to remove all or some of the corresponding cells from the measurement.

8.3.7.3 Unsuccessful Operation

Not applicable.

8.3.7.4 Abnormal Conditions

If the eNB₁ receives a RESOURCE STATUS UPDATE message which includes the ABS Status IE, and all bits in the Usable ABS Pattern Info IE are set to '0', the eNB₁ shall ignore the DL ABS Status IE.

8.3.8 Mobility Settings Change

8.3.8.1 General

This procedure enables an eNB to negotiate the handover trigger settings with a peer eNB controlling neighbouring cells.

The procedure uses non UE-associated signalling.
8.3.8.2 Successful Operation

The procedure is initiated with a MOBILITY CHANGE REQUEST message sent from eNB1 to eNB2.

Upon receipt, eNB2 shall evaluate if the proposed eNB2 handover trigger modification may be accepted. If eNB2 is able to successfully complete the request it shall reply with MOBILITY CHANGE ACKNOWLEDGE.

8.3.8.3 Unsuccessful Operation

If the requested parameter modification is refused by the eNB2, or if the eNB2 is not able to complete the procedure, the eNB2 shall send a MOBILITY CHANGE FAILURE message with the Cause IE set to an appropriate value. The eNB2 may include eNB2 Mobility Parameters Modification Range IE in MOBILITY CHANGE FAILURE message, for example in cases when the proposed change is out of permitted range.

8.3.8.4 Abnormal Conditions

Void.

8.3.9 Radio Link Failure Indication

8.3.9.1 General

The purpose of the Radio Link Failure Indication procedure is to transfer information regarding RRC re-establishment attempts, or received RLF Reports, between eNBs. The signalling takes place from the eNB at which a re-establishment attempt is made, or an RLF Report is received, to an eNB to which the UE concerned may have previously been attached prior to the connection failure. This may aid the detection of radio link failure and handover failure cases (TS 36.300 [15]).

The procedure uses non UE-associated signalling.
8.3.9.2 Successful Operation

![Figure 8.3.9.2-1: Radio Link Failure Indication, successful operation](image)

eNB2 initiates the procedure by sending the RLF INDICATION message to eNB1 following a re-establishment attempt or an RLF Report reception from a UE at eNB2, when eNB2 considers that the UE may have previously suffered a connection failure at a cell controlled by eNB1.

eNB2 may include the `ShortMAC-I` IE in the RLF INDICATION message, e.g., in order to aid the eNB1 to resolve a potential PCI confusion situation or to aid the eNB1 to identify the UE.

eNB2 may include the `UE RLF Report Container` IE and optionally also the `UE RLF Report Container for extended bands` IE in the RLF INDICATION message, which may be used by the eNB1 to determine the nature of the failure. If the `UE RLF Report Container` IE is included in the RLF INDICATION message sent after successful re-establishment, the eNB2 shall use the `Re-establishment Cell ECGI` IE in the RLF INDICATION message to indicate the ECGI of the cell where the re-establishment was successful.

eNB2 may include the `RRC Conn Setup Indicator` IE in the RLF INDICATION message, which indicates that the RLF Report is retrieved after an RRC connection setup or an incoming successful handover.

If the `RRC Conn Setup Indicator` IE is present in the RLF INDICATION message, the eNB1 shall ignore the values in the `Failure cell PCI` IE, `Re-establishment cell ECGI` IE, `C-RNTI` IE and `ShortMAC-I` IE.

eNB2 may include the `RRC Conn Reestab Indicator` IE in the RLF INDICATION message, which may be used by the eNB1 to determine where the failure occurred.

8.3.9.3 Unsuccessful Operation

Not applicable.

8.3.9.4 Abnormal Conditions

Void.

8.3.10 Handover Report

8.3.10.1 General

The purpose of the Handover Report procedure is to transfer mobility related information between eNBs.

The procedure uses non UE-associated signalling.
8.3.10.2 Successful Operation

An eNB initiates the procedure by sending an HANDOVER REPORT message to another eNB. By sending the message eNB\(_1\) indicates to eNB\(_2\) that a mobility-related problem was detected.

If the Handover Report Type IE is set to "HO too early" or "HO to wrong cell", then the eNB\(_1\) indicates to eNB\(_2\) that, following a successful handover from a cell of eNB\(_2\) to a cell of eNB\(_1\), a radio link failure occurred and the UE attempted RRC Re-establishment either at the original cell of eNB\(_2\) (Handover Too Early), or at another cell (Handover to Wrong Cell). The detection of Handover Too Early and Handover to Wrong Cell events is made according to TS 36.300 [15].

If the UE-related information is available in eNB\(_1\), the eNB\(_1\) should include in HANDOVER REPORT message:

- the Mobility Information IE, if the Mobility Information IE was sent for this handover from eNB\(_2\);
- the Source cell C-RNTI IE.

If received, the eNB\(_2\) uses the above information according to TS 36.300 [15].

If the UE RLF Report received from the eNB sending the RLF INDICATION message, as described in TS 36.300 [15], is available, the eNB\(_1\) may also include it in the HANDOVER REPORT as UE RLF Report Container IE and optionally also UE RLF Report Container for extended bands IE.

If the Handover Report Type IE is set to "InterRAT ping-pong", then the eNB\(_1\) indicates to eNB\(_2\) that a completed handover from a cell of eNB\(_2\) to a cell in other RAT might have resulted in an inter-RAT ping-pong and the UE was successfully handed over to a cell of eNB\(_1\) (indicated with Failure cell ECGI IE).

The report contains the source and target cells, and cause of the handover. If the Handover Report Type IE is set to "HO to wrong cell", then the Re-establishment cell ECGI IE shall be included in the HANDOVER REPORT message. If the Handover Report Type IE is set to "InterRAT ping-pong", then the Target cell in UTRAN IE shall be included in the HANDOVER REPORT message.

8.3.10.3 Unsuccessful Operation

Not applicable.

8.3.10.4 Abnormal Conditions

Void.

8.3.11 Cell Activation

8.3.11.1 General

The purpose of the Cell Activation procedure is to request to a neighbouring eNB to switch on one or more cells, previously reported as inactive due to energy saving reasons.

The procedure uses non UE-associated signalling.
8.3.11.2 Successful Operation

An eNB1 initiates the procedure by sending a CELL ACTIVATION REQUEST message to a peer eNB2.

Upon receipt of this message, eNB2 should activate the cell(s) indicated in the CELL ACTIVATION REQUEST message and shall indicate in the CELL ACTIVATION RESPONSE message for which cells the request was fulfilled.

Interactions with eNB Configuration Update procedure:

eNB2 shall not send an ENB CONFIGURATION UPDATE message to eNB1 just for the reason of the cell(s) indicated in the CELL ACTIVATION REQUEST message changing state, as the receipt of the CELL ACTIVATION RESPONSE message by eNB1 is used to update the information about cell activation state of eNB2 cells in eNB1.

8.3.11.3 Unsuccessful Operation

If the eNB2 cannot activate any of the cells indicated in the CELL ACTIVATION REQUEST message, it shall respond with a CELL ACTIVATION FAILURE message with an appropriate cause value.

8.3.11.4 Abnormal Conditions

Not applicable.

8.3.12 X2 Removal

8.3.12.1 General

The purpose of the X2 Removal procedure is to remove the signaling connection between two eNBs in a controlled manner. If successful, this procedure erases any existing application level configuration data in the two nodes.

The procedure uses non UE-associated signaling.

8.3.12.2 Successful Operation
An eNB1 initiates the procedure by sending the X2 REMOVAL REQUEST message to a candidate eNB2. Upon reception of the X2 REMOVAL REQUEST message the candidate eNB2 shall reply with the X2 REMOVAL RESPONSE message. After receiving the X2 REMOVAL RESPONSE message, the initiating eNB1 shall initiate removal of the TNL association towards eNB2 and may remove all resources associated with that signaling connection. The candidate eNB2 may then remove all resources associated with that signaling connection.

If the X2 Removal Threshold IE is included in the X2 REMOVAL REQUEST message, the candidate eNB2 shall, if supported, accept to remove the signalling connection with eNB1 if the X2 Benefit Value of the signalling connection determined at the candidate eNB2 is lower than the value of the X2 Removal Threshold IE.

### 8.3.12.3 Unsuccessful Operation

If the candidate eNB2 cannot accept to remove the signaling connection with eNB1 it shall respond with an X2 REMOVAL FAILURE message with an appropriate cause value.

### 8.3.12.4 Abnormal Conditions

Void.

### 8.3.13 Retrieve UE Context

#### 8.3.13.1 General

The purpose of the Retrieve UE Context procedure is to retrieve the UE context from the eNB where the RRC connection has been suspended (old eNB) and transfer it to the eNB where the RRC Connection has been requested to be resumed (new eNB) or to retrieve the UE context for a UE which attempts to re-establish its RRC connection in an eNB (the new eNB) different from the eNB (the old eNB) where the RRC connection failed, e.g. due to RLF.

The procedure uses UE-associated signalling.
8.3.13.2 Successful Operation

The new eNB initiates the procedure by sending the RETRIEVE UE CONTEXT REQUEST message to the old eNB.

If the old eNB is able to identify the UE context and to successfully verify the UE by means of the Resume ID, the ShortMAC-I, optionally the C-RNTI, the failure cell PCI and the E-UTRAN Cell Identifier of the new cell contained in the RETRIEVE UE CONTEXT REQUEST message, it shall respond with the RETRIEVE UE CONTEXT RESPONSE message. The allocation of resources according to the values of the Allocation and Retention Priority IE included in the E-RAB Level QoS Parameters IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [4].

If the C-RNTI IE is present in the RETRIEVE UE CONTEXT REQUEST, the old eNB shall ignore the Resume ID IE.

The old eNB may include in the GUMMEI IE any GUMMEI corresponding to the source MME node.

If the PLMN of the new cell is not the Serving PLMN stored in the UE Context the old eNB shall replace the Serving PLMN with the PLMN of the new cell and move the Serving PLMN to the equivalent PLMN list, before propagating the roaming and access restriction information to the new eNB. The new eNB shall act upon reception of the

- UE Security Capabilities IE,
- AS Security Information IE,
- Subscriber Profile ID for RAT/Frequency priority IE,
- Handover Restriction List IE,
- Location Reporting Information IE,
- Management Based MDT Allowed IE
- Management Based MDT PLMN List IE
- Trace Activation IE,
- SRVCC Operation Possible IE,
- Masked IMEISV IE
- Expected UE Behaviour IE,
- ProSe Authorized IE,
- V2X Services Authorized IE,
- Aerial UE subscription information IE,

within the RETRIEVE UE CONTEXT RESPONSE message as specified for the target eNB upon reception of the HANDOVER REQUEST message for the Handover Preparation procedure.

If the UE Sidelink Aggregate Maximum Bit Rate IE is contained in the RETRIEVE UE CONTEXT RESPONSE message, the new eNB shall, if supported, use it for the concerned UE’s sidelink communication in network scheduled mode for V2X services.
If the *Aerial UE subscription information* IE is included in the RETRIEVE UE CONTEXT RESPONSE message, the target eNB shall, if supported, store this information in the UE context and use it as defined in TS 36.300 [15].

### 8.3.13.3 Unsuccessful Operation

![Diagram](https://example.com/diagram.png)

**Figure 8.3.13.3-1: Retrieve UE Context, unsuccessful operation**

If the old eNB is not able to identify the UE context by means of the Resume ID, or with the ShortMAC-I, C-RNTI, failed cell PCI and new E-UTRAN Cell Identifier contained in the RETRIEVE UE CONTEXT REQUEST message, it shall respond to the new eNB with the RETRIEVE UE CONTEXT FAILURE message.

### 8.3.13.4 Abnormal Conditions

Void.

### 8.3.14 EN-DC X2 Removal

#### 8.3.14.1 General

The purpose of the EN-DC X2 Removal procedure is to remove the signaling connection between eNB and en-gNB in a controlled manner. If successful, this procedure erases any existing application level configuration data in the two nodes.

The procedure uses non UE-associated signaling.

#### 8.3.14.2 Successful Operation

![Diagram](https://example.com/diagram.png)

**Figure 8.3.14.2-1: eNB Initiated EN-DC X2 Removal, successful operation**
eNB initiated EN-DC X2 Removal:

An eNB initiates the procedure by sending the EN-DC X2 REMOVAL REQUEST message to a candidate en-gNB. Upon reception of the EN-DC X2 REMOVAL REQUEST message the candidate en-gNB shall reply with the EN-DC X2 REMOVAL RESPONSE message. After receiving the EN-DC X2 REMOVAL RESPONSE message, the initiating eNB shall initiate removal of the TNL association towards en-gNB and may remove all resources associated with that signaling connection. The candidate eNB may then remove all resources associated with that signaling connection.

If the X2 Removal Threshold IE is included in the EN-DC X2 REMOVAL REQUEST message, the candidate en-gNB shall, if supported, accept to remove the signalling connection with eNB if the X2 Benefit Value of the signalling connection determined at the candidate en-gNB is lower than the value of the X2 Removal Threshold IE.

en-gNB initiated EN-DC X2 Removal:

An en-gNB initiates the procedure by sending the EN-DC X2 REMOVAL REQUEST message to a candidate eNB. Upon reception of the EN-DC X2 REMOVAL REQUEST message the candidate eNB shall reply with the EN-DC X2 REMOVAL RESPONSE message. After receiving the EN-DC X2 REMOVAL RESPONSE message, the initiating en-gNB shall initiate removal of the TNL association towards eNB and may remove all resources associated with that signaling connection. The candidate eNB may then remove all resources associated with that signaling connection.

If the X2 Removal Threshold IE is included in the EN-DC X2 REMOVAL REQUEST message, the candidate eNB shall, if supported, accept to remove the signalling connection with en-gNB if the X2 Benefit Value of the signalling connection determined at the candidate eNB is lower than the value of the X2 Removal Threshold IE.

8.3.14.3 Unsuccessful Operation
If the candidate receiving node cannot accept to remove the signaling connection with initiating node it shall respond with an EN-DC X2 REMOVAL FAILURE message with an appropriate cause value.

8.3.14.4 Abnormal Conditions

Void.

8.4 X2 Release

8.4.1 General

The purpose of the X2 Release procedure is to inform an eNB that the signalling (i.e. SCTP) connection to a peer eNB is unavailable.

8.4.2 Successful Operation

![Figure 8.4.2-1: X2AP Release, successful operation](image)

eNB1 initiates the procedure by sending the X2 RELEASE message to eNB2. Upon the reception of X2 RELEASE message, eNB2 shall consider that the signalling connection to an eNB indicated by the eNB ID IE is unavailable. eNB2 may delete all the context information related to the indicated eNB.

8.4.3 Unsuccessful Operation

Not Applicable

8.4.4 Abnormal Condition

Not Applicable.

8.5 X2AP Message Transfer

8.5.1 General

The purpose of the X2AP Message Transfer procedure is to allow indirect transport of an X2AP message (except the X2AP MESSAGE TRANSFER message) between two eNBs and to allow an eNB to perform registration.
8.5.2 Successful Operation

![Diagram of X2AP Message Transfer, successful operation](image)

**eNB1** initiates the procedure by sending the X2AP MESSAGE TRANSFER message to **eNB2**.

Upon the reception of X2 MESSAGE TRANSFER message the target eNB may:

- Retrieve the X2AP message included in the X2AP Message IE;
- Consider the target eNB ID contained in the Target eNB ID IE, included in the RNL Header IE, as the destination for the X2AP message signaled in the X2AP Message IE;
- Consider the source eNB ID contained in the Source eNB ID IE, included in the RNL Header IE, as the source of the X2AP message signaled in the X2AP Message IE.

In case the included RNL Header IE does not contain the Target eNB ID IE, the receiving eNB shall consider the eNB ID included in the Source eNB ID IE as the eNB ID corresponding to the TNL address(es) of the sender and update its internal information.

8.5.3 Unsuccessful Operation

Not Applicable.

8.5.4 Abnormal Condition

Not Applicable.

8.6 Procedures for Dual Connectivity

8.6.1 SeNB Addition Preparation

8.6.1.1 General

The purpose of the SeNB Addition Preparation procedure is to request the SeNB to allocate resources for dual connectivity operation for a specific UE.

The procedure uses UE-associated signalling.
8.6.1.2 Successful Operation

The MeNB initiates the procedure by sending the SENB ADDITION REQUEST message to the SeNB. When the MeNB sends the SENB ADDITION REQUEST message, it shall start the timer $T_{DCprep}$.

The allocation of resources according to the values of the Allocation and Retention Priority IE included in the E-RAB Level QoS Parameters IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [4].

If the SENB ADDITION REQUEST message contains the Serving PLMN IE, the SeNB may use it for RRM purposes.

If the SENB ADDITION REQUEST message contains the Expected UE Behaviour IE, the SeNB shall, if supported, store this information and may use it to optimize resource allocation.

The SeNB shall report to the MeNB, in the SENB ADDITION REQUEST ACKNOWLEDGE message, the result for all the requested E-RABs in the following way:

- A list of E-RABs which are successfully established shall be included in the E-RABs Admitted To Be Added List IE.
- A list of E-RABs which failed to be established shall be included in the E-RABs Not Admitted List IE.

NOTE: The MeNB may trigger the SeNB Addition Preparation procedure in the course of the Inter-MeNB handover without SeNB change procedure as described in 36.300 [15]. The deleted E-RABs are not included in the E-RABs To Be Added List IE in the SENB ADDITION REQUEST message, from MeNB point of view. If the SeNB reports a certain E-RAB to be successfully established, respective SCG resources, from an SeNB point of view, may be actually successfully established or modified or kept; if a certain E-RAB is reported to be failed to be established, respective SCG resources, from an SeNB point of view, may be actually failed to be established or modified or kept.

For each E-RAB configured with the SCG bearer option

- the SeNB shall choose the ciphering algorithm based on the information in the UE Security Capabilities IE and locally configured priority list of AS encryption algorithms and apply the key indicated in the SeNB Security Key IE as specified in the TS 33.401 [18].
- the MeNB may propose to apply forwarding of downlink data by including the DL Forwarding IE within the E-RABs To be Added Item IE of the SENB ADDITION REQUEST message. For each E-RAB that it has decided to admit, the SeNB may include the DL Forwarding GTP Tunnel Endpoint IE within the E-RABs Admitted To Be Added Item IE of the SENB ADDITION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer. This GTP tunnel endpoint may be different from the corresponding DL GTP TEID IE in the E-RAB To Be Modified List IE of the E-RAB MODIFICATION INDICATION message (see TS 36.413 [4]) depending on implementation choice.
- the SeNB may include for each bearer in the E-RABs Admitted To Be Added List IE the UL Forwarding GTP Tunnel Endpoint IE to indicate that it requests data forwarding of uplink packets to be performed for that bearer.
- If the Correlation ID IE for the concerned E-RAB is received by the SeNB, the SeNB shall use this information for LIPA operation for the concerned E-RAB.
- If the SIPTO Correlation ID IE for the concerned E-RAB is received by the SeNB, the SeNB shall use this information for SIPTO@LN operation for the concerned E-RAB.
If the **CSG Membership Status** IE is included in the SENB ADDITION REQUEST message, the SeNB shall act as specified in TS 36.300 [15].

Upon reception of the SENB ADDITION REQUEST ACKNOWLEDGE message the MeNB shall stop the timer $T_{Dc prep}$.

If the **GW Transport Layer Address** IE is received in the SENB ADDITION REQUEST ACKNOWLEDGE message, the MeNB stores this information and use it according to TS 36.300 [15].

If the **SIPTO-L-GW Transport Layer Address** IE is received in the SENB ADDITION REQUEST ACKNOWLEDGE message, the MeNB stores this information and use it according to TS 36.300 [15].

If the **SeNB UE X2AP ID** IE and/or **SeNB UE X2AP ID Extension** IE are contained in the SENB ADDITION REQUEST message, the SeNB shall, if supported, store this information and use it as defined in TS 36.300 [15].

If the **Tunnel Information for BBF** IE is received in the SENB ADDITION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, transfer the tunnel information for BBF to the core network.

**Interactions with the SeNB Reconfiguration Completion procedure:**

If the SeNB admits at least one E-RAB, the SeNB shall start the timer $T_{DCoverall}$ when sending the SENB ADDITION REQUEST ACKNOWLEDGE message to the MeNB. The reception of the SENB RECONFIGURATION COMPLETE message shall stop the timer $T_{DCoverall}$.

### 8.6.1.3 Unsuccessful Operation

If the SeNB is not able to accept any of the bearers or a failure occurs during the SeNB Addition Preparation, the SeNB sends the SENB ADDITION REQUEST REJECT message with an appropriate cause value to the MeNB.

### 8.6.1.4 Abnormal Conditions

If the SeNB receives a SENB ADDITION REQUEST message containing multiple **E-RAB ID** IEs (in the **E-RABs To Be Added List** IE) set to the same value, the SeNB shall consider the establishment of the corresponding E-RAB as failed.

If the SeNB receives a SENB ADDITION REQUEST message containing a **E-RAB Level QoS Parameters** IE which contains a **QCI** IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the **GBR QoS Information** IE, the SeNB shall consider the establishment of the corresponding E-RAB as failed.

If the supported algorithms for encryption defined in the **Encryption Algorithms** IE in the **UE Security Capabilities** IE, plus the mandated support of EEA0 in all UEs (TS 33.401 [18]), do not match any algorithms defined in the configured list of allowed encryption algorithms in the SeNB (TS 33.401 [18]), the SeNB shall reject the procedure using the SENB ADDITION REQUEST REJECT message.

If the SeNB receives a SENB ADDITION REQUEST message which does not contain the **CSG Membership Status** IE, and the SCell served by the SeNB is a hybrid cell, the SeNB shall reject the procedure using the SENB ADDITION REQUEST REJECT message.

If the SeNB receives a SENB ADDITION REQUEST message containing a **SeNB UE X2AP ID** IE that does not match any existing UE Context that has such ID, the SeNB shall reject the procedure using the SENB ADDITION REQUEST REJECT message.
If the SeNB receives a SENB ADDITION REQUEST message containing both the Correlation ID and the SIPTO Correlation ID IEs for the same E-RAB, the SeNB shall consider the establishment of the corresponding E-RAB as failed.

Interactions with the SeNB Reconfiguration Completion and SeNB initiated SeNB Release procedure:

If the timer $T_{DCoverall}$ expires before the SeNB has received the SENB RECONFIGURATION COMPLETE or the SENB RELEASE REQUEST message, the SeNB shall regard the requested RRC connection reconfiguration as being not applied by the UE and shall trigger the SeNB initiated SeNB Release procedure.

Interactions with the MeNB initiated SeNB Release procedure:

If the timer $T_{DCprep}$ expires before the MeNB has received the SENB ADDITION REQUEST ACKNOWLEDGE message, the MeNB shall regard the SeNB Addition Preparation procedure as being failed and shall trigger the MeNB initiated SeNB Release procedure.

8.6.2 SeNB Reconfiguration Completion

8.6.2.1 General

The purpose of the SeNB Reconfiguration Completion procedure is to provide information to the SeNB whether the requested configuration was successfully applied by the UE.

The procedure uses UE-associated signalling.

8.6.2.2 Successful Operation

The MeNB initiates the procedure by sending the SENB RECONFIGURATION COMPLETE message to the SeNB.

The SENB RECONFIGURATION COMPLETE message may contain information that

- either the UE has successfully applied the configuration requested by the SeNB. The MeNB may also provide configuration information in the MeNB to SeNB Container IE.

- or the MeNB has not triggered configuration requested by the SeNB. The MeNB shall provide information with sufficient precision in the included Cause IE to enable the SeNB to know the reason for an unsuccessful reconfiguration. The MeNB may also provide configuration information in the MeNB to SeNB Container IE.

Upon reception of the SENB RECONFIGURATION COMPLETE message the SeNB shall stop the timer $T_{DCoverall}$.

8.6.2.3 Abnormal Conditions

Void.

8.6.3 MeNB initiated SeNB Modification Preparation

8.6.3.1 General

This procedure is used to enable an MeNB to request an SeNB to modify the UE context at the SeNB.
The procedure uses UE-associated signalling.

### 8.6.3.2 Successful Operation

**Figure 8.6.3.2-1: MeNB initiated SeNB Modification Preparation, successful operation**

The MeNB initiates the procedure by sending the SENB MODIFICATION REQUEST message to the SeNB. When the MeNB sends the SENB MODIFICATION REQUEST message, it shall start the timer $T_{DCprep}$.

The SENB MODIFICATION REQUEST message may contain

- within the **UE Context Information** IE;
  - E-RABs to be added within the **E-RABs To Be Added Item** IE;
  - E-RABs to be modified within the **E-RABs To Be Modified Item** IE;
  - E-RABs to be released within the **E-RABs To Be Released Item** IE;
  - the **SeNB UE Aggregate Maximum Bit Rate** IE;
- the **MeNB to SeNB Container** IE;
- the **SCG Change Indication** IE;
- the **CSG Membership Status** IE.

If the SENB MODIFICATION REQUEST message contains the **Serving PLMN** IE, the SeNB may use it for RRM purposes.

If the **SeNB UE Aggregate Maximum Bit Rate** IE is included in the SENB MODIFICATION REQUEST message, the SeNB shall:

- replace the previously provided SeNB UE Aggregate Maximum Bit Rate by the received SeNB UE Aggregate Maximum Bit Rate in the UE context;
- use the received SeNB UE Aggregate Maximum Bit Rate for non-GBR Bearers for the concerned UE as defined in TS 36.300 [15].

The allocation of resources according to the values of the **Allocation and Retention Priority** IE included in the **E-RAB Level QoS Parameters** IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [4].

If at least one of the requested modifications is admitted by the SeNB, the SeNB shall modify the related part of the UE context accordingly and send the SENB MODIFICATION REQUEST ACKNOWLEDGE message back to the MeNB.

The SeNB shall include the E-RABs for which resources have been either added or modified or released at the SeNB either in the **E-RABs Admitted To Be Added List** IE or the **E-RABs Admitted To Be Modified List** IE or the **E-RABs Admitted To Be Released List** IE. The SeNB shall include the E-RABs that have not been admitted in the **E-RABs Not Admitted List** IE with an appropriate cause value.

For each E-RAB configured with the SCG bearer option
- the SeNB shall, if included, choose the ciphering algorithm based on the information in the UE Security Capabilities IE and locally configured priority list of AS encryption algorithms and apply the key indicated in the SeNB Security Key IE as specified in the TS 33.401 [18].

- if applicable, the MeNB may propose to apply forwarding of downlink data by including the DL Forwarding IE within the E-RABs To Be Added Item IE of the SENB MODIFICATION REQUEST message. For each E-RAB that has decided to admit, the SeNB may include the DL Forwarding GTP Tunnel Endpoint IE within the E-RABs Admitted To Be Added Item IE of the SENB MODIFICATION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer. The MeNB may also provide for an applicable E-RAB to be released the DL Forwarding GTP Tunnel Endpoint IE and the UL Forwarding GTP Tunnel Endpoint IE within the E-RABs To Be Released Item IE of the SENB MODIFICATION REQUEST message.

- if applicable, the SeNB may include for each bearer in the E-RABs Admitted To Be Added List IE in the SENB MODIFICATION REQUEST message the UL Forwarding GTP Tunnel Endpoint IE to indicate that it requests data forwarding of uplink packets to be performed for that bearer.

- If the Correlation ID IE for the concerned E-RAB is received by the SeNB, the SeNB shall use this information for LIPA operation for the concerned E-RAB.

- If the SIPTO Correlation ID IE for the concerned E-RAB is received by the SeNB, the SeNB shall use this information for SIPTO@LN operation for the concerned E-RAB.

For each E-RAB configured with the split bearer option to be modified, if the SENB MODIFICATION REQUEST message includes the SCG Change Indication IE and the MeNB GTP Tunnel Endpoint IE in the E-RABs To Be Modified Item IE, the SeNB shall act as specified in TS 36.300 [15].

For each E-RAB configured with the split bearer option to be modified (released)

- if applicable, the MeNB may provide for an applicable E-RAB to be released the DL Forwarding GTP Tunnel Endpoint IE within the E-RABs To Be Released Item IE of the SENB MODIFICATION REQUEST message.

If the E-RAB level QoS parameter IE is included in the SENB MODIFICATION REQUEST message for an E-RAB to be modified the SeNB shall allocate respective resources and provide corresponding radio configuration information within the SeNB to MeNB Container IE as described in TS 36.300 [15].

If the SENB MODIFICATION REQUEST message contains for an E-RAB to be modified which is configured with the SCG bearer option the S1 UL GTP Tunnel Endpoint IE the SeNB shall use it as the new UL S1-U address.

If the SENB MODIFICATION REQUEST message contains for an E-RAB to be modified which is configured with the split bearer option the MeNB GTP Tunnel Endpoint IE the SeNB shall use it as the new UL X2-U address.

For an E-RAB to be modified which is configured with the SCG bearer option the SeNB may include in the SENB MODIFICATION REQUEST ACKNOWLEDGE message the SI DL GTP Tunnel Endpoint IE.

For an E-RAB to be modified which is configured with the split bearer option the SeNB may include in the SENB MODIFICATION REQUEST ACKNOWLEDGE message the SeNB GTP Tunnel Endpoint IE.

If the SCG Change Indication IE is included in the SENB MODIFICATION REQUEST message, the SeNB shall act as specified in TS 36.300 [15].

If the CSG Membership Status IE is included in the SENB MODIFICATION REQUEST message, the SeNB shall act as specified in TS 36.300 [15].

Upon reception of the SENB MODIFICATION REQUEST ACKNOWLEDGE message the MeNB shall stop the timer TDCprep. If the SENB MODIFICATION REQUEST ACKNOWLEDGE message has included the SeNB to MeNB Container IE the MeNB is then defined to have a Prepared SeNB Modification for that X2 UE-associated signalling.

When the SeNB supporting L-GW function for LIPA operation releases radio and control plane related resources associated to the LIPA bearer, it shall also request using intra-node signalling the collocated L-GW to release the LIPA PDN connection as defined in TS 23.401 [12].

Interactions with the SeNB Reconfiguration Completion procedure:

If the SeNB admits a modification of the UE context requiring the MeNB to report about the success of the RRC connection reconfiguration procedure, the SeNB shall start the timer TDCoverall when sending the SENB
MODIFICATION REQUEST ACKNOWLEDGE message to the MeNB. The reception of the SeNB RECONFIGURATION COMPLETE message shall stop the timer T_{DCoverall}.

8.6.3.3 Unsuccessful Operation

Figure 8.6.3.3-1: MeNB initiated SeNB Modification Preparation, unsuccessful operation

If the SeNB does not admit any modification requested by the MeNB, or a failure occurs during the MeNB initiated SeNB Modification Preparation, the SeNB shall send the SENB MODIFICATION REQUEST REJECT message to the MeNB. The message shall contain the Cause IE with an appropriate value.

If the SeNB receives a SENB MODIFICATION REQUEST message containing the MeNB to SeNB Container IE that does not include required information as specified in TS 36.331 [9], the SeNB shall send the SENB MODIFICATION REQUEST REJECT message to the MeNB.

8.6.3.4 Abnormal Conditions

If the SeNB receives a SENB MODIFICATION REQUEST message containing multiple E-RAB ID IEs (in the E-RABs To Be Added List IE and/or the E-RABs To Be Modified List IE) set to the same value, the SeNB shall not admit the action requested for the corresponding E-RABs.

If the SeNB receives an SENB MODIFICATION REQUEST message containing multiple E-RAB ID IEs (in the E-RAB To Be Released List IE) set to the same value, the SeNB shall initiate the release of one corresponding E-RAB and ignore the duplication of the instances of the selected corresponding E-RABs.

If the SeNB receives a SENB MODIFICATION REQUEST message containing a E-RAB Level QoS Parameters IE which contains a QCI IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the GBR QoS Information IE, the SeNB shall not admit the corresponding E-RAB.

If the supported algorithms for encryption defined in the Encryption Algorithms IE in the UE Security Capabilities IE in the UE Context Information IE, plus the mandated support of EEA0 in all UEs (TS 33.401 [18]), do not match any algorithms defined in the configured list of allowed encryption algorithms in the SeNB (TS 33.401 [18]), the SeNB shall reject the procedure using the SENB MODIFICATION REQUEST REJECT message.

If the timer T_{DCprep} expires before the MeNB has received the SENB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall regard the MeNB initiated SeNB Modification Preparation procedure as being failed and shall release the UE Context at the SeNB.

If the SeNB receives a SENB MODIFICATION REQUEST message containing both the Correlation ID and the SIPTO Correlation ID IEs for the same E-RAB, the SeNB shall consider the establishment of the corresponding E-RAB as failed.

Interactions with the SeNB Reconfiguration Completion and SeNB initiated SeNB Release procedure:

If the timer T_{DCoverall} expires before the SeNB has received the SENB RECONFIGURATION COMPLETE or the SENB RELEASE REQUEST message, the SeNB shall regard the requested modification RRC connection reconfiguration as being not applied by the UE and shall trigger the SeNB initiated SeNB Release procedure.

Interaction with the SeNB initiated SeNB Modification Preparation procedure:
If the MeNB, after having initiated the MeNB initiated SeNB Modification procedure, receives the SENB MODIFICATION REQUIRED message, the MeNB shall refuse the SeNB initiated SeNB Modification procedure with an appropriate cause value in the Cause IE.

If the MeNB has a Prepared SeNB Modification and receives the SENB MODIFICATION REQUIRED message, the MeNB shall respond with the SENB MODIFICATION REFUSE message to the SeNB with an appropriate cause value in the Cause IE.

### 8.6.4 SeNB initiated SeNB Modification

#### 8.6.4.1 General

This procedure is used by the SeNB to modify the UE context in the SeNB.

The procedure uses UE-associated signalling.

#### 8.6.4.2 Successful Operation

![Diagram](image)

**Figure 8.6.4.2-1: SeNB initiated SeNB Modification, successful operation.**

The SeNB initiates the procedure by sending the SENB MODIFICATION REQUIRED message to the MeNB. When the SeNB sends the SENB MODIFICATION REQUIRED message, it shall start the timer $T_{DCoverall}$.

The SENB MODIFICATION REQUIRED message may contain

- the *SeNB to MeNB Container IE*.
- E-RABs to be released within the *E-RABs To Be Released IE*;
- the *SCG Change Indication IE*.

If the MeNB receives a SENB MODIFICATION REQUIRED message containing the *SCG Change Indication IE*, the MeNB shall act as specified in TS 36.300 [15].

If the MeNB is able to perform the modifications requested by the SeNB, the MeNB shall send the SENB MODIFICATION CONFIRM message to the SeNB. The SENB MODIFICATION CONFIRM message may contain the *MeNB to SeNB Container IE*.

Upon reception of the SENB MODIFICATION CONFIRM message the SeNB shall stop the timer $T_{DCoverall}$.

**Interaction with the MeNB initiated SeNB Modification Preparation procedure:**

If applicable, as specified in TS 36.300 [15], the SeNB may receive, after having initiated the SeNB initiated SeNB Modification procedure, the SENB MODIFICATION REQUEST message including the *DL Forwarding GTP Tunnel Endpoint IE* and the *UL Forwarding GTP Tunnel Endpoint IE* within the *E-RABs To Be Released List IE*.

If applicable, as specified in TS 36.300 [15], the SeNB may receive, after having initiated the SeNB initiated SeNB Modification procedure, the SENB MODIFICATION REQUEST message including the *SeNB Security Key IE* within the *UE Context Information IE*. 
If the SeNB has initiated the SeNB initiated SeNB Modification procedure with the SENB MODIFICATION REQUIRED message including the E-RABs To Be Released Item IE, it may receive the SENB MODIFICATION REQUEST message including the SCG Change Indication IE, upon which the SeNB shall provide respective information in the SeNB to MeNB Container IE within the SENB MODIFICATION REQUEST ACKNOWLEDGMENT message, as specified in TS 36.300 [15].

8.6.4.3 Unsuccessful Operation

![Diagram](image_url)

Figure 8.6.4.3-1: SeNB initiated SeNB Modification, unsuccessful operation.

In case the request modification cannot be performed successfully the MeNB shall respond with the SENB MODIFICATION REFUSE message to the SeNB with an appropriate cause value in the Cause IE.

The MeNB may also provide configuration information in the MeNB to SeNB Container IE.

8.6.4.4 Abnormal Conditions

If the timer TdCoverall expires before the SeNB has received the SENB MODIFICATION CONFIRM or the SENB MODIFICATION REFUSE message, the SeNB shall regard the requested modification as failed and may take further actions like triggering the SeNB initiated SeNB Release procedure to release all SeNB resources allocated for the UE.

If the MeNB is aware that the SeNB didn’t receive the latest configuration information concerning the MCG, the MeNB may respond with the SENB MODIFICATION REFUSE message to the SeNB with an appropriate cause value in the Cause IE.

If the value received in the E-RAB ID IE of any of the E-RABs To Be Released Items IE is not known at the MeNB, the MeNB shall regard the procedure as failed and may take appropriate actions like triggering the MeNB initiated SeNB Release procedure.

Interaction with the MeNB initiated SeNB Modification Preparation procedure:

If the SeNB, after having initiated the SeNB initiated SeNB Modification procedure, receives the SENB MODIFICATION REQUEST message including other IEs than an applicable SeNB Security Key IE and/or applicable forwarding addresses and/or the SCG Change Indication IE the SeNB shall

- regard the SeNB initiated SeNB Modification Procedure as being failed,
- stop the TdCoverall, which was started to supervise the SeNB initiated SeNB Modification procedure,
- be prepared to receive the SENB MODIFICATION REFUSE message from the MeNB and
- continue with the MeNB initiated SeNB Modification Preparation procedure as specified in section 8.6.3.

8.6.5 MeNB initiated SeNB Release

8.6.5.1 General

The MeNB initiated SeNB Release procedure is triggered by the MeNB to initiate the release of the resources for a specific UE.
The procedure uses UE-associated signalling.

### 8.6.5.2 Successful Operation

![Diagram](image)

**Figure 8.6.5.2-1: MeNB initiated SeNB Release, successful operation**

The MeNB initiates the procedure by sending the SENB RELEASE REQUEST message. Upon reception of the SENB RELEASE REQUEST message the SeNB shall stop providing user data to the UE. The `SeNB UE X2AP ID` IE and, if available, the `SeNB UE X2AP ID Extension` IE shall be included if it has been obtained from the SeNB. The MeNB may provide appropriate information within the `Cause` IE.

If the bearer context in the SeNB was configured with the SCG bearer option, for each SCG bearer for which the MeNB requests forwarding of uplink/downlink data, the MeNB includes the `UL Forwarding GTP Tunnel Endpoint` / `DL Forwarding GTP Tunnel Endpoint` IE within the `E-RABs To Be Released Item` IE of the SENB RELEASE REQUEST message to indicate that the SeNB should perform data forwarding of uplink/downlink packets for that SCG bearer.

If the bearer context in the SeNB was configured with the split bearer option, for each Split bearer for which the MeNB requests forwarding of downlink data, the MeNB includes the `DL Forwarding GTP Tunnel Endpoint` IE within the `E-RABs To Be Released Item` IE of the SENB RELEASE REQUEST message to indicate that the SeNB should perform data forwarding of downlink packets for that split bearer.

Upon reception of the SENB RELEASE REQUEST message containing `UE Context Kept Indicator` IE set to “True”, the SeNB shall, if supported, only initiate the release of the resources related to the UE-associated signalling connection between the MeNB and the SeNB.

Upon reception of the SENB RELEASE REQUEST message containing `MakeBeforeBreak Indicator` IE set to “True”, the SeNB shall, if supported, perform Make-Before-Break SeNB change as specified in TS 36.300 [15].

### 8.6.5.3 Unsuccessful Operation

Not applicable.

### 8.6.5.4 Abnormal Conditions

Should the SENB RELEASE REQUEST message refer to a context that does not exist, the SeNB shall ignore the message.

When the MeNB has initiated the procedure and did not include the `SeNB UE X2AP ID` IE the MeNB shall regard the resources for the UE at the SeNB as being fully released.

### 8.6.6 SeNB initiated SeNB Release

#### 8.6.6.1 General

This procedure is triggered by the SeNB to initiate the release of the resources for a specific UE.

The procedure uses UE-associated signalling.
8.6.6.2 Successful Operation

The SeNB initiates the procedure by sending the SENB RELEASE REQUIRED message to the MeNB.

Upon reception of the SENB RELEASE REQUIRED message, the MeNB replies with the SENB RELEASE CONFIRM message. For each E-RAB configured with the SCG bearer option, the MeNB may include the DL Forwarding GTP Tunnel Endpoint IE and the UL Forwarding GTP Tunnel Endpoint IE within the E-RABs To Be Released Item IE to indicate that it requests data forwarding of uplink and downlink packets to be performed for that bearer. For each E-RAB configured with the split bearer option, the MeNB may include the DL Forwarding GTP Tunnel Endpoint IE within the E-RABs To Be Released Item IE to indicate that it requests data forwarding of downlink packets to be performed for that bearer.

The SeNB may start data forwarding and stop providing user data to the UE upon reception of the SENB RELEASE CONFIRM message.

8.6.6.3 Unsuccessful Operation

Not applicable.

8.6.6.4 Abnormal Conditions

Void.

8.6.7 SeNB Counter Check

8.6.7.1 General

This procedure is initiated by the SeNB to request the MeNB to execute a counter check procedure to verify the value of the PDCP COUNTs associated with SCG bearers established in the SeNB.

The procedure uses UE-associated signalling.

8.6.7.2 Successful Operation

![Diagram of SeNB Counter Check procedure, successful operation.](image)
The SeNB initiates the procedure by sending the SENB COUNTER CHECK REQUEST message to the MeNB.
Upon reception of the SENB COUNTER CHECK REQUEST message, the MeNB may perform the RRC counter check procedure as defined in TS 33.401 [18].

8.6.7.3 Unsuccessful Operation
Not applicable.

8.6.7.4 Abnormal Conditions
Not applicable.

8.7 Procedures for E-UTRAN-NR Dual Connectivity

8.7.1 EN-DC X2 Setup

8.7.1.1 General
The purpose of the EN-DC X2 Setup procedure is to exchange application level configuration data needed for eNB and en-gNB to interoperate correctly over the X2 interface. This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also resets the X2 interface like a Reset procedure would do.

The procedure uses non UE-associated signalling.

8.7.1.2 Successful Operation

An eNB initiates the procedure by sending the EN-DC X2 SETUP REQUEST message to a candidate en-gNB. The candidate en-gNB replies with the EN-DC X2 SETUP RESPONSE message. The initiating eNB shall transfer the complete list of its served cells to the candidate en-gNB. The candidate en-gNB shall reply with the complete list of its served cells. If Supplementary Uplink is configured at the candidate en-gNB, the candidate en-gNB shall include in the
EN-DC X2 SETUP RESPONSE message the SUL Information IE and the Supported SUL band List IE for each served cell where supplementary uplink is configured.

If the EN-DC X2 SETUP REQUEST message contains the Protected E-UTRA Resource Indication IE, the receiving en-gNB should forward it to lower layers and use it for cell-level resource coordination with the eNB. The en-gNB shall consider the received Protected E-UTRA Resource Indication IE when expressing its desired resource allocation to the eNB during E-UTRA – NR Cell Resource Coordination procedure. The en-gNB shall consider the received Protected E-UTRA Resource Indication IE content valid until reception of a new update of the IE for the same eNB.

The protected resource pattern indicated in the Protected E-UTRA Resource Indication IE is not valid in subframes indicated by the Reserved Subframes IE, as well as in the non-control region of the MBSFN subframes i.e. it is valid only in the control region therein. The size of the control region of MBSFN subframes is indicated in the Protected E-UTRA Resource Indication IE.

en-gNB initiated EN-DC X2 Setup:
An en-gNB initiates the procedure by sending the EN-DC X2 SETUP REQUEST message to a candidate eNB. The candidate eNB replies with the EN-DC X2 SETUP RESPONSE message. The initiating en-gNB shall transfer the complete list of its served cells to the candidate eNB. The candidate eNB shall reply with the complete list of its served cells.

If Supplementary Uplink is configured at the en-gNB, the en-gNB shall include in the EN-DC X2 SETUP REQUEST message the SUL Information IE and the Supported SUL band List IE for each served cell where supplementary uplink is configured.

8.7.1.3 Unsuccessful Operation

![Diagram 1](#)

Figure 8.7.1.3-1: eNB Initiated EN-DC X2 Setup, unsuccessful operation

![Diagram 2](#)

Figure 8.7.1.3-2: en-gNB Initiated EN-DC X2 Setup, unsuccessful operation

If the candidate receiving node cannot accept the setup it shall respond with an EN-DC X2 SETUP FAILURE message with appropriate cause value.

8.7.1.4 Abnormal Conditions

If the first message received for a specific TNL association is not an EN-DC X2 SETUP REQUEST, EN-DC X2 SETUP RESPONSE, or EN-DC X2 SETUP FAILURE message then this shall be treated as a logical error.

If the initiating node does not receive either EN-DC X2 SETUP RESPONSE message or EN-DC X2 SETUP FAILURE message, the initiating node may reinitiate the EN-DC X2 Setup procedure towards the same candidate node, provided...
that the content of the EN-DC X2 SETUP REQUEST message is identical to the content of the previously unacknowledged EN-DC X2 SETUP REQUEST message.

8.7.2 EN-DC Configuration Update

8.7.2.1 General

The purpose of the EN-DC Configuration Update procedure is to update application level configuration data needed for eNB and en-gNB to interoperate correctly over the X2 interface.

The procedure uses non UE-associated signalling.

8.7.2.2 Successful Operation

![Diagram of EN-DC Configuration Update]

**eNB initiated EN-DC Configuration Update:**

An eNB initiates the procedure by sending an EN-DC CONFIGURATION UPDATE message to a peer en-gNB.

After successful update of requested information, en-gNB shall reply with the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message to inform the initiating eNB that the requested update of application data was performed successfully.

If the *Cell Assistance Information* IE is present, the en-gNB may use it to generate the *List of Served NR Cells* IE and include the list in the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message.

If the EN-DC CONFIGURATION UPDATE REQUEST message contains the Protected E-UTRA Resource Indication IE, the receiving en-gNB should forward it to lower layers and use it for cell-level resource coordination with the eNB. The en-gNB shall consider the received Protected E-UTRA Resource Indication IE when expressing its desired resource allocation to the eNB during E-UTRA – NR Cell Resource Coordination procedure. The en-gNB shall consider the received Protected E-UTRA Resource Indication IE content valid until reception of a new update of the IE for the same eNB.

The protected resource pattern indicated in the Protected E-UTRA Resource Indication IE is not valid in subframes indicated by the Reserved Subframes IE, as well as in the non-control region of the MBSFN subframes i.e. it is valid...
only in the control region therein. The size of the control region of MBSFN subframes is indicated in the Protected E-UTRA Resource Indication IE.

The eNB may initiate a further EN-DC Configuration Update procedure only after a previous EN-DC Configuration Update procedure has been completed.

If Supplementary Uplink is configured at the en-gNB, the en-gNB shall include in the EN-DC X2 CONFIGURATION UPDATE ACKNOWLEDGE message the SUL Information IE and the Supported SUL band List IE for each cell added in the Served NR Cells To Add IE and in the Served NR Cells To Modify IE.

**en-gNB initiated EN-DC Configuration Update:**

An en-gNB initiates the procedure by sending an EN-DC CONFIGURATION UPDATE message to an eNB.

If Supplementary Uplink is configured at the en-gNB, the en-gNB shall include in the EN-DC X2 CONFIGURATION UPDATE message the SUL Information IE and the Supported SUL band List IE for each served cell added in the Served NR Cells To Add IE and in the Served NR Cells To Modify IE.

If the Deactivation Indication IE is contained in the Served NR Cells To Modify IE, it indicates that the concerned NR cell was switched off to lower energy consumption, and is available for activation on request from the eNB, as described in TS 36.300 [15].

After successful update of requested information, eNB shall reply with the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message to inform the initiating en-gNB that the requested update of application data was performed successfully. In case the eNB receives an EN-DC CONFIGURATION UPDATE without any IE except for Message Type IE it shall reply with EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message without performing any updates to the existing configuration.

Upon reception of an EN-DC CONFIGURATION UPDATE message, eNB shall update the information for en-gNB as follows:

**Update of Served NR Cell Information:**

- If Served NR Cells To Add IE is contained in the EN-DC CONFIGURATION UPDATE message, eNB shall add cell information according to the information in the Served NR Cell Information IE.

- If Served NR Cells To Modify IE is contained in the EN-DC CONFIGURATION UPDATE message, eNB shall modify information of cell indicated by Old NR-CGI IE according to the information in the Served NR Cell Information IE.

- If Served NR Cells To Delete IE is contained in the EN-DC CONFIGURATION UPDATE message, eNB shall delete information of cell indicated by Old NR-CGI IE.

The en-gNB may initiate a further EN-DC Configuration Update procedure only after a previous EN-DC Configuration Update procedure has been completed.

**8.7.2.3 Unsuccessful Operation**

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**Figure 8.7.2.3-1: eNB Initiated EN-DC Configuration Update, unsuccessful operation**
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8.7.2.3-2: en-gNB Initiated EN-DC Configuration Update, unsuccessful operation

If the candidate receiving node can not accept the update it shall respond with an EN-DC CONFIGURATION UPDATE FAILURE message and appropriate cause value.

8.7.2.4 Abnormal Conditions

If the initiating node after initiating EN-DC Configuration Update procedure receives neither EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message nor EN-DC CONFIGURATION UPDATE FAILURE message, the initiating node may reinitiate the EN-DC Configuration Update procedure towards the same candidate receiving node, provided that the content of the EN-DC CONFIGURATION UPDATE message is identical to the content of the previously unacknowledged EN-DC CONFIGURATION UPDATE message.

8.7.3 EN-DC Cell Activation

8.7.3.1 General

The purpose of the EN-DC Cell Activation procedure is to enable an eNB to request a neighbouring en-gNB to switch on one or more cells, previously reported as inactive due to energy saving reasons.

The procedure uses non UE-associated signalling.

8.7.3.2 Successful Operation

An eNB initiates the procedure by sending a EN-DC CELL ACTIVATION REQUEST message to a peer en-gNB.

Upon receipt of this message, the en-gNB should activate the cell(s) indicated in the EN-DC CELL ACTIVATION REQUEST message and shall indicate in the EN-DC CELL ACTIVATION RESPONSE message for which cells the request was fulfilled.

Interactions with EN-DC Configuration Update procedure:

The en-gNB shall not send an EN-DC CONFIGURATION UPDATE message to the eNB just for the reason of the cell(s) indicated in the EN-DC CELL ACTIVATION REQUEST message changing cell activation state, as the receipt of the EN-DC CELL ACTIVATION RESPONSE message by the eNB is used to update the information about the activation state of en-gNB cells in the eNB.
8.7.3.3 Unsuccessful Operation

If the en-gNB cannot activate any of the cells indicated in the EN-DC CELL ACTIVATION REQUEST message, it shall respond with a EN-DC CELL ACTIVATION FAILURE message with an appropriate cause value.

8.7.3.4 Abnormal Conditions

Not applicable.

8.7.4 SgNB Addition Preparation

8.7.4.1 General

The purpose of the SgNB Addition Preparation procedure is to request the en-gNB to allocate resources for EN-DC connectivity operation for a specific UE.

The procedure uses UE-associated signalling.

8.7.4.2 Successful Operation

The MeNB initiates the procedure by sending the SGNB ADDITION REQUEST message to the en-gNB. When the MeNB sends the SGNB ADDITION REQUEST message, it shall start the timer T_{DCprep}.

The allocation of resources according to the values of the Allocation and Retention Priority IE included in the Full E-RAB Level QoS Parameters IE or in the Maximum MCG admissible E-RAB Level QoS Parameters IE or in the Requested MCG E-RAB Level QoS Parameters IE or in the Requested SCG E-RAB Level QoS Parameters IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [4].

If the SGNB ADDITION REQUEST message contains the Serving PLMN IE, the en-gNB may use it for RRM purposes.

If the SGNB ADDITION REQUEST message contains the Expected UE Behaviour IE, the en-gNB shall, if supported, store this information and may use it to optimize resource allocation.
If the SGNB ADDITION REQUEST message contains the Handover Restriction List IE, the en-gNB node, if supported, shall store this information and use it to select an appropriate NR cell.

If the SGNB ADDITION REQUEST message contains the MeNB Resource Coordination Information IE, the en-gNB should forward it to lower layers and it may use it for the purpose of resource coordination with the MeNB. The en-gNB shall consider the received UL Coordination Information IE value valid until reception of a new update of the IE for the same UE. The en-gNB shall consider the received DL Coordination Information IE value valid until reception of a new update of the IE for the same UE.

The en-gNB shall choose the ciphering algorithm based on the information in the NR UE Security Capabilities IE and locally configured priority list of AS encryption algorithms and apply the key indicated in the SgNB Security Key IE as specified in the TS 33.401 [18].

If the SGNB ADDITION REQUEST message contains the Subscriber Profile ID for RAT/Frequency Priority IE, the en-gNB may use it for RRM purposes.

The en-gNB shall search for the target NR cell among the NR neighbour cells of the E-UTRAN cell indicated in MeNB Cell ID IE, as specified in the TS 37.340 [32].

The en-gNB shall report to the MeNB, in the SGNB ADDITION REQUEST ACKNOWLEDGE message, the result for all the requested E-RABs in the following way:

- a list of E-RABs which are successfully established shall be included in the E-RABs Admitted To Be Added List IE;
- a list of E-RABs which failed to be established shall be included in the E-RABs Not Admitted List IE.

NOTE: The MeNB may trigger the SgNB Addition Preparation procedure in the course of the Inter-MeNB handover without SgNB change procedure as described in TS 37.340 [32]. The deleted E-RABs are not included in the E-RABS To be Added List IE in the SGNB ADDITION REQUEST message, from MeNB point of view. If the en-gNB reports a certain E-RAB to be successfully established, respective SCG resources, from an en-gNB point of view, may be actually successfully established or modified or kept; if a certain E-RAB is reported to be failed to be established, respective SCG resources, from an en-gNB point of view, may be actually failed to be established or modified or kept.

For each E-RAB for which allocation of the PDCP entity is requested at the en-gNB:

- the MeNB may propose to apply forwarding of downlink data by including the DL Forwarding IE within the E-RABs To be Added Item IE of the SGNB ADDITION REQUEST message. For each E-RAB that it has decided to admit, the en-gNB may include the DL Forwarding GTP Tunnel Endpoint IE within the E-RABs Admitted To Be Added Item IE of the SGNB ADDITION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer. This GTP tunnel endpoint may be different from the corresponding DL GTP TEID IE in the E-RAB To Be Modified List IE of the E-RAB MODIFICATION INDICATION message (see TS 36.413 [4]) depending on implementation choice;
- the en-gNB may include for each bearer in the E-RABS Admitted To Be Added List IE the UL Forwarding GTP Tunnel Endpoint IE to indicate that it requests data forwarding of uplink packets to be performed for that bearer.
- the en-gNB shall use the SI UL GTP Tunnel Endpoint IE of the SGNB ADDITION REQUEST message as the UL S1-U address.
- the MeNB shall use the SgNB UL GTP TEID at PDCP IE of the SGNB ADDITION REQUEST ACKNOWLEDGE message as the UL X2-U address.
- if the SGNB ADDITION REQUEST message contains for an E-RAB to be added which is requested to be configured with MCG resources the MeNB DL GTP TEID at MCG IE the en-gNB shall use it as the DL X2-U address for delivery of DL PDCP PDUs.
- the en-gNB shall include in the SGNB ADDITION REQUEST ACKNOWLEDGE message the SI DL GTP TEID at the SgNB IE.
- the en-gNB shall include in the SGNB ADDITION REQUEST ACKNOWLEDGE message the RLC Mode IE.

Upon reception of the SGNB ADDITION REQUEST ACKNOWLEDGE message the MeNB shall stop the timer T_{DPCPprep}.
If the SGNB ADDITION ACKNOWLEDGE message contains the SgNB Resource Coordination Information IE, the MeNB may use it for the purpose of resource coordination with the en-gNB. The MeNB shall consider the received UL Coordination Information IE value valid until reception of a new update of the IE for the same UE. The MeNB shall consider the received DL Coordination Information IE value valid until reception of a new update of the IE for the same UE.

If the SgNB UE X2AP ID IE is contained in the SGNB ADDITION REQUEST message, the en-gNB shall, if supported, store this information and use it as defined in TS 37.340 [32].

If the SGNB ADDITION REQUEST message contains the SGNB Addition Trigger Indication, the en-gNB shall include the RRC config indication IE in the SGNB ADDITION REQUEST ACKNOWLEDGE message to inform the MeNB if the en-gNB applied full or delta configuration, as specified in TS 37.340 [32].

If the en-gNB receives for an E-RAB for which the PDCP entity is allocated at the MeNB the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB ADDITION REQUEST message, it may provide the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB ADDITION REQUEST ACKNOWLEDGE message if PDCP duplication is configured at the en-gNB.

Interactions with the MeNB initiated SgNB Modification procedure:

If the en-gNB provides for an E-RAB for which the PDCP entity is allocated at the MeNB the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB ADDITION REQUEST message and the MeNB has not provided the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB ADDITION REQUEST message, the MeNB shall trigger the MeNB initiated SgNB Modification procedure to provide the Secondary MeNB UL GTP TEID at PDCP IE to the SgNB.

Interactions with the SgNB Reconfiguration Completion procedure:

If the en-gNB admits at least one E-RAB, the en-gNB shall start the timer $T_{DCoverall}$ when sending the SGNB ADDITION REQUEST ACKNOWLEDGE message to the MeNB. The reception of the SGNB RECONFIGURATION COMPLETE message shall stop the timer $T_{DCoverall}$.

8.7.4.3 Unsuccessful Operation

If the en-gNB is not able to accept any of the bearers or a failure occurs during the SgNB Addition Preparation, the en-gNB sends the SGNB ADDITION REQUEST REJECT message with an appropriate cause value to the MeNB.

8.7.4.4 Abnormal Conditions

If the en-gNB receives a SGNB ADDITION REQUEST message containing multiple E-RAB ID IEs (in the E-RABs To Be Added List IEs) set to the same value, the en-gNB shall consider the establishment of the corresponding E-RAB as failed.

If the en-gNB receives a SGNB ADDITION REQUEST message containing a E-RAB Level QoS Parameters IE which contains a QCI IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the GBR QoS Information IE, the en-gNB shall consider the establishment of the corresponding E-RAB as failed.

If the supported algorithms for encryption defined in the NR Encryption Algorithms IE in the NR UE Security Capabilities IE, plus the mandated support of NEA0 in all UEs (TS 33.401 [18]), do not match any algorithms defined
in the configured list of allowed encryption algorithms in the en-gNB (TS 33.401 [18]), the en-gNB shall reject the procedure using the SGNB ADDITION REQUEST REJECT message.

If the supported algorithms for integrity defined in the NR Integrity Protection Algorithms IE in the NR UE Security Capabilities IE do not match any algorithms defined in the configured list of allowed integrity protection algorithms in the en-gNB (TS 33.401 [18]), the en-gNB shall reject the procedure using the SGNB ADDITION REQUEST REJECT message.

If the en-gNB receives a SGNB ADDITION REQUEST message containing a SgNB UE X2AP ID IE that does not match any existing UE Context that has such ID, the en-gNB shall reject the procedure using the SGNB ADDITION REQUEST REJECT message.

If the MeNB has provided the en-gNB for an E-RAB for which the PDCP entity is allocated at the MeNB the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB ADDITION REQUEST message, and the en-gNB does not provide the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB ADDITION REQUEST ACKNOWLEDGE message, the MeNB shall assume that PDCP duplication was not configured at the en-gNB and releases duplication resources.

If the en-gNB provides for an E-RAB for which the PDCP entity is allocated at the MeNB the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB ADDITION REQUEST ACKNOWLEDGE message and the MeNB has not provided the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB ADDITION REQUEST message, and the MeNB does not trigger the MeNB initiated SgNB Modification procedure to provide the Secondary MeNB UL GTP TEID at PDCP IE to the SgNB the en-gNB before the SgNB Reconfiguration Completion procedure was triggered, the en-gNB shall trigger the release of the concerned E-RAB.

Interactions with the SgNB Reconfiguration Completion and SgNB initiated SgNB Release procedure:

If the timer TDCoverall expires before the en-gNB has received the SGNB RECONFIGURATION COMPLETE or the SGNB RELEASE REQUEST message, the en-gNB shall regard the requested RRC connection reconfiguration as being not applied by the UE and shall trigger the SgNB initiated SgNB Release procedure.

Interactions with the MeNB initiated SgNB Release procedure:

If the timer TDCprep expires before the MeNB has received the SGNB ADDITION REQUEST ACKNOWLEDGE message, the MeNB shall regard the SgNB Addition Preparation procedure as being failed and shall trigger the MeNB initiated SgNB Release procedure.

8.7.5 SgNB Reconfiguration Completion

8.7.5.1 General

The purpose of the SgNB Reconfiguration Completion procedure is to provide information to the en-gNB whether the requested configuration was successfully applied by the UE.

The procedure uses UE-associated signalling.

8.7.5.2 Successful Operation

![Figure 8.7.5.2-1: SgNB Reconfiguration Complete procedure, successful operation.](image)

The MeNB initiates the procedure by sending the SGNB RECONFIGURATION COMPLETE message to the en-gNB.
The SGNB RECONFIGURATION COMPLETE message may contain information that
- either the UE has successfully applied the configuration requested by the en-gNB. The MeNB may also provide NR \textit{RRCReconfigurationComplete} message in the \textit{MeNB to SgNB Container} IE.
- or the configuration requested by the en-gNB has been rejected. The MeNB shall provide information with sufficient precision in the included \textit{Cause} IE to enable the en-gNB to know the reason for an unsuccessful reconfiguration.

Upon reception of the SGNB RECONFIGURATION COMPLETE message the en-gNB shall stop the timer $T_{DCoverall}$.

8.7.5.3 Abnormal Conditions

Void.

8.7.6 MeNB initiated SgNB Modification Preparation

8.7.6.1 General

This procedure is used to enable an MeNB to request an en-gNB to modify the UE context at the en-gNB, or to query the current SCG configuration for supporting delta signalling in MeNB initiated SgNB change, or to provide the S-RLF-related information to the en-gNB.

The procedure uses UE-associated signalling.

8.7.6.2 Successful Operation

The MeNB initiates the procedure by sending the SGNB MODIFICATION REQUEST message to the en-gNB. When the MeNB sends the SGNB MODIFICATION REQUEST message, it shall start the timer $T_{DCprep}$.

The SGNB MODIFICATION REQUEST message may contain:
- within the \textit{UE Context Information} IE (if the modification of the UE context at the en-gNB is requested):
  - E-RABs to be added within the \textit{E-RABs To Be Added Item} IE;
  - E-RABs to be modified within the \textit{E-RABs To Be Modified Item} IE;
  - E-RABs to be released within the \textit{E-RABs To Be Released Item} IE;
  - the \textit{SgNB UE Aggregate Maximum Bit Rate} IE;
- the \textit{MeNB to SgNB Container} IE;
- the \textit{SCG Configuration Query} IE;
- the \textit{MeNB Resource Coordination Information} IE;
- the \textit{Requested split SRBs} IE;
- the Requested split SRBs release IE.

If the SGNB MODIFICATION REQUEST message contains the Serving PLMN IE, the en-gNB may use it for RRM purposes.

If the SGNB MODIFICATION REQUEST message contains the Handover Restriction List IE, the en-gNB shall

- replace the previously provided Handover Restriction List by the received Handover Restriction List in the UE context;
- use this information to select an appropriate NR cell.

If the SgNB UE Aggregate Maximum Bit Rate IE is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall:

- replace the previously provided SgNB UE Aggregate Maximum Bit Rate by the received SgNB UE Aggregate Maximum Bit Rate in the UE context;
- use the received SgNB UE Aggregate Maximum Bit Rate for non-GBR Bearers for the concerned UE as defined in TS 37.340 [32].

The allocation of resources according to the values of the QCI IE, Allocation and Retention Priority IE or GBR QoS Information IE included in the Full E-RAB Level QoS Parameters IE or in the Maximum MCG admissible E-RAB Level QoS Parameters IE or in the Requested SCG E-RAB Level QoS Parameters IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [4].

If the SGNB MODIFICATION REQUEST message contains the MeNB Resource Coordination Information IE, the en-gNB should forward it to lower layers and it may use it for the purpose of resource coordination with the MeNB. The en-gNB shall consider the received UL Coordination Information IE value valid until reception of a new update of the IE for the same UE. The en-gNB shall consider the received DL Coordination Information IE value valid until reception of a new update of the IE for the same UE.

If at least one of the requested modifications is admitted by the en-gNB, the en-gNB shall modify the related part of the UE context accordingly and send the SGNB MODIFICATION REQUEST ACKNOWLEDGE message back to the MeNB.

The en-gNB shall include the E-RABs for which resources have been either added or modified or released at the en-gNB either in the E-RABs Admitted To Be Added List IE or the E-RABs Admitted To Be Modified List IE or the E-RABs Admitted To Be Released List IE. The en-gNB shall include the E-RABs that have not been admitted in the E-RABs Not Admitted List IE with an appropriate cause value.

The en-gNB shall, if included, choose the ciphering algorithm based on the information in the NR UE Security Capabilities IE and locally configured priority list of AS encryption algorithms and apply the key indicated in the SgNB Security Key IE as specified in the TS 33.401 [18].

For each E-RAB for which allocation of the PDCP entity is requested at the en-gNB:

- if applicable, the MeNB may propose to apply forwarding of downlink data by including the DL Forwarding IE within the E-RABs To Be Added Item IE of the SGNB MODIFICATION REQUEST message. For each E-RAB that it has decided to admit, the en-gNB may include the DL Forwarding GTP Tunnel Endpoint IE within the E-RABs Admitted To Be Added Item IE of the SGNB MODIFICATION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer. The MeNB may also provide for an applicable E-RAB to be released the DL Forwarding GTP Tunnel Endpoint IE and the UL Forwarding GTP Tunnel Endpoint IE within the E-RABs To Be Released Item IE of the SGNB MODIFICATION REQUEST message.
- if applicable, the en-gNB may include for each bearer in the E-RABs Admitted To Be Added List IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the UL Forwarding GTP Tunnel Endpoint IE to indicate that it requests data forwarding of uplink packets to be performed for that bearer.
- if applicable, the en-gNB may include for each bearer in the E-RABs Admitted To Be Modified List IE which is configured with the SN terminated split bearer option in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the UL configuration IE to indicate that the MCG UL configuration of the UE has changed.
For each E-RAB configured with SCG resources and the PDCP entity is hosted by the MeNB and

- requested to be modified,
  
  - if the SGNB MODIFICATION REQUEST message includes the MeNB UL GTP TEID at PDCP IE in the E-RABs To Be Modified Item IE, the en-gNB shall act as specified in TS 37.340 [32].
  
  - if the SGNB MODIFICATION REQUEST message contains the MeNB UL GTP TEID at PDCP IE the en-gNB shall use it as the new UL X2-U address.
  
  - the en-gNB may include in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the SgNB DL GTP TEID at SCG IE.

If, dependent on the configured bearer type, the Full E-RAB Level QoS Parameters IE or the Maximum MCG admissible E-RAB Level QoS Parameters IE or the Requested SCG E-RAB level QoS Parameters IE are included in the SGNB MODIFICATION REQUEST message for an E-RAB to be modified the en-gNB shall allocate respective resources and provide corresponding radio configuration information within the SgNB to MeNB Container IE as described in TS 37.340 [32].

If the SGNB MODIFICATION REQUEST message contains, for an E-RAB to be modified which is configured with the PDCP entity in the en-gNB, the SI UL GTP Tunnel Endpoint IE, the en-gNB shall use it as the new UL S1-U address.

If the SGNB MODIFICATION REQUEST message contains an E-RAB to be modified which is configured with the PDCP entity in the en-gNB and the MN terminated split bearer option, the MeNB may include the UL configuration IE to indicate that the SCG UL configuration of the UE has changed.

If the SGNB MODIFICATION REQUEST message contains for an E-RAB to be modified which is configured with the PDCP entity in the en-gNB and MCG resources the MeNB DL GTP TEID at MCG IE the en-gNB shall use it as the DL X2-U address.

If the SGNB MODIFICATION REQUEST message contains the Subscriber Profile ID for RAT/Frequency Priority IE, the en-gNB may use it for RRM purposes.

For an E-RAB to be modified which is configured with the PDCP entity in the en-gNB the en-gNB may include in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the SI DL GTP TEID at the SgNB IE.

If the SGNB MODIFICATION REQUEST message contains the Requested split SRBs IE, the en-gNB may use it to add split SRBs. If the SGNB MODIFICATION REQUEST message contains the Requested split SRBs release IE, the en-gNB may use it to release split SRBs.

If the MeNB receives for an E-RAB to be setup for which the PDCP entity is allocated at the MeNB the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB MODIFICATION REQUEST message, it may provide the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message if PDCP duplication is configured at the en-gNB.

**Interactions with the MeNB initiated SgNB Modification procedure:**

If the en-gNB provides for an E-RAB to be setup for which the PDCP entity is allocated at the MeNB the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message and the MeNB has not provided the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB MODIFICATION
REQUEST message, the MeNB shall trigger the MeNB initiated SgNB Modification procedure to provide the Secondary MeNB UL GTP TEID at PDCP IE to the SgNB.

Interactions with the SgNB Reconfiguration Completion procedure:

If the en-gNB admits a modification of the UE context requiring the MeNB to report about the success of the RRC connection reconfiguration procedure, the en-gNB shall start the timer T_{DCoverall} when sending the SGNB MODIFICATION REQUEST ACKNOWLEDGE message to the MeNB. The reception of the SGNB RECONFIGURATION COMPLETE message shall stop the timer T_{DCoverall}.

8.7.6.3 Unsuccessful Operation

If the en-gNB does not admit any modification requested by the MeNB, or a failure occurs during the MeNB initiated SgNB Modification Preparation, the en-gNB shall send the SGNB MODIFICATION REQUEST REJECT message to the MeNB. The message shall contain the Cause IE with an appropriate value.

If the en-gNB receives a SGNB MODIFICATION REQUEST message containing the MeNB to SgNB Container IE that does not include required information as specified in TS 38.331 [31], the en-gNB shall send the SGNB MODIFICATION REQUEST REJECT message to the MeNB.

8.7.6.4 Abnormal Conditions

If the en-gNB receives a SGNB MODIFICATION REQUEST message containing multiple E-RAB ID IEs (in the E-RABs To Be Added List IE and/or the E-RABs To Be Modified List IE) set to the same value, the en-gNB shall not admit the action requested for the corresponding E-RABs.

If the en-gNB receives an SGNB MODIFICATION REQUEST message containing multiple E-RAB ID IEs (in the E-RAB To Be Released List IE) set to the same value, the en-gNB shall initiate the release of one corresponding E-RAB and ignore the duplication of the instances of the selected corresponding E-RABs.

If the en-gNB receives a SGNB MODIFICATION REQUEST message containing, dependent on the configured bearer type, the Full E-RAB Level QoS Parameters IE or the Maximum MCG admissible E-RAB Level QoS Parameters IE or the Requested SCG E-RAB Level QoS Parameters IE which contains a QCI IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the GBR QoS Information IE, the en-gNB shall not admit the corresponding E-RAB.

If the supported algorithms for encryption defined in the NR Encryption Algorithms IE in the NR UE Security Capabilities IE in the UE Context Information IE, plus the mandated support of NEA0 in all UEs (TS 33.401 [18]), do not match any algorithms defined in the configured list of allowed encryption algorithms in the en-gNB (TS 33.401 [18]), the en-gNB shall reject the procedure using the SGNB MODIFICATION REQUEST REJECT message.

If the supported algorithms for integrity defined in the NR Integrity Protection Algorithms IE in the NR UE Security Capabilities IE in the UE Context Information IE do not match any algorithms defined in the configured list of allowed integrity protection algorithms in the en-gNB (TS 33.401 [18]), the en-gNB shall reject the procedure using the SGNB MODIFICATION REQUEST REJECT message.
If the timer $T_{DC_{overall}}$ expires before the en-gNB has received the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the en-gNB shall regard the SgNB Modification Preparation procedure as being failed and may trigger the SgNB initiated SgNB Release procedure.

Interaction with the SgNB initiated SgNB Modification Preparation procedure:

If the MeNB, after having initiated the MeNB initiated SgNB Modification procedure, receives the SGNB MODIFICATION REQUIRED message, the MeNB shall refuse the SgNB initiated SgNB Modification procedure with an appropriate cause value in the Cause IE.

If the MeNB has a Prepared SgNB Modification and receives the SGNB MODIFICATION REQUIRED message, the MeNB shall respond with the SGNB MODIFICATION REFUSE message to the en-gNB with an appropriate cause value in the Cause IE.

Interaction with the MeNB initiated SgNB Release procedure:

If the timer $T_{DC_{prep}}$ expires before the MeNB has received the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall regard the MeNB initiated SgNB Modification Preparation procedure as being failed and shall release the UE Context at the en-gNB.

If the MeNB has provided the en-gNB for an E-RAB to be setupr which the PDCP entity is allocated at the MeNB the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB MODIFICATION REQUEST message, and the en-gNB does not provide the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall assume that PDCP duplication was not configured at the en-gNB and releases duplication resources.

If the en-gNB provides for an E-RAB to be setup for which the PDCP entity is allocated at the MeNB the Secondary SgNB DL GTP TEID at SCG IE to the MeNB in the SGNB MODIFICATION REQUEST message and the MeNB has not provided the Secondary MeNB UL GTP TEID at PDCP IE in the SGNB MODIFICATION REQUEST message, and the MeNB does not trigger the MeNB initiated SgNB Modification procedure to provide the Secondary MeNB UL GTP TEID at PDCP IE to the SgNB before the SgNB Reconfiguration Completion procedure was triggered, the en-gNB shall trigger the release of the concerned E-RAB.

**Interactions with the SgNB Reconfiguration Completion and SgNB initiated SgNB Release procedure:**

If the timer $T_{DC_{overall}}$ expires before the en-gNB has received the SGNB RECONFIGURATION COMPLETE or the SGNB RELEASE REQUEST message, the en-gNB shall regard the requested modification RRC connection reconfiguration as being not applied by the UE and shall trigger the SgNB initiated SgNB Release procedure.

**Interaction with the SgNB initiated SgNB Modification Preparation procedure:**

If the MeNB, after having initiated the MeNB initiated SgNB Modification procedure, receives the SGNB MODIFICATION REQUIRED message, the MeNB shall refuse the SgNB initiated SgNB Modification procedure with an appropriate cause value in the Cause IE.

If the MeNB has a Prepared SgNB Modification and receives the SGNB MODIFICATION REQUIRED message, the MeNB shall respond with the SGNB MODIFICATION REFUSE message to the en-gNB with an appropriate cause value in the Cause IE.

**Interactions with the MeNB initiated SgNB Release procedure:**

If the timer $T_{DC_{prep}}$ expires before the MeNB has received the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall regard the SgNB Modification Preparation procedure as being failed and may trigger the MeNB initiated SgNB Release procedure.

### 8.7.7 SgNB initiated SgNB Modification

#### 8.7.7.1 General

This procedure is used by the en-gNB to modify the UE context in the en-gNB.

The procedure uses UE-associated signalling.

#### 8.7.7.2 Successful Operation

![Figure 8.7.7.2-1: SgNB initiated SgNB Modification, successful operation.](image-url)
The en-gNB initiates the procedure by sending the SGNB MODIFICATION REQUIRED message to the MeNB. When the en-gNB sends the SGNB MODIFICATION REQUIRED message, it shall start the timer T_{DCoverall}.

The SGNB MODIFICATION REQUIRED message may contain

- the *PDCP Change Indication* IE;
- the *SgNB to MeNB Container* IE.
- E-RABs to be modified within the *E-RABs To Be Modified Item* IE;
- E-RABs to be released within the *E-RABs To Be Released Item* IE;
- the *SgNB Resource Coordination Information* IE.

For the SN terminated split bearers, the en-gNB may include in the SGNB MODIFICATION REQUIRED message the *UL configuration* IE to indicate that the MCG UL configuration of the UE has changed.

If the MeNB is able to perform the change requested by the en-gNB, the MeNB shall send the SGNB MODIFICATION CONFIRM message to the en-gNB. The SGNB MODIFICATION CONFIRM message may contain the *MeNB to SgNB Container* IE.

If the SGNB MODIFICATION REQUIRED message contains the *SgNB Resource Coordination Information* IE, the MeNB may use it for the purpose of resource coordination with the en-gNB. The MeNB shall consider the received *UL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. The MeNB shall consider the received *DL Coordination Information* IE value valid until reception of a new update of the IE for the same UE.

Upon reception of the SGNB MODIFICATION CONFIRM message the en-gNB shall stop the timer T_{DCoverall}.

If the SGNB MODIFICATION CONFIRM message contains the *MeNB Resource Coordination Information* IE, the en-gNB may include in the SGNB MODIFICATION REQUIRED message the *MeNB Resource Coordination Information* IE. The en-gNB should forward it to lower layers and it may use it for the purpose of resource coordination with the MeNB. The en-gNB shall consider the received *UL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. The en-gNB shall consider the received *DL Coordination Information* IE value valid until reception of a new update of the IE for the same UE.

If the MeNB receives for an E-RAB for which the PDCP entity is allocated at the MeNB the *Secondary SgNB DL GTP TEID at SCG* IE in the SGNB MODIFICATION REQUIRED message, it shall provide the *Secondary MeNB UL GTP TEID at PDCP* IE to the en-gNB in the SGNB MODIFICATION CONFIRM message.

### Interaction with the MeNB initiated SgNB Modification Preparation procedure:

If applicable, as specified in TS 37.340 [15], the en-gNB may receive, after having initiated the SgNB Modification procedure, the SGNB MODIFICATION REQUEST message including the *DL Forwarding GTP Tunnel Endpoint* IE and the *UL Forwarding GTP Tunnel Endpoint* IE within the *E-RABs To Be Released List* IE.

If applicable, as specified in TS 37.340 [15], the en-gNB may receive, after having initiated the SgNB Modification procedure, the SGNB MODIFICATION REQUEST message including the *SgNB Security Key* IE within the *UE Context Information* IE.
8.7.7.3 Unsuccessful Operation

In case the request modification cannot be performed successfully the MeNB shall respond with the SGNB MODIFICATION REFUSE message to the en-gNB with an appropriate cause value in the Cause IE.

The MeNB may also provide configuration information in the MeNB to SgNB Container IE.

8.7.7.4 Abnormal Conditions

If the timer T_{Doverall} expires before the en-gNB has received the SGNB MODIFICATION CONFIRM or the SGNB MODIFICATION REFUSE message, the en-gNB shall regard the requested modification as failed and may take further actions like triggering the SgNB initiated SgNB Release procedure to release all en-gNB resources allocated for the UE.

If the value received in the E-RAB ID IE of any of the E-RABs To Be Released Items IE is not known at the MeNB, the MeNB shall regard the procedure as failed and may take appropriate actions like triggering the MeNB initiated SgNB Release procedure.

If the en-gNB does not receive for an E-RAB for which the PDCP entity is allocated at the MeNB the Secondary MeNB UL GTP TEID at PDCP IE to the en-gNB in the SGNB MODIFICATION CONFIRM message although the Secondary SgNB DL GTP TEID at SCG IE was provided to the MeNB in the SGNB MODIFICATION REQUIRED message, it shall assume the setup of the secondary X2-U bearer as being failed.

Interaction with the MeNB initiated SgNB Modification Preparation procedure:

If the en-gNB, after having initiated the SgNB initiated SgNB Modification procedure, receives the SGNB MODIFICATION REQUEST message including other IEs than an applicable SgNB Security Key IE and/or applicable forwarding addresses, the en-gNB shall

- regard the SgNB initiated SgNB Modification Procedure as being failed;
- stop the T_{Doverall}, which was started to supervise the SgNB initiated SgNB Modification procedure;
- be prepared to receive the SGNB MODIFICATION REFUSE message from the MeNB and;
- continue with the MeNB initiated SgNB Modification Preparation procedure as specified in section 8.7.4.

Interaction with the MeNB initiated handover procedure:

If the MeNB, after having initiated the handover procedure, receives the SGNB MODIFICATION REQUIRED message, the MeNB shall refuse the SgNB modification procedure with an appropriate cause value in the Cause IE.

8.7.8 SgNB Change

8.7.8.1 General

This procedure is used by the en-gNB to change to another en-gNB.

The procedure uses UE-associated signalling.
8.7.8.2 Successful Operation

The en-gNB initiates the procedure by sending the SGNB CHANGE REQUIRED message to the MeNB including the Target SgNB ID Information IE. When the en-gNB sends the SGNB CHANGE REQUIRED message, it shall start the timer TDCoverall.

The SGNB CHANGE REQUIRED message may contain

- the SgNB to MeNB Container IE.

If the MeNB is able to perform the change requested by the en-gNB, the MeNB shall send the SGNB CHANGE CONFIRM message to the en-gNB. For each E-RAB configured with the PDCP entity in the en-gNB, the MeNB may include the DL Forwarding GTP Tunnel Endpoint IE and the UL Forwarding GTP Tunnel Endpoint IE within the E-RABs To Be Released Item IE to indicate that it requests data forwarding of uplink and downlink packets to be performed for that bearer.

The en-gNB may start data forwarding and stop providing user data to the UE and shall stop the timer TDCoverall upon reception of the SGNB CHANGE CONFIRM message.

8.7.8.3 Unsuccessful Operation

In case the request change cannot be performed successfully the MeNB shall respond with the SGNB CHANGE REFUSE message to the en-gNB with an appropriate cause value in the Cause IE.

8.7.8.4 Abnormal Conditions

If the timer TDCoverall expires before the en-gNB has received the SGNB CHANGE CONFIRM or the SGNB CHANGE REFUSE message, the en-gNB shall regard the requested change as failed and may take further actions like triggering the SgNB initiated SgNB Release procedure to release all en-gNB resources allocated for the UE.

Interaction with the MeNB initiated handover procedure:

---

Figure 8.7.8.2-1: SgNB Change, successful operation.

Figure 8.7.8.3-1: SgNB Change, unsuccessful operation.
If the MeNB, after having initiated the handover procedure, receives the SGNB CHANGE REQUIRED message, the MeNB shall refuse the SgNB change procedure with an appropriate cause value in the Cause IE.

8.7.9 MeNB initiated SgNB Release

8.7.9.1 General

The MeNB initiated SgNB Release procedure is triggered by the MeNB to initiate the release of the resources for a specific UE.

The procedure uses UE-associated signalling.

8.7.9.2 Successful Operation

The MeNB initiates the procedure by sending the SGNB RELEASE REQUEST message. Upon reception of the SGNB RELEASE REQUEST message the en-gNB shall stop providing user data to the UE. The SgNB UE X2AP ID IE shall be included if it has been obtained from the en-gNB.

If the bearer context in the en-gNB was configured with the PDCP entity in the en-gNB, for E-RAB for which the MeNB requests forwarding of uplink/downlink data, the MeNB includes the UL Forwarding GTP Tunnel Endpoint/ DL Forwarding GTP Tunnel Endpoint IE within the E-RABs To Be Released Item IE of the SGNB RELEASE REQUEST message to indicate that the en-gNB should perform data forwarding of uplink/downlink packets for that E-RAB.

Upon reception of the SGNB RELEASE REQUEST message containing UE Context Kept Indicator IE set to “True”, the en-gNB shall, if supported, only initiate the release of the resources related to the UE-associated signalling connection between the MeNB and the en-gNB.

If the en-gNB confirms the request to release en-gNB resources it shall send the SGNB RELEASE REQUEST ACKNOWLEDGE message to the MeNB.

8.7.9.3 Unsuccessful Operation

If the en-gNB cannot confirm the request to release en-gNB resources it shall send the SGNB RELEASE REQUEST REJECT message to the MeNB with an appropriate cause indicated in the Cause IE.

8.7.9.4 Abnormal Conditions

If the SGNB RELEASE REQUEST message refer to a context that does not exist, the en-gNB shall ignore the message.
When the MeNB has initiated the procedure and did not include the $SgNB \ UE \ X2AP \ ID$ IE the MeNB shall regard the resources for the UE at the en-gNB as being fully released.

**Interactions with the UE Context Release procedure:**

If the MeNB does not receive the reply from the en-gNB before it has to release the EN-DC connection, or it receives $SgNB \ RELEASE \ REQUEST \ REJECT$, it may trigger the UE Context Release procedure. If the en-gNB received the UE CONTEXT RELEASE right after receiving the $SgNB \ RELEASE \ REQUEST$ (and before or after responding to it), the en-gNB shall consider the related MeNB initiated $SgNB \ Release$ procedure as being the resolution of abnormal conditions and release the related UE context immediately.

### 8.7.10 SgNB initiated SgNB Release

#### 8.7.10.1 General

This procedure is triggered by the en-gNB to initiate the release of the resources for a specific UE.

The procedure uses UE-associated signalling.

#### 8.7.10.2 Successful Operation

![Figure 8.7.10.2-1: SgNB initiated SgNB Release, successful operation.](image)

The en-gNB initiates the procedure by sending the $SgNB \ RELEASE \ REQUIRED$ message to the MeNB.

Upon reception of the $SgNB \ RELEASE \ REQUIRED$ message, the MeNB replies with the $SgNB \ RELEASE \ CONFIRM$ message. For each E-RAB configured with the PDCP entity in the en-gNB, the MeNB may include the $DL \ Forwarding \ GTP \ Tunnel \ Endpoint$ IE and the $UL \ Forwarding \ GTP \ Tunnel \ Endpoint$ IE within the $E-RABs \ To \ Be \ Released \ Item$ IE to indicate that it requests data forwarding of uplink and downlink packets to be performed for that bearer. For each E-RAB configured with the PDCP entity in the MeNB and SCG resources, the MeNB may include the $DL \ Forwarding \ GTP \ Tunnel \ Endpoint$ IE within the $E-RABs \ To \ Be \ Released \ Item$ IE to indicate that it requests data forwarding of downlink packets to be performed for that bearer.

The en-gNB may start data forwarding and stop providing user data to the UE upon reception of the $SgNB \ RELEASE \ CONFIRM$ message.

#### 8.7.10.3 Unsuccessful Operation

Not applicable.

#### 8.7.10.4 Abnormal Conditions

Void.

### 8.7.11 SgNB Counter Check

#### 8.7.11.1 General

This procedure is initiated by the en-gNB to request the MeNB to execute a counter check procedure to verify the value of the PDCP COUNTs associated with SN terminated bearers.
The procedure uses UE-associated signalling.

8.7.11.2 Successful Operation

![Diagram of SgNB Counter Check procedure](image1)

**Figure 8.7.11.2-1: SgNB Counter Check procedure, successful operation.**

The en-gNB initiates the procedure by sending the SGNB COUNTER CHECK REQUEST message to the MeNB.

Upon reception of the SGNB COUNTER CHECK REQUEST message, the MeNB may perform the RRC counter check procedure as defined in TS 33.401 [18].

8.7.11.3 Unsuccessful Operation

Not applicable.

8.7.11.4 Abnormal Conditions

Not applicable.

8.7.12 RRC Transfer

8.7.12.1 General

The purpose of the RRC Transfer procedure is to deliver an LTE RRC message encapsulated in a PDCP-C PDU to the en-gNB so that it may then be forwarded to the UE, or from the en-gNB, if it was received from the UE. Delivery status may also be provided from the en-gNB to the MeNB using the RRC Transfer.

The procedure is also to enable transfer of the NR RRC message container with the NR measurements from the MeNB to the en-gNB, when received from the UE.

The procedure uses UE-associated signalling.

8.7.12.2 Successful Operation

![Diagram of RRC Transfer procedure](image2)

**Figure 8.7.12.2-1: RRC Transfer procedure, successful operation.**

Either the MeNB initiates the procedure by sending the RRC TRANSFER message to the en-gNB or the en-gNB initiates the procedure by sending the RRC TRANSFER message to the MeNB.
If the en-gNB receives an RRC TRANSFER message without the RRC Container IE in the Split SRB IE, the Delivery Status IE in the Split SRB IE or the RRC container IE in NR UE Measurement IE, it shall ignore the message. If the en-gNB receives the RRC Container IE in the MCG split SRB IE, it shall deliver the contained RRC message to the UE.

If the MeNB receives the Delivery Status IE in the split SRB IE the MeNB shall consider RRC messages up to the indicated NR PDCP SN as having been successfully delivered to UE by en-gNB.

8.7.12.3 Abnormal Conditions

In case of the split SRBs, the receiving node may ignore the message, if the MeNB has not indicated possibility of RRC transfer at the bearer setup.

8.7.13 Secondary RAT Data Usage Report

8.7.13.1 General

This procedure is initiated by the en-gNB to report secondary RAT data volume.

The procedure uses UE-associated signalling.

8.7.13.2 Successful Operation

The en-gNB initiates the procedure by sending the SECONDARY RAT DATA USAGE REPORT message to the MeNB.

8.7.13.3 Unsuccessful Operation

Not applicable.

8.7.13.4 Abnormal Conditions

Not applicable.

8.7.14 Partial reset of EN-DC

8.7.14.1 General

This procedure is triggered by the en-gNB or the MeNB to initiate the reset of the resources for selected UEs.

The procedure uses non UE-associated signalling.
8.7.14.2 Successful Operation

The en-gNB or MeNB initiates the procedure by sending the PARTIAL RESET REQUIRED message to the MeNB or the en-gNB.

In case of the eNB-initiated Partial Reset, at reception of the PARTIAL RESET REQUIRED message, the en-gNB node shall release all allocated resources on X2 and Uu related to the UE association(s) indicated in the PARTIAL RESET REQUIRED message and remove the indicated UE contexts including X2AP ID.

In case of the en-gNB-initiated Partial Reset, at reception of the PARTIAL RESET REQUIRED message, the eNB may decide to release all allocated resources on X2 and Uu related to the UE association(s) indicated in the PARTIAL RESET REQUIRED message and remove the indicated UE contexts including X2AP ID, or to reconfigure the UEs for MN-terminated MCG bearers.

After the receiving node has released or reconfigured all assigned X2 resources and the UE X2AP IDs for all indicated UE associations which can be used for new UE-associated logical X2-connections over the X2 interface, the receiving node shall respond with the PARTIAL RESET CONFIRM message. The node receiving the request does not need to wait for the release or reconfiguration of radio resources to be completed before returning the PARTIAL RESET CONFIRM message.

The node initiating the procedure shall include the SgNB UE X2AP ID IE in the PARTIAL RESET REQUIRED message if it has already been allocated for the UE. The node receiving the request shall use the SgNB UE X2AP ID IE (if included) and/or the MeNB UE S1AP ID IE (and the MeNB UE S1AP ID Extension IE, if included) to identify the UE association(s) to be released. If the SgNB UE X2AP ID IE was included in the PARTIAL RESET REQUIRED message, the receiving node shall include it also in the PARTIAL RESET CONFIRM message.

The node receiving the request shall include in the PARTIAL RESET CONFIRM message, for each UE association to be released, the same list of UE-associated logical X2-connections over X2. The list shall be in the same order as received in the PARTIAL RESET REQUIRED message and shall include also unknown UE-associated logical X2-connections.
Interactions with other procedures:
If the PARTIAL RESET REQUIRED message is received, any other ongoing procedure (except for a Reset or another Partial Reset of EN-DC procedures) on the same X2 interface related to a UE association, indicated in the PARTIAL RESET REQUIRED message, shall be aborted.

8.7.14.3 Unsuccessful Operation
Not applicable.

8.7.14.4 Abnormal Conditions
Void.

8.7.15 E-UTRA – NR Cell Resource Coordination

8.7.15.1 General
The purpose of the E-UTRA – NR Cell Resource Coordination procedure is to enable coordination of radio resource allocation between an eNB and an en-gNB that are sharing spectrum and whose coverage areas are fully or partially overlapping. During the procedure, the eNB and en-gNB shall exchange their intended resource allocations for data traffic, and, if possible, converge to a shared resource.

The procedure uses non-UE-associated signalling.

8.7.15.2 Successful Operation

\textbf{Figure 8.7.15.2-1: eNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation}

\textbf{Figure 8.7.15.2-2: en-gNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation}

eNB initiated E-UTRA – NR Cell Resource Coordination:
An eNB initiates the procedure by sending the E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message to an en-gNB over the X2 interface. The en-gNB extracts the Data Traffic Resource Indication IE and it replies by sending the E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE message. The en-gNB shall calculate the full eNB resource allocation by combining the Data Traffic Resource Indication IE and the Protected E-UTRA Resource Indication IE that were most recently received from the eNB.

In case of conflict between the most recently received Data Traffic Resource Indication IE and the most recently received Protected E-UTRA Resource Indication IE, the en-gNB shall give priority to the Protected E-UTRA Resource Indication IE.

en-gNB initiated E-UTRA – NR Cell Resource Coordination:

An en-gNB initiates the procedure by sending the E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message to an eNB. The eNB replies with the E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE message.

In case of conflict between the most recently received Data Traffic Resource Indication IE and the most recently received Protected E-UTRA Resource Indication IE, the en-gNB shall give priority to the Protected E-UTRA Resource Indication IE.

8.7.16 SgNB Activity Notification

8.7.16.1 General

The purpose of the SgNB Activity Notification procedure is to allow an en-gNB to send a notification to an eNB concerning user data traffic activity of already established E-RABs. The procedure uses UE-associated signalling.

8.7.16.2 Successful Operation

The en-gNB initiates the procedure by sending an SGNB ACTIVITY NOTIFICATION message to the eNB.

The SGNB ACTIVITY NOTIFICATION message may contain notification for UE context level user plane activity in the UE Context level user plane activity report IE.

The NOTIFY message may contain notification for activity of E-RABs.

8.7.16.3 Abnormal Conditions

Void.

9 Elements for X2AP Communication

9.0 General

Sub clauses 9.1 and 9.2 describe the structure of the messages and information elements required for the X2AP protocol in tabular format. Sub clause 9.3 provides the corresponding ASN.1 definition.

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 36.413 [4].
NOTE: The messages have been defined in accordance to the guidelines specified in TR 25.921 [30].

9.1 Message Functional Definition and Content

9.1.1 Messages for Basic Mobility Procedures

9.1.1.1 HANDOVER REQUEST

This message is sent by the source eNB to the target eNB to request the preparation of resources for a handover.

Direction: source eNB → target eNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td></td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Target Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI 9.2.14</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>GUMMEI</td>
<td>M</td>
<td></td>
<td>9.2.16</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>UE Context Information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;MME UE S1AP ID</td>
<td>M</td>
<td></td>
<td>INTEGER</td>
<td>MME UE S1AP ID allocated at the MME</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UE Security Capabilities</td>
<td>M</td>
<td></td>
<td>9.2.29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;AS Security Information</td>
<td>M</td>
<td></td>
<td>9.2.30</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&gt;UE Aggregate Maximum Bit Rate</td>
<td>M</td>
<td></td>
<td>9.2.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Subscriber Profile ID for RAT/Frequency priority</td>
<td>O</td>
<td></td>
<td>9.2.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs To Be Setup List</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs To Be Setup Item</td>
<td>1 .. &lt;maxnof Bearers&gt;</td>
<td></td>
<td>EACH</td>
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<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td></td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB Level QoS Parameters</td>
<td>M</td>
<td></td>
<td>9.2.9</td>
<td>Includes necessary QoS parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DL Forwarding</td>
<td>O</td>
<td></td>
<td>9.2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL GTP Tunnel Endpoint</td>
<td>M</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SGW endpoint of the S1 transport bearer. For delivery of UL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Bearer Type</td>
<td>O</td>
<td></td>
<td>9.2.92</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;RRC Context</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes the RRC HandoverPreparation Information message as defined in subclause 10.2.2 of TS 36.331 [9], or the RRC HandoverPreparation Information-NB message as defined in 10.6.2 of TS 36.331 [9].</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Handover Restriction List</td>
<td>O</td>
<td></td>
<td>9.2.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Location Reporting Information</td>
<td>O</td>
<td></td>
<td>9.2.21</td>
<td>Includes the necessary parameters for location reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Management Based MDT Allowed</td>
<td>O</td>
<td></td>
<td>9.2.59</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;Management Based MDT PLMN List</td>
<td>O</td>
<td></td>
<td>MDT PLMN List 9.2.64</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;UE Sidelink Aggregate Maximum Bit Rate</td>
<td>O</td>
<td></td>
<td>9.2.97</td>
<td>This IE applies only if the UE is authorized for V2X services.</td>
<td>YES</td>
<td>Ignore</td>
</tr>
<tr>
<td>UE History Information</td>
<td>M</td>
<td></td>
<td>9.2.38</td>
<td>Same definition as in TS 36.413 [4]</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Trace Activation</td>
<td>O</td>
<td></td>
<td>9.2.2</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SRVCC Operation Possible</td>
<td>O</td>
<td></td>
<td>9.2.33</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>CSG Membership Status</td>
<td>O</td>
<td></td>
<td>9.2.52</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Mobility Information</td>
<td>O</td>
<td>BIT STRING (SIZE (32))</td>
<td>Information related to the handover; the source eNB provides it in order to enable later analysis of the conditions that led to a wrong HO.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---</td>
<td>------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Masked IMEISV</td>
<td>O</td>
<td>9.2.69</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UE History Information from the UE</td>
<td>O</td>
<td>OCTET STRING</td>
<td>VisitedCellInfoList contained in the UEInformationResponse message (TS 36.331 [9])</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Expected UE Behaviour</td>
<td>O</td>
<td>9.2.70</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ProSe Authorized</td>
<td>O</td>
<td>9.2.78</td>
<td>YES ignore</td>
<td></td>
<td></td>
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<tr>
<td>UE Context Reference at the SeNB</td>
<td>O</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Global SeNB ID</td>
<td>M</td>
<td>Global eNB ID 9.2.22</td>
<td></td>
<td></td>
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<tr>
<td>&gt;SeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td></td>
<td></td>
<td></td>
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<td>&gt;SeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>V2X Services Authorized</td>
<td>O</td>
<td>9.2.93</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UE Context Reference at the WT</td>
<td>O</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;WT ID</td>
<td>M</td>
<td>9.2.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;WT UE XwAP ID</td>
<td>M</td>
<td>9.2.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UE Context Reference at the SgNB</td>
<td>O</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Global en-gNB ID</td>
<td>M</td>
<td>9.2.112</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;SgNB UE X2AP ID</td>
<td>M</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the SgNB.</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>NR UE Security Capabilities</td>
<td>O</td>
<td>9.2.107</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerial UE subscription information</td>
<td>O</td>
<td>9.2.129</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Range bound

<table>
<thead>
<tr>
<th>maxnoofBearers</th>
<th>Maximum no. of E-RABs. Value is 256</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofMDTPLMNs</td>
<td>PLMNs in the Management Based MDT PLMN list. Value is 16.</td>
</tr>
</tbody>
</table>

#### 9.1.1.2 HANDOVER REQUEST ACKNOWLEDGE

This message is sent by the target eNB to inform the source eNB about the prepared resources at the target.

Direction: target eNB → source eNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the target eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RABs Admitted List</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt; E-RABs Admitted Item 1 .. &lt;maxnoofBearers&gt;</td>
<td>EACH</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td></td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UL GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DL GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-RABs Not Admitted List</td>
<td>O</td>
<td></td>
<td>E-RAB List 9.2.28</td>
<td>A value for E-RAB ID shall only be present once in E-RABs Admitted List IE and in E-RABs Not Admitted List IE.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Target eNB To Source eNB</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes the RRC E-UTRA Handover Command message as defined in subclause 10.2.2 in TS 36.331 [9]</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>UE Context Kept Indicator</td>
<td>O</td>
<td></td>
<td>9.2.85</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the target eNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>WT UE Context Kept Indicator</td>
<td>O</td>
<td></td>
<td>UE Context Kept Indicator 9.2.85</td>
<td>Indicates that the WT has acknowledge d to keep the UE context</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

**Range bound**
<table>
<thead>
<tr>
<th>maxnoofBearers</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>
9.1.1.3 HANDOVER PREPARATION FAILURE

This message is sent by the target eNB to inform the source eNB that the Handover Preparation has failed.

Direction: target eNB \(\rightarrow\) source eNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

9.1.1.4 SN STATUS TRANSFER

This message is sent by the source eNB to the target eNB to transfer the uplink/downlink PDCP SN and HFN status during a handover or for EN-DC.

Direction: source eNB \(\rightarrow\) target eNB (handover), eNB from which the E-RAB context is transferred \(\rightarrow\) eNB to which the E-RAB context is transferred (dual connectivity), eNB/en-gNB from which the E-RAB context is transferred \(\rightarrow\) en-gNB/eNB to which the E-RAB context is transferred (EN-DC).
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated for handover at the source eNB and for dual connectivity/EN-DC at the eNB from which the E-RAB context is transferred</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated for handover at the target eNB and for dual connectivity/EN-DC at the eNB to which the E-RAB context is transferred</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>E-RABs Subject To Status Transfer</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>List</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs Subject To Status Transfer</td>
<td>1 ..</td>
<td>&lt;maxnoof Bearers&gt;</td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>Item</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;Receive Status Of UL PDCP SDUs</td>
<td>O</td>
<td>BIT STRING (4096)</td>
<td></td>
<td>PDCP Sequence Number = (First Missing SDU Number + bit position) modulo 4096 0: PDCP SDU has not been received. 1: PDCP SDU has been received correctly</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;UL COUNT Value</td>
<td>M</td>
<td>COUNT Value 9.2.15</td>
<td></td>
<td>PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 12 bit long PDCP-SN</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;DL COUNT Value</td>
<td>M</td>
<td>COUNT Value 9.2.15</td>
<td></td>
<td>PDCP-SN and Hyper frame number that the target eNB/en-gNB should assign for the next DL SDU not having an SN yet in case of 12 bit long PDCP-SN</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;Receive Status Of UL PDCP SDUs Extended</td>
<td>O</td>
<td>BIT STRING (1..16384)</td>
<td></td>
<td>The IE is used in case of 15 bit long PDCP-SN in this release. The first bit indicates the status of the SDU after the First Missing UL PDCP SDU. The Nth bit indicates the status of the UL PDCP SDU in position (N + First Missing SDU Number) modulo (1 + the maximum value of the PDCP-SN). 0: PDCP SDU has not been received. 1: PDCP SDU has been received correctly.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Extension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UL COUNT Value Extended</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>COUNT Value Extended 9.2.66</td>
<td>PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 15 bit long PDCP-SN</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DL COUNT Value Extended</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>COUNT Value Extended 9.2.66</td>
<td>PDCP-SN and Hyper Frame Number that the target eNB/en-gNB should assign for the next DL SDU not having an SN yet in case of 15 bit long PDCP-SN</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Receive Status Of UL PDCP SDUs for PDCP SN Length 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>BIT STRING (1..131072)</td>
<td>The IE is used in case of 18 bit long PDCP-SN. The first bit indicates the status of the SDU after the First Missing UL PDCP SDU. The Nth bit indicates the status of the UL PDCP SDU in position (N + First Missing SDU Number) modulo (1 + the maximum value of the PDCP-SN). 0: PDCP SDU has not been received. 1: PDCP SDU has been received correctly</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UL COUNT Value for PDCP SN Length 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>COUNT Value for PDCP SN Length 18 9.2.82</td>
<td>PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 18 bit long PDCP-SN</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DL COUNT Value for PDCP SN Length 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>COUNT Value for PDCP SN Length 18 9.2.82</td>
<td>PDCP-SN and Hyper Frame Number that the target eNB/en-gNB should assign for the next DL SDU not having an SN yet in case of 18 bit long PDCP-SN</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated for handover at the source eNB and for dual connectivity/EN-DC at the eNB from which the E-RAB context is transferred.</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated for handover at the target eNB and for dual connectivity/EN-DC at the eNB to which the E-RAB context is transferred.</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated for EN-DC at the SgNB.</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>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256.</td>
</tr>
</tbody>
</table>
### 9.1.1.5 UE CONTEXT RELEASE

This message is sent by the target eNB to the source eNB to indicate that resources can be released.

**Direction:** target eNB → source eNB (handover), MeNB → SeNB (dual connectivity), MeNB → en-gNB (EN-DC).

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated for handover at the source eNB and for dual connectivity at the SeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated for handover at the target eNB and for dual connectivity at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated for handover at the source eNB and for dual connectivity at the SeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated for handover at the source eNB and for dual connectivity at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SIPTO Bearer Deactivation Indication</td>
<td>O</td>
<td>ENUMERATED (True, …,)</td>
<td>Indicates that SIPTO@LN PDN connection deactivation is needed.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>O</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated for EN-DC at the SgNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.1.1.6 HANDOVER CANCEL

This message is sent by the source eNB to the target eNB to cancel an ongoing handover.

**Direction:** source eNB → target eNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>O</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the target eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the source eNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the target eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>
9.1.2 Messages for global procedures

9.1.2.1 LOAD INFORMATION

This message is sent by an eNB to neighbouring eNBs to transfer load and interference co-ordination information.

Direction: eNB1 → eNB2.

<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>9.2.13</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Information</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell Information Item</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI</td>
<td>Id of the source cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UL Interference Overload Indication</td>
<td>O</td>
<td></td>
<td>9.2.17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UL High Interference Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Target Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI</td>
<td>Id of the cell for which the HII is meant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL High Interference Indication</td>
<td>M</td>
<td></td>
<td>9.2.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Relative Narrowband Tx Power (RNTP)</td>
<td>O</td>
<td></td>
<td>9.2.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;ABS Information</td>
<td>O</td>
<td></td>
<td>9.2.54</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Invoke Indication</td>
<td>O</td>
<td></td>
<td>9.2.55</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Intended UL-DL Configuration</td>
<td>O</td>
<td></td>
<td>ENUMERATED</td>
<td>One of the UL-DL configuration defined in TS 36.211 [10]. The UL subframe(s) in the indicated configuration is subset of those in SIB1 UL-DL configuration. This IE applies to TDD only.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;Extended UL Interference Overload Info</td>
<td>O</td>
<td></td>
<td>9.2.67</td>
<td>This IE applies to TDD only.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;CoMP Information</td>
<td>O</td>
<td></td>
<td>9.2.74</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Dynamic DL transmission information</td>
<td>O</td>
<td></td>
<td>9.2.77</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellineNB</td>
<td>Maximum no. cells that can be served by an eNB. Value is 256.</td>
</tr>
</tbody>
</table>

9.1.2.2 ERROR INDICATION

This message is used to indicate that some error has been detected in the eNB/en-gNB.

Direction: eNB1 → eNB2 or eNB → en-gNB or en-gNB → eNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>O</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated for handover at the source eNB and for dual connectivity at the SeNB or the eNB from which the E-RAB context is transferred.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>O</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated for handover at the target eNB and for dual connectivity/EN-DC at the MeNB or the eNB to which the E-RAB context is transferred.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Cause</td>
<td>O</td>
<td></td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated for handover at the source eNB and for dual connectivity at the SeNB or the eNB from which the E-RAB context is transferred.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated for handover at the target eNB and for dual connectivity at the MeNB or the eNB to which the E-RAB context is transferred.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old en-gNB UE X2AP ID</td>
<td>O</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated for EN-DC at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.1.2.3 X2 SETUP REQUEST

This message is sent by an eNB to a neighbouring eNB to transfer the initialization information for a TNL association.

Direction: eNB₁ → eNB₂.
<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Present</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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Global eNB ID</td>
<td>M</td>
<td>9.2.22</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Served Cells</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Served Cell Information</td>
<td>M</td>
<td></td>
<td>9.2.8</td>
<td>Complete list of cells served by the eNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;Served Cell Information</td>
<td>M</td>
<td></td>
<td>9.2.8</td>
<td>Complete list of cells served by the eNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;Neighbour Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;ECGI</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td>E-UTRAN Cell Global Identifier of the neighbour cell</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;PCI</td>
<td>M</td>
<td>INTEGER (0..503, …)</td>
<td>Physical Cell Identifier of the neighbour cell</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EARFCN</td>
<td>M</td>
<td>9.2.26</td>
<td>DL EARFCN for FDD or EARFCN for TDD</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TAC</td>
<td>O</td>
<td>OCTET STRING (2)</td>
<td>Tracking Area Code</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EARFCN Extension</td>
<td>O</td>
<td>9.2.65</td>
<td>DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the EARFCN IE is ignored.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td><strong>GU Group Id List</strong></td>
<td></td>
<td></td>
<td></td>
<td>List of all the pools to which the eNB belongs</td>
<td>GLOBAL</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;GU Group Id</td>
<td>M</td>
<td>9.2.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LHN ID</td>
<td>O</td>
<td>9.2.83</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

**Range bound**

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellineNB</td>
<td>Maximum no. of cells that can be served by an eNB. Value is 256.</td>
</tr>
<tr>
<td>maxnoofNeighbours</td>
<td>Maximum no. of neighbour cells associated to a given served cell. Value is 512.</td>
</tr>
<tr>
<td>maxPools</td>
<td>Maximum no. of pools an eNB can belong to. Value is 16.</td>
</tr>
</tbody>
</table>

**9.1.2.4 X2 SETUP RESPONSE**

This message is sent by an eNB to a neighbouring eNB to transfer the initialization information for a TNL association.

Direction: eNB₂ → eNB₁.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Global eNB ID</td>
<td>M</td>
<td>9.2.22</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td><strong>Served Cells</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Served Cell Information</td>
<td>M</td>
<td>9.2.8</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;Neighbour Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;ECGI</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td>E-UTRAN Cell Global Identifier of the neighbour cell</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;PCI</td>
<td>M</td>
<td>INTEGER</td>
<td></td>
<td>Physical Cell Identifier of the neighbour cell</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;EARFCN</td>
<td>M</td>
<td>9.2.26</td>
<td></td>
<td>DL EARFCN for FDD or EARFCN for TDD</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;TAC</td>
<td>O</td>
<td>OCTET</td>
<td></td>
<td>Tracking Area Code</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;EARFCN Extension</td>
<td>O</td>
<td>9.2.65</td>
<td></td>
<td>DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the EARFCN IE is ignored.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>GU Group Id List</td>
<td></td>
<td></td>
<td></td>
<td>List of all the pools to which the eNB belongs</td>
<td>GLOBAL</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;GU Group Id</td>
<td>M</td>
<td>9.2.20</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>LHN ID</td>
<td>O</td>
<td>9.2.83</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

### Range bound

<table>
<thead>
<tr>
<th></th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellineNB</td>
<td>Maximum no. of cells that can be served by an eNB. Value is 256.</td>
</tr>
<tr>
<td>maxnnofNeighbours</td>
<td>Maximum no. of neighbour cells associated to a given served cell. Value is 512.</td>
</tr>
<tr>
<td>maxPools</td>
<td>Maximum no. of pools an eNB can belong to. Value is 16.</td>
</tr>
</tbody>
</table>

#### 9.1.2.5 X2 SETUP FAILURE

This message is sent by the eNB to indicate X2 Setup failure.

**Direction:** eNB₂ → eNB₁.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Time To Wait</td>
<td>O</td>
<td>9.2.32</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

#### 9.1.2.6 RESET REQUEST

This message is sent from one eNB to another eNB/en-gNB or from en-gNB to an eNB and is used to request the X2 interface between the two eNB or between an eNB and an en-gNB to be reset.

---

**ETSI**
Direction: eNB₁ → eNB₃, eNB → en-gNB, en-gNB → eNB.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td></td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.1.2.7  RESET RESPONSE

This message is sent by a eNB/en-gNB as a response to a RESET REQUEST message.

Direction: eNB₂ → eNB₁, eNB → en-gNB, en-gNB → eNB.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.1.2.8  ENB CONFIGURATION UPDATE

This message is sent by an eNB to a peer eNB to transfer updated information for a TNL association.

Direction: eNB₁ → eNB₂.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Served Cells To Add</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 .. &lt;maxCellineNB&gt;</td>
<td></td>
<td>Complete list of added cells served by the eNB</td>
<td>GLOBAL</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;Served Cell Information</td>
<td>M</td>
<td>9.2.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Neighbour Information</td>
<td></td>
<td>0 .. &lt;maxnoofNeighbours&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;ECGI</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td>E-UTRAN Cell Global Identifier of the neighbour cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;PCI</td>
<td>M</td>
<td>INTEGER (0..503, …)</td>
<td></td>
<td>Physical Cell Identifier of the neighbour cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EARFCN</td>
<td>M</td>
<td>9.2.26</td>
<td></td>
<td>DL EARFCN for FDD or EARFCN for TDD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TAC</td>
<td>O</td>
<td>OCTET STRING (2)</td>
<td></td>
<td>Tracking Area Code</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;EARFCN Extension</td>
<td>O</td>
<td>9.2.65</td>
<td></td>
<td>DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the EARFCN IE is ignored.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>Served Cells To Modify</strong></td>
<td></td>
<td>0 .. &lt;maxCellineNB&gt;</td>
<td></td>
<td>Complete list of modified cells served by the eNB</td>
<td>GLOBAL</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;Old ECGI</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td>Old E-UTRAN Cell Global Identifier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Served Cell Information</td>
<td>M</td>
<td>9.2.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Neighbour Information</td>
<td></td>
<td>0 .. &lt;maxnoofNeighbours&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;ECGI</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td>E-UTRAN Cell Global Identifier of the neighbour cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;PCI</td>
<td>M</td>
<td>INTEGER (0..503, …)</td>
<td></td>
<td>Physical Cell Identifier of the neighbour cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EARFCN</td>
<td>M</td>
<td>9.2.26</td>
<td></td>
<td>DL EARFCN for FDD or EARFCN for TDD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;TAC</td>
<td>O</td>
<td>OCTET STRING (2)</td>
<td></td>
<td>Tracking Area Code</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;EARFCN Extension</td>
<td>O</td>
<td>9.2.65</td>
<td></td>
<td>DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the EARFCN IE is ignored.</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>
### Deactivation Indication

<table>
<thead>
<tr>
<th>Served Cells To Delete</th>
<th>0..&lt;maxCellineNB&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates that the concerned cell is switched off for energy saving reasons</td>
<td>YES</td>
</tr>
</tbody>
</table>

### Served Cells To Delete

<table>
<thead>
<tr>
<th>Old ECGI</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>ECGI 9.2.14</td>
</tr>
<tr>
<td>New ECGI</td>
<td>Old E-UTRAN Cell Global Identifier of the cell to be deleted</td>
</tr>
</tbody>
</table>

### GU Group Id To Add List

<table>
<thead>
<tr>
<th>GU Group Id</th>
<th>0..&lt;maxPools&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>GLOBAL</td>
</tr>
</tbody>
</table>

### GU Group Id To Delete List

<table>
<thead>
<tr>
<th>GU Group Id</th>
<th>0..&lt;maxPools&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>GLOBAL</td>
</tr>
</tbody>
</table>

### Coverage Modification List

<table>
<thead>
<tr>
<th>Coverage Modification List</th>
<th>0..&lt;maxCellineNB&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>GLOBAL</td>
</tr>
</tbody>
</table>

### ECGI

<table>
<thead>
<tr>
<th>ECGI</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>ECGI 9.2.14</td>
</tr>
<tr>
<td>New ECGI</td>
<td>E-UTRAN Cell Global Identifier of the cell to be modified</td>
</tr>
</tbody>
</table>

### Cell Coverage State

<table>
<thead>
<tr>
<th>Cell Coverage State</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>INTEGER (0..15, ..)</td>
</tr>
<tr>
<td>New ECGI</td>
<td>Value ‘0’ indicates that the cell is inactive. Other values indicates that the cell is active and also indicates the coverage configuration of the concerned cell</td>
</tr>
</tbody>
</table>

### Cell Deployment Status Indicator

<table>
<thead>
<tr>
<th>Cell Deployment Status Indicator</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>ENUMERATE (pre-change-notification, ..)</td>
</tr>
<tr>
<td>New ECGI</td>
<td>Indicates the Cell Coverage State is planned to be used at the next reconfiguration</td>
</tr>
</tbody>
</table>

### Cell Replacing Info

<table>
<thead>
<tr>
<th>Cell Replacing Info</th>
<th>C-ItCellDeploymentStatusIndicator Present</th>
</tr>
</thead>
</table>

### Replacing Cells

<table>
<thead>
<tr>
<th>Replacing Cells</th>
<th>0..&lt;maxCellineNB&gt;</th>
</tr>
</thead>
</table>

### ECGI

<table>
<thead>
<tr>
<th>ECGI</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>ECGI 9.2.14</td>
</tr>
<tr>
<td>New ECGI</td>
<td>E-UTRAN Cell Global Identifier of a cell that may replace all or part of the coverage of the cell to be modified</td>
</tr>
</tbody>
</table>

### Range bound

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellineNB</td>
<td>Maximum no. of cells that can be served by an eNB. Value is 256.</td>
</tr>
<tr>
<td>maxnoofNeighbours</td>
<td>Maximum no. of neighbour cells associated to a given served cell. Value is 512.</td>
</tr>
<tr>
<td>maxPools</td>
<td>Maximum no. of pools an eNB can belong to. Value is 16.</td>
</tr>
</tbody>
</table>
### 9.1.2.9 ENB CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by an eNB to a peer eNB to acknowledge update of information for a TNL association.

Direction: eNB₂ → eNB₁.

<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>Range</td>
<td>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>Range</td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.1.2.10 ENB CONFIGURATION UPDATE FAILURE

This message is sent by an eNB to a peer eNB to indicate eNB Configuration Update Failure.

Direction: eNB₂ → eNB₁.

<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>Range</td>
<td>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>Range</td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Time To Wait</td>
<td>O</td>
<td>Range</td>
<td>9.2.32</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>Range</td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.1.2.11 RESOURCE STATUS REQUEST

This message is sent by an eNB₁ to neighbouring eNB₂ to initiate the requested measurement according to the parameters given in the message.

Direction: eNB₁ → eNB₂.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifCellDeploymentStatusIndicatorPresent</td>
<td>This IE shall be present if the Cell Deployment Status Indicator IE is present.</td>
</tr>
<tr>
<td>IE/Group Name</td>
<td>Presence</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Message Type</td>
<td>M</td>
</tr>
<tr>
<td>eNB1 Measurement ID</td>
<td>M</td>
</tr>
<tr>
<td>eNB2 Measurement ID</td>
<td>C-</td>
</tr>
<tr>
<td>Registration Request</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Report Characteristics</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell To Report</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell To Report Item</td>
<td>1 ..</td>
</tr>
<tr>
<td></td>
<td>&lt;maxCell lineNB&gt;</td>
</tr>
<tr>
<td>&gt;&gt;Cell ID</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Success</td>
<td>O</td>
</tr>
<tr>
<td>Indicator</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Reporting Periodicity of RSRP Measurement Report</td>
<td>O</td>
</tr>
</tbody>
</table>
### Reporting Periodicity of CSI Report

| ENUMERATED (5ms, 10ms, 20ms, 40ms, 80ms, ...) | Periodicity that can be used for the reporting of CSI Report Periodic. | YES | ignore |

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifRegistrationRequestStoporPartialStoporAdd</td>
<td>This IE shall be present if the Registration Request IE is set to the value “stop”, “partial stop” or “add”.</td>
</tr>
</tbody>
</table>

### RESOURCE STATUS RESPONSE

This message is sent by the eNB₂ to indicate that the requested measurement, for all or for a subset of the measurement objects included in the measurement is successfully initiated.

Direction: eNB₂ → eNB₁.
<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>9.2.13</td>
<td></td>
<td>YES reject</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>eNB1 Measurement ID</td>
<td>M</td>
<td>INTEGER (1..4095,....)</td>
<td>Allocated by eNB1</td>
<td>YES reject</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>eNB2 Measurement ID</td>
<td>M</td>
<td>INTEGER (1..4095,....)</td>
<td>Allocated by eNB2</td>
<td>YES reject</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>Measurement Initiation Result</td>
<td>0..1</td>
<td></td>
<td></td>
<td>List of all cells in which measurement objects were requested, included when indicating partial success</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>- Measurement Initiation Result Item</td>
<td>1 .. &lt;maxCelllineNB&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cell ID</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Measurement Failure Cause List</td>
<td>0..1</td>
<td></td>
<td></td>
<td>Indicates that eNB2 could not initiate the measurement for at least one of the requested measurement objects in the cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt; Measurement Failure Cause Item</td>
<td>1 .. &lt;maxFailedMeasObjects&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt; Measurement Failed Report Characteristics</td>
<td>M</td>
<td>BITSTRING (SIZE(32))</td>
<td>Each position in the bitmap indicates measurement object that failed to be initiated in the eNB2. First Bit = PRB Periodic, Second Bit = TNL load Ind Periodic, Third Bit = HW Load Ind Periodic, Fourth Bit = Composite Available Capacity Periodic, Fifth Bit = ABS Status Periodic, Sixth Bit = RSRP Measurement Report Periodic, Seventh Bit = CSI Report Periodic. Other bits shall be ignored by the eNB1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt; Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td>Failure cause for measurement objects for which the measurement cannot be initiated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxFailedMeasObjects</td>
<td>Maximum number of measurement objects that can fail per measurement. Value is 32.</td>
</tr>
<tr>
<td>maxCelllineNB</td>
<td>Maximum no. cells that can be served by an eNB. Value is 256.</td>
</tr>
</tbody>
</table>
### 9.1.2.13 RESOURCE STATUS FAILURE

This message is sent by the eNB2 to indicate that for none of the requested measurement objects the measurement can be initiated.

**Direction:** eNB2 → eNB1.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB1 Measurement ID</td>
<td>M</td>
<td>INTEGER</td>
<td>(1..4095,...)</td>
<td>Allocated by eNB1</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB2 Measurement ID</td>
<td>M</td>
<td>INTEGER</td>
<td>(1..4095,...)</td>
<td>Allocated by eNB2</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td>Ignored by the receiver when the Complete Failure Cause Information IE is included</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criticality Diagnostics</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>Complete Failure Cause Information</td>
<td></td>
<td>0..1</td>
<td></td>
<td>Complete list of failure causes for all requested cells</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Complete Failure Cause Information Item</td>
<td>1 ..</td>
<td><code>&lt;maxCellineNB&gt;</code></td>
<td>EACH</td>
<td></td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Cell ID</td>
<td>M</td>
<td>ECGI</td>
<td>9.2.14</td>
<td></td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Measurement Failure Cause List</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Measurement Failure Cause Item</td>
<td>1 ..</td>
<td><code>&lt;maxFailedMeasObjects&gt;</code></td>
<td>EACH</td>
<td></td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Measurement Failed Report Characteristics</td>
<td>M</td>
<td>BITSTRING (SIZE(32))</td>
<td>Each position in the bitmap indicates measurement object that failed to be initiated in the eNB2. First Bit = PRB Periodic, Second Bit = TNL load Ind Periodic, Third Bit = HW Load Ind Periodic, Fourth Bit = Composite Available Capacity Periodic, Fifth Bit = ABS Status Periodic, Sixth Bit = RSRP Measurement Report Periodic, Seventh Bit = CSI Report Periodic. Other bits shall be ignored by the eNB1.</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td>Failure cause for measurements that cannot be initiated</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellineNB</td>
<td>Maximum no. cells that can be served by an eNB. Value is 256.</td>
</tr>
<tr>
<td>maxFailedMeasObjects</td>
<td>Max number of measurement objects that can fail per measurement. Value is 32.</td>
</tr>
</tbody>
</table>
### 9.1.2.14 RESOURCE STATUS UPDATE

This message is sent by eNB₂ to neighbouring eNB₁ to report the results of the requested measurements.

Direction: eNB₂ → eNB₁.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>eNB₁ Measurement ID</td>
<td>M</td>
<td></td>
<td>INTEGER (1..4095,...)</td>
<td>Allocated by eNB₁</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB₂ Measurement ID</td>
<td>M</td>
<td></td>
<td>INTEGER (1..4095,...)</td>
<td>Allocated by eNB₂</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cell Measurement Result</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cell Measurement Result Item</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>&gt;Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI 9.2.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Hardware Load Indicator</td>
<td>O</td>
<td></td>
<td>9.2.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;S1 TNL Load Indicator</td>
<td>O</td>
<td></td>
<td>9.2.35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Radio Resource Status</td>
<td>O</td>
<td></td>
<td>9.2.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Composite Available Capacity Group</td>
<td>O</td>
<td></td>
<td>9.2.44</td>
<td>YES</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;ABS Status</td>
<td>O</td>
<td></td>
<td>9.2.58</td>
<td>YES</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;RSRP Measurement Report List</td>
<td>O</td>
<td></td>
<td>9.2.76</td>
<td>YES</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;CSI Report</td>
<td>O</td>
<td></td>
<td>9.2.79</td>
<td>YES</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;Cell Reporting Indicator</td>
<td>O</td>
<td></td>
<td>ENUMERATED 9.2.14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Range bound
maxCellineNB
Maximum no. cells that can be served by an eNB. Value is 256.

### 9.1.2.15 MOBILITY CHANGE REQUEST

This message is sent by eNB₁ to neighbouring eNB₂ to initiate adaptation of mobility parameters.

Direction: eNB₁ → eNB₂.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB₁ Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI 9.2.14</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB₂ Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI 9.2.14</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB₁ Mobility Parameters</td>
<td>O</td>
<td></td>
<td>Mobility Parameters Information 9.2.48</td>
<td>Configuration change in eNB₁ cell</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>eNB₂ Proposed Mobility Parameters</td>
<td>M</td>
<td></td>
<td>Mobility Parameters Information 9.2.48</td>
<td>Proposed configuration change in eNB₂ cell</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td></td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>
9.1.2.16 MOBILITY CHANGE ACKNOWLEDGE

This message is sent by the eNB2 to indicate that the eNB2 Proposed Mobility Parameter proposed by eNB1 was accepted.

Direction: eNB2 → eNB1.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB1 Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI</td>
<td>9.2.14</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB2 Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI</td>
<td>9.2.14</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.1.2.17 MOBILITY CHANGE FAILURE

This message is sent by the eNB2 to indicate that the eNB2 Proposed Mobility Parameter proposed by eNB1 was refused.

Direction: eNB2 → eNB1.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB1 Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI</td>
<td>9.2.14</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>eNB2 Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI</td>
<td>9.2.14</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td></td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Mobility Parameters</td>
<td>O</td>
<td></td>
<td>9.2.49</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Modification Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.1.2.18 RLF INDICATION

This message is sent by the eNB2 to indicate an RRC re-establishment attempt or a reception of an RLF Report from a UE that suffered a connection failure at eNB1.

Direction: eNB2 → eNB1.
### 9.1.2.19  HANOVER REPORT

This message is sent by the eNB1 to report a handover failure event or other critical mobility problem.

**Direction:** eNB₁ → eNB₂.
### IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality
--- | --- | --- | --- | --- | --- | ---
**Message Type** | M | | 9.2.13 | | YES | ignore
**Handover Report Type** | M | | ENUMERATED (HO too early, HO to wrong cell, …, InterRAT ping-pong) | | YES | ignore
**Handover Cause** | M | | Cause 9.2.6 | Indicates handover cause employed for handover from eNB | YES | ignore
**Source cell ECGI** | M | | ECGI 9.2.14 | ECGI of source cell for handover procedure (in eNB2) | YES | ignore
**Failure cell ECGI** | M | | ECGI 9.2.14 | ECGI of target cell for handover procedure (in eNB1) | YES | ignore
**Re-establishment cell ECGI** | C- | ifHandoverReportType HoToWrongCell | ECGI 9.2.14 | ECGI of cell where UE attempted re-establishment | YES | ignore
**Target cell in UTRAN** | C- | ifHandoverReportType InterRATpingpong | OCTET STRING | Encoded according to UTRAN Cell ID in the Last Visited UTRAN Cell Information IE, as defined in in TS 25.413 [24] | YES | ignore
**Source cell C-RNTI** | O | | BIT STRING (SIZE (16)) | C-RNTI allocated at the source eNB (in eNB2) contained in the AS-config (TS 36.331 [9]). | YES | ignore
**Mobility Information** | O | | BIT STRING (SIZE (32)) | Information provided in the HANDOVER REQUEST message from eNB2. | YES | ignore
**UE RLF Report Container** | O | | OCTET STRING | The UE RLF Report Container IE received in the RLF INDICATION message. | YES | ignore
**UE RLF Report Container for extended bands** | O | | OCTET STRING | The UE RLF Report Container for extended bands IE received in the RLF INDICATION message. | YES | ignore

### Condition | Explanation
--- | ---
ifHandoverReportType HoToWrongCell | This IE shall be present if the Handover Report Type IE is set to the value "HO to wrong cell"
ifHandoverReportType InterRATpingpong | This IE shall be present if the Handover Report Type IE is set to the value "InterRAT ping-pong"

### 9.1.2.20 CELL ACTIVATION REQUEST

This message is sent by an eNB to a peer eNB to request a previously switched-off cell(s) to be re-activated.

Direction: eNB₁ → eNB₂.
9.1.2.21 CELL ACTIVATION RESPONSE

This message is sent by an eNB to a peer eNB to indicate that one or more cell(s) previously switched-off has(have) been activated.

Direction: eNB₂ → eNB₁.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Served Cells To Activate</td>
<td></td>
<td>1 .. &lt;maxCellineNB&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECGI</td>
<td>M</td>
<td>9.2.14</td>
<td></td>
<td>GLOBAL</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>

Range bound: maxCellineNB

Explanation: Maximum no. cells that can be served by an eNB. Value is 256.

9.1.2.22 CELL ACTIVATION FAILURE

This message is sent by an eNB to a peer eNB to indicate cell activation failure.

Direction: eNB₂ → eNB₁.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

9.1.2.23 X2 RELEASE

This message is used to indicate that the signalling connection to an eNB is unavailable.

Direction: eNB₁ → eNB₂.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Global eNB ID</td>
<td>M</td>
<td>9.2.22</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>

9.1.2.24 X2AP MESSAGE TRANSFER

This message is used for indirect transport of an X2AP message (except the X2AP MESSAGE TRANSFER message) between two eNBs, and to allow an eNB to perform registration.

Direction: eNB₁ → eNB₂.
### 9.1.2.25 X2 REMOVAL REQUEST

This message is sent by an eNB to a neighbouring eNB to initiate the removal of the signaling connection.

Direction: eNB₁ → eNB₂.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>RNL Header</td>
<td>M</td>
<td></td>
<td>9.2.68</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>X2AP Message</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes any X2AP message except the X2AP MESSAGE TRANSFER message</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 9.1.2.26 X2 REMOVAL RESPONSE

This message is sent by an eNB to a neighbouring eNB to acknowledge the initiation of removal of the signaling connection.

Direction: eNB₂ → eNB₁.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Global eNB ID</td>
<td>M</td>
<td></td>
<td>9.2.22</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>X2 Removal Threshold</td>
<td>O</td>
<td></td>
<td>X2 Benefit Value 9.2.90</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 9.1.2.27 X2 REMOVAL FAILURE

This message is sent by the eNB to indicate that removing the signaling connection cannot be accepted.

Direction: eNB₂ → eNB₁.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td></td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.1.2.28 RETRIEVE UE CONTEXT REQUEST

This message is sent by the new eNB to request the old eNB to transfer the UE Context to the new eNB.

Direction: new eNB → old eNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the new eNB</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the new eNB</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Resume ID</td>
<td>M</td>
<td>9.2.91</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>ShortMAC-I</td>
<td>M</td>
<td>BIT STRING (SIZE 16)</td>
<td>ShortResumeMAC-C-I contained in the RRCConnection ResumeRequest message (TS 36.331 [9])</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>New E-UTRAN Cell Identifier</td>
<td>M</td>
<td>BIT STRING (SIZE 28)</td>
<td>The E-UTRAN Cell Identifier of the cell where the RRC connection has been requested to be resumed.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>C-RNTI</td>
<td>O</td>
<td>BIT STRING (SIZE 16)</td>
<td>C-RNTI contained in the RRC Re-establishment Request message (TS 36.331 [9]). If this IE is present, the Resume ID IE is ignored</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Failure cell PCI</td>
<td>O</td>
<td>INTEGER (0..503, ...)</td>
<td>Physical Cell Identifier</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 9.1.2.29 RETRIEVE UE CONTEXT RESPONSE

This message is sent by the old eNB to transfer the UE context to the new eNB.

Direction: old eNB → new eNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID</td>
<td>9.2.24</td>
<td>Allocated at the new eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID</td>
<td>9.2.86</td>
<td>Allocated at the new eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID</td>
<td>9.2.24</td>
<td>Allocated at the old eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Old eNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID</td>
<td>9.2.86</td>
<td>Allocated at the old eNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>GUMMEI</td>
<td>M</td>
<td>9.2.16</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td><strong>IE Context Information</strong></td>
<td>M</td>
<td>9</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;MME UE S1AP ID</td>
<td>M</td>
<td>INTEGER (0..2^32 - 1)</td>
<td></td>
<td>MME UE S1AP ID allocated at the MME</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;UE Security Capabilities</td>
<td>M</td>
<td>9.2.29</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;AS Security Information</td>
<td>M</td>
<td>9.2.30</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;UE Aggregate Maximum Bit Rate</td>
<td>M</td>
<td>9.2.12</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;Subscriber Profile ID for RAT/Frequency priority</td>
<td>O</td>
<td>9.2.25</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;E-RABS To Be Setup List</td>
<td>1</td>
<td>1 .. &lt;maxno of Bearers &gt;</td>
<td></td>
<td>EACH</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABS To Be Setup Item</td>
<td>1</td>
<td>1 .. &lt;maxno of Bearers &gt;</td>
<td></td>
<td>EACH</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;E-RAB Level QoS Parameters</td>
<td>M</td>
<td>9.2.9</td>
<td></td>
<td>Includes necessary QoS parameters</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Bearer Type</td>
<td>O</td>
<td>9.2.92</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL GTP Tunnel Endpoint</td>
<td>M</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td></td>
<td>SGW endpoint of the S1 transport bearer. For delivery of UL PDUs.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;RRC Context</td>
<td>M</td>
<td>OCTET STRING</td>
<td></td>
<td>Includes either the RRC Handover Preparation Information message as defined in subclause 10.2.2 of TS 36.331 [9], or the HandoverPreparationInformation-NB message as defined in subclause 10.6.2 of TS 36.331 [9].</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;Handover Restriction List</td>
<td>O</td>
<td>9.2.3</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;Location Reporting Information</td>
<td>O</td>
<td>9.2.21</td>
<td></td>
<td>Includes the necessary parameters for location reporting</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
9.1.2.30 RETRIEVE UE CONTEXT FAILURE

This message is sent by the old eNB to inform the new eNB that the Retrieve UE Context procedure has failed.

Direction: old eNB → new eNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>New eNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the new eNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>New eNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the new eNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.1.2.31 EN-DC X2 SETUP REQUEST

This message is sent by an initiating node to a neighbouring node, both nodes able to interact for EN-DC, to transfer the initialization information for a TNL association.

Direction: eNB → en-gNB, en-gNB → eNB.
### Message Type M  9.2.13  YES reject

**IE type and reference**: 9.2.13

**Semantics description**: Complete list of cells served by the eNB

**Criticality**: YES reject

#### Presence

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>CHOICE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiating NodeType</td>
<td>M</td>
<td>9.2.22</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>eNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Global eNB ID</td>
<td>M</td>
<td>9.2.22</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;List of Served E-UTRA Cells 9.2.8</td>
<td>1 .. &lt;maxCellineNB&gt;</td>
<td>Complete list of cells served by the eNB</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Served E-UTRA Cell Information M</td>
<td>9.2.8</td>
<td>Served Cell Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR Neighbour Information O</td>
<td>9.2.98</td>
<td>NR neighbours</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>en-gNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Global en-gNB ID</td>
<td>M</td>
<td>9.2.112</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;List of Served NR Cells 9.2.98</td>
<td>1 .. &lt;maxCellinengNB&gt;</td>
<td>Complete list of cells served by the engNB.</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Served NR Cell Information M</td>
<td>9.2.110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR Neighbour Information O</td>
<td>9.2.98</td>
<td>NR neighbours.</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Range bound

<table>
<thead>
<tr>
<th>maxCellineNB</th>
<th>Maximum no. cells that can be served by an eNB. Value is 256.</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellinengNB</td>
<td>Maximum no. cells that can be served by an en-gNB. Value is 16384.</td>
</tr>
</tbody>
</table>

### 9.1.2.32 EN-DC X2 SETUP RESPONSE

This message is sent by a neighbouring node to an initiating node, both nodes able to interact for EN-DC, to transfer the initialization information for a TNL association.

**Direction**: eNB → en-gNB, en-gNB → eNB.
9.1.2.33 EN-DC X2 SETUP FAILURE

This message is sent by the neighbouring node to indicate EN-DC X2 Setup failure.

Direction: eNB → en-gNB, en-gNB → eNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.1.2.34 EN-DC CONFIGURATION UPDATE

This message is sent by an initiating node to a peer neighbouring node, both nodes able to interact for EN-DC, to transfer updated information for a TNL association.

Direction: eNB → en-gNB, en-gNB → eNB.
<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>9.2.13</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHOICE Initiating NodeType</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;eNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cell Assistance Information</td>
<td>O</td>
<td>9.2.115</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;Served E-UTRA Cells To Add</td>
<td>0 ..</td>
<td>&lt;maxCellineNB&gt;</td>
<td></td>
<td>GLOBAL reject</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Served E-UTRA Cell Information</td>
<td>M</td>
<td></td>
<td></td>
<td>Served Cell Information 9.2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;NR Neighbour Information</td>
<td>O</td>
<td>9.2.98</td>
<td></td>
<td>NR neighbours  YES ignore</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;Served E-UTRA Cells To Modify</td>
<td>0 ..</td>
<td>&lt;maxCellineNB&gt;</td>
<td></td>
<td>Complete list of modified cells served by the eNB</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Old ECGI</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td>Old E-UTRAN Cell Global Identifier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Served E-UTRA Cell Information</td>
<td>M</td>
<td></td>
<td></td>
<td>Served Cell Information 9.2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;NR Neighbour Information</td>
<td>O</td>
<td>9.2.98</td>
<td></td>
<td>NR neighbours  YES ignore</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;Served E-UTRA Cells To Delete</td>
<td>0 ..</td>
<td>&lt;maxCellineNB&gt;</td>
<td></td>
<td>Complete list of deleted cells served by the eNB</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Old ECGI</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td>Old E-UTRAN Cell Global Identifier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;en-gNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Served NR Cells To Add</td>
<td>0 ..</td>
<td>&lt;maxCellinen-gNB&gt;</td>
<td></td>
<td>GLOBAL reject</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Served NR Cell Information</td>
<td>M</td>
<td>9.2.110</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;NR Neighbour Information</td>
<td>O</td>
<td>9.2.98</td>
<td></td>
<td>NR neighbours  YES ignore</td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;Served NR Cells To Modify</td>
<td>0 ..</td>
<td>&lt;maxCellinen-gNB&gt;</td>
<td></td>
<td>GLOBAL reject</td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Old NR-CGI</td>
<td>M</td>
<td>9.2.111</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;NR Deactivation Indication</td>
<td>O</td>
<td>ENUMERATED</td>
<td></td>
<td>Indicates that the concerned NR cell is switched off for energy saving reasons. If this IE is not included, indicates that the concerned cell is activated.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;NR Neighbour Information</td>
<td>O</td>
<td>9.2.98</td>
<td></td>
<td>NR neighbours  YES ignore</td>
<td></td>
<td>ignore</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>&gt;&gt;Served NR Cells To Delete</th>
<th>0 .. &lt;maxCellinear-gNB&gt;</th>
<th>GLOBAL</th>
<th>reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;&gt;&gt;Old NR-CGI</td>
<td>M</td>
<td>9.2.111</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellinearNB</td>
<td>Maximum no. cells that can be served by an eNB. Value is 256.</td>
</tr>
<tr>
<td>maxCellinear-gNB</td>
<td>Maximum no. cells that can be served by an en-gNB. Value is 16384.</td>
</tr>
</tbody>
</table>

### 9.1.2.35 EN-DC CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a neighbouring node to a peer node, both nodes able to interact for EN-DC, to acknowledge update of information for a TNL association.

Direction: en-gNB → eNB, eNB → en-gNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>CHOICE Responding NodeType</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;eNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;en-gNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;List of Served NR Cells</td>
<td>0 ..</td>
<td>9.2.110</td>
<td>&lt;maxCellinear-gNB&gt;</td>
<td>Complete or limited list of cells served by the en-gNB, if requested by the eNB.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| >>Served NR Cell Information | M | 9.2.110 |
| >>>NR Neighbour Information | O | 9.2.98  |
| Criticality Diagnostics      | O | 9.2.7   |

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellinear-gNB</td>
<td>Maximum no. cells that can be served by an en-gNB. Value is 16384.</td>
</tr>
</tbody>
</table>

### 9.1.2.36 EN-DC CONFIGURATION UPDATE FAILURE

This message is sent by a neighbouring node to a peer node to indicate EN-DC eNB Configuration Update Failure.

Direction: en-gNB → eNB, eNB → en-gNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.1.2.37 EN-DC CELL ACTIVATION REQUEST

This message is sent by an eNB to a peer en-gNB to request a previously switched-off cell(s) to be re-activated.

Direction: eNB → en-gNB.
### 9.1.2.38 EN-DC CELL ACTIVATION RESPONSE

This message is sent by an en-gNB to a peer eNB to indicate that one or more cell(s) previously switched-off has (have) been activated.

**Direction:** en-gNB → eNB.

<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>9.2.13</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activated NR Cell List</td>
<td>1</td>
<td></td>
<td>GLOBAL ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Activated NR Cell Item</td>
<td>1 .. &lt; maxCellinengNB &gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR CGI</td>
<td>M</td>
<td>9.2.111</td>
<td>- -</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activation ID</td>
<td>M</td>
<td>INTEGER (0..255)</td>
<td>Allocated by the eNB</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td>YES ignore</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>maxCellinengNB</td>
<td>Maximum no. cells that can be served by an en-gNB. Value is 16384.</td>
</tr>
</tbody>
</table>

### 9.1.2.39 EN-DC CELL ACTIVATION FAILURE

This message is sent by an en-gNB to a peer eNB to indicate cell activation failure.

**Direction:** en-gNB → eNB.

<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>9.2.13</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activation ID</td>
<td>M</td>
<td>INTEGER (0..255)</td>
<td>Allocated by the eNB</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9.1.2.40 EN-DC X2 REMOVAL REQUEST

This message is sent by an initiating node to a neighbouring node to initiate the removal of the signaling connection.

**Direction:** eNB → en-gNB, en-gNB → eNB.
### 9.1.2.41 EN-DC X2 REMOVAL RESPONSE

This message is sent by an initiating node to a neighbouring node to acknowledge the initiation of removal of the signaling connection.

**Direction:** eNB → en-gNB, en-gNB → eNB.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>CHOICE Initiating Node Type</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;eNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Global eNB ID</td>
<td>M</td>
<td></td>
<td>9.2.22</td>
<td></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;&gt;en-gNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Global en-gNB ID</td>
<td>M</td>
<td></td>
<td>9.2.112</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>X2 Removal Threshold</td>
<td>O</td>
<td></td>
<td>X2 Benefit Value</td>
<td>9.2.90</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 9.1.2.42 EN-DC X2 REMOVAL FAILURE

This message is sent by the initiating node to indicate that removing the signaling connection cannot be accepted.

**Direction:** eNB → en-gNB, en-gNB → eNB.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>CHOICE Initiating Node Type</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;eNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Global eNB ID</td>
<td>M</td>
<td></td>
<td>9.2.22</td>
<td></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;&gt;en-gNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Global en-gNB ID</td>
<td>M</td>
<td></td>
<td>9.2.112</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.1.3 Messages for Dual Connectivity Procedures

#### 9.1.3.1 SENB ADDITION REQUEST

This message is sent by the MeNB to the SeNB to request the preparation of resources for dual connectivity operation for a specific UE.

**Direction:** MeNB → SeNB.
### IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality
--- | --- | --- | --- | --- | --- | ---
Message Type | M | | 9.2.13 | | YES | reject
MeNB UE X2AP ID | M | | eNB UE X2AP ID 9.2.24 | Allocated at the MeNB | YES | reject
UE Security Capabilities | C-ifSCGBearerOption | | 9.2.29 | | YES | reject
SeNB Security Key | C-ifSCGBearerOption | | 9.2.72 | The S-KeNB which is provided by the MeNB, see TS 33.401 [18]. | YES | reject
SeNB UE Aggregate Maximum Bit Rate | M | | UE Aggregate Maximum Bit Rate 9.2.12 | The UE Aggregate Maximum Bit Rate is split into MeNB UE Aggregate Maximum Bit Rate and SeNB UE Aggregate Maximum Bit Rate which are enforced by MeNB and SeNB respectively. | YES | reject
Serving PLMN | O | PLMN Identity 9.2.4 | The serving PLMN of the SCG in the SeNB. | YES | ignore

#### E-RABs To Be Added List

<table>
<thead>
<tr>
<th>Item</th>
<th>Presence</th>
<th>Range</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-RABs To Be Added Item</td>
<td>1</td>
<td></td>
<td>YES reject</td>
</tr>
<tr>
<td>&gt;E-RABs To Be Added Item</td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td>EACH reject</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&gt;E-RABs To Be Added Item</th>
<th>Presence</th>
<th>Range</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;&gt;CHOICE Bearer Option</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;SCG Bearer</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.9</td>
<td>Includes necessary QoS parameters</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB Level QoS Parameters</td>
<td>O</td>
<td>9.2.5</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;S1 UL GTP Tunnel Endpoint</td>
<td>M</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SGW endpoint of the S1 transport bearer. For delivery of UL PDUs.</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Correlation ID</td>
<td>O</td>
<td>Correlation ID 9.2.84</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;SIPTO Correlation ID</td>
<td>O</td>
<td>Correlation ID 9.2.84</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Split Bearer</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.9</td>
<td>Includes necessary QoS parameters</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB Level QoS Parameters</td>
<td>M</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>MeNB endpoint of the X2 transport bearer. For delivery of UL PDUs.</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;MeNB GTP Tunnel Endpoint</td>
<td>M</td>
<td>OCTET STRING</td>
<td>Includes the SCG-ConfigInfo message as defined in TS 36.331 [9]</td>
</tr>
<tr>
<td>MeNB to SeNB Container</td>
<td>O</td>
<td>9.2.52</td>
<td>YES reject</td>
</tr>
<tr>
<td>CSG Membership Status</td>
<td>O</td>
<td>9.2.24</td>
<td>Allocated at the SeNB</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>O</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>YES reject</td>
</tr>
</tbody>
</table>
### Range bound

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

### Condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifSCGBearerOption</td>
<td>This IE shall be present if the <em>Bearer Option</em> IE is set to the value “SCG bearer”.</td>
</tr>
</tbody>
</table>

#### 9.1.3.2  SENB ADDITION REQUEST ACKNOWLEDGE

This message is sent by the SeNB to confirm the MeNB about the SeNB addition preparation.

Direction: SeNB → MeNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>E-RABs Admitted To Be Added List</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;E-RABs Admitted To Be Added Item</td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Bearer Option</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;SCG Bearer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;S1 DL GTP Tunnel Endpoint</td>
<td>M</td>
<td>9.2.23</td>
<td>GTP Tunnel Endpoint</td>
<td>SeNB endpoint of the S1 transport bearer. For delivery of DL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;UL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Split Bearer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;SeNB GTP Tunnel Endpoint</td>
<td>M</td>
<td></td>
<td>GTP Tunnel Endpoint</td>
<td>Endpoint of the X2 transport bearer at the SeNB.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-RABs Not Admitted List</td>
<td>O</td>
<td>9.2.28</td>
<td>E-RAB List</td>
<td>A value for E-RAB ID shall only be present once in E-RABs Admitted List IE and in E-RABs Not Admitted List IE.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SeNB to MeNB Container</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes the SCG-Config message as defined in TS 36.331 [9]</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td>BIT STRING</td>
<td>Indicating GW Transport Layer Address.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>GW Transport Layer Address</td>
<td>O</td>
<td></td>
<td>BIT STRING</td>
<td>Indicating GW Transport Layer Address.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SIPTO L-GW Transport Layer Address</td>
<td>O</td>
<td></td>
<td>BIT STRING</td>
<td>Indicating SIPTO L-GW Transport Layer Address.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>9.2.86</td>
<td>Extended eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td>9.2.86</td>
<td>Extended eNB UE X2AP ID</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Tunnel Information for BBF</td>
<td>O</td>
<td>9.2.89</td>
<td>Tunnel Information</td>
<td>Indicating eNB’s Local IP Address assigned by the broadband access provider, UDP port Number.</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>
9.1.3.3 SENB ADDITION REQUEST REJECT

This message is sent by the SeNB to inform the MeNB that the SeNB Addition Preparation has failed.

Direction: SeNB → MeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

9.1.3.4 SENB RECONFIGURATION COMPLETE

This message is sent by the MeNB to the SeNB to indicate whether the configuration requested by the SeNB was applied by the UE.

Direction: MeNB → SeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Response Information</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Response Type</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Configuration successfully applied</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;MeNB to SeNB Container</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes the SCG-ConfigInfo message as defined in TS 36.331 [9]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;Configuration rejected by the MeNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;MeNB to SeNB Container</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes the SCG-ConfigInfo message as defined in TS 36.331 [9]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;MeNB to SeNB Container</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

Range bound: maxnoofBearers
Explanation: Maximum no. of E-RABs. Value is 256
9.1.3.5  SENB MODIFICATION REQUEST

This message is sent by the MeNB to the SeNB to request the preparation to modify SeNB resources for a specific UE.

Direction: MeNB → SeNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td></td>
<td>9.2.6</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SCG Change Indication</td>
<td>O</td>
<td></td>
<td>9.2.73</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Serving PLMN</td>
<td>O</td>
<td>0..1</td>
<td>PLMN Identity 9.2.4</td>
<td>The serving PLMN of the SCG in the SeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>UE Context Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UE Security Capabilities</td>
<td>O</td>
<td>9.2.29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;SeNB Security Key</td>
<td>O</td>
<td>9.2.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;SeNB UE Aggregate Maximum Bit Rate</td>
<td>O</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs To Be Added List</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs To Be Added Item</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;CHOICE Bearer Option</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;SCG Bearer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB Level QoS Parameters</td>
<td>M</td>
<td>9.2.9</td>
<td></td>
<td>Includes necessary QoS parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DL Forwarding</td>
<td>O</td>
<td>9.2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;S1 UL GTP Tunnel Endpoint</td>
<td>M</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SGW endpoint of the S1 transport bearer. For delivery of UL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Correlation ID</td>
<td>O</td>
<td></td>
<td>Correlation ID 9.2.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;SIPTO Correlation ID</td>
<td>O</td>
<td></td>
<td>Correlation ID 9.2.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Split Bearer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB Level QoS Parameters</td>
<td>M</td>
<td>9.2.9</td>
<td></td>
<td>Includes necessary QoS parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;MeNB GTP Tunnel Endpoint</td>
<td>M</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>MeNB endpoint of the X2 transport bearer. For delivery of UL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs To Be Modified List</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs To Be Modified Item</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;CHOICE Bearer Option</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;SCG Bearer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB Level QoS Parameters</td>
<td>O</td>
<td>9.2.9</td>
<td></td>
<td>Includes QoS parameters to be modified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;S1 UL GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SGW endpoint of the S1 transport bearer. For delivery of UL PDUs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### E-RABs To Be Released List

| >>>> E-RABs To Be Released Item | 0..1 |

#### E-RABs To Be Released Item

| CHOICE Bearer Option |

### SCG Bearer

| >>>> E-RAB ID | M |

#### DL Forwarding GTP Tunnel Endpoint

| >>>> GTP Tunnel Endpoint 9.2.1 |

#### UL Forwarding GTP Tunnel Endpoint

| >>>> GTP Tunnel Endpoint 9.2.1 |

#### SplitBearer

| >>>> E-RAB ID | M |

#### DL Forwarding GTP Tunnel Endpoint

| >>>> GTP Tunnel Endpoint 9.2.1 |

### MeNB to SeNB Container

| OCTET STRING |

#### CSG Membership Status

| 9.2.52 |

### MeNB UE X2AP ID Extension

| Extended eNB UE X2AP ID 9.2.86 |

### SeNB UE X2AP ID Extension

| Extended eNB UE X2AP ID 9.2.86 |

#### Range bound

| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |

### 9.1.3.6 SENB MODIFICATION REQUEST ACKNOWLEDGE

This message is sent by the SeNB to confirm the MeNB’s request to modify the SeNB resources for a specific UE.

Direction: SeNB → MeNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

**E-RABs Admitted List**

<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>0..1</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
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</tbody>
</table>

**>E-RABs Admitted To Be Added List**

<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>1</td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**>>>E-RABs Admitted To Be Added Item**

<table>
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<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>1 .. &lt;maxnoof Bearer&gt;</td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

**>>>CHOICE Bearer Option**

<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></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**>>>SCG Bearer**

<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>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<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>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**>>>S1 DL GTP Tunnel Endpoint**

<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>GTP Tunnel Endpoint 9.2.1</td>
<td>SeNB endpoint of the S1 transport bearer. For delivery of DL PDUs.</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**>>>DL Forwarding GTP Tunnel Endpoint**

<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>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**>>>UL Forwarding GTP Tunnel Endpoint**

<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>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**>>>Split Bearer**

<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>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<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>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**>>>SeNB GTP Tunnel Endpoint**

<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>GTP Tunnel Endpoint 9.2.1</td>
<td>Endpoint of the X2 transport bearer at the SeNB.</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**>E-RABs Admitted To Be Modified List**

<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>0..1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**>>>E-RABs Admitted To Be Modified Item**

<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>1 .. &lt;maxnoof Bearer&gt;</td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

**>>>CHOICE Bearer Option**

<table>
<thead>
<tr>
<th>Presence</th>
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<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></td>
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**>>>SCG Bearer**

<table>
<thead>
<tr>
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<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>
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<td></td>
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<td></td>
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**>>>S1 DL GTP Tunnel Endpoint**

<table>
<thead>
<tr>
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<th>IE type and reference</th>
<th>Semantics description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SeNB endpoint of the S1 transport bearer. For delivery of DL PDUs.</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**>>>Split Bearer**

<table>
<thead>
<tr>
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<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>9.2.23</td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<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>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
9.1.3.7  SENB MODIFICATION REQUEST REJECT

This message is sent by the SeNB to inform the MeNB that the MeNB initiated SeNB Modification Preparation has failed.

Direction: SeNB → MeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

**Range bound**

<table>
<thead>
<tr>
<th>maxnoofBearers</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum no. of E-RABs. Value is 256</td>
<td></td>
</tr>
</tbody>
</table>
9.1.3.8  SENB MODIFICATION REQUIRED

This message is sent by the SeNB to the MeNB to request the modification of SeNB resources for a specific UE.

Direction: SeNB → MeNB.

<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>9.2.13</td>
<td>M</td>
<td>Allocating the SeNB resources</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td>M</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SCG Change Indication</td>
<td>O</td>
<td>9.2.73</td>
<td>M</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>E-RABs To Be Released List</td>
<td>O</td>
<td>9.2.73</td>
<td>M</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs To Be Released Item</td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td>eNB UE X2AP ID</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cause</td>
<td>M</td>
<td>9.2.6</td>
<td>eNB UE X2AP ID</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB to MeNB Container</td>
<td>O</td>
<td>OCTET</td>
<td>STRING</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>9.2.86</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
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<td>reject</td>
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<tr>
<td>SeNB UE X2AP ID Extension</td>
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<td>eNB UE X2AP ID</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

Range bound | Explanation
maxnoofBearers | Maximum no. of E-RABs. Value is 256

9.1.3.9  SENB MODIFICATION CONFIRM

This message is sent by the MeNB to inform the SeNB about the successful modification.

Direction: MeNB → SeNB.
### Table

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>MeNB to SeNB Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the SCG-ConfigInfo message as defined in TS 36.331 [9]</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

#### Range bound

<table>
<thead>
<tr>
<th>maxnoofBearers</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

## 9.1.3.10 SENB MODIFICATION REFUSE

This message is sent by the MeNB to inform the SeNB that the SeNB initiated SeNB Modification has failed.

**Direction**: MeNB $\rightarrow$ SeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB to SeNB Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the SCG-ConfigInfo message as defined in TS 36.331 [9]</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>
9.1.3.11 SENB RELEASE REQUEST

This message is sent by the MeNB to the SeNB to request the release of resources.

| Direction: MeNB → SeNB. |

### Table: SENB RELEASE REQUEST

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>O</td>
<td>9.2.6</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>O</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td><strong>E-RABs To Be Released List</strong></td>
<td></td>
<td></td>
<td>0..1</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td><strong>&gt; E-RABs To Be Released Item</strong></td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td><strong>&gt;&gt;CHOICE Bearer Option</strong></td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;SCG Bearer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;UL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;Split Bearer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>UE Context Kept Indicator</td>
<td>O</td>
<td>9.2.85</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MakeBeforeBreak Indicator</td>
<td>O</td>
<td></td>
<td>ENUMERATED (True, ...)</td>
<td></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>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

9.1.3.12 SENB RELEASE REQUIRED

This message is sent by the SeNB to request the release of all resources for a specific UE at the SeNB.
Direction: SeNB → MeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>SeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>

9.1.3.13 SENB RELEASE CONFIRM

This message is sent by the MeNB to confirm the release of all resources for a specific UE at the SeNB.

Direction: MeNB → SeNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RABs to be Released List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

**E-RABs To Be Released Item**

<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></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

<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></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

<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></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

<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></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

**Range bound**

<table>
<thead>
<tr>
<th>maxnoofBearers</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

### 9.1.3.14 SENB COUNTER CHECK REQUEST

This message is sent by the SeNB to request the verification of the value of the PDCP COUNTs associated with SCG bearers established in the SeNB.

Direction: SeNB → MeNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE</td>
<td>9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE</td>
<td>9.2.24</td>
<td>Allocated at the SeNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

| E-RABs Subject to Counter Check List | 1 | YES | ignore |
|                                     |   |     |       |
| >E-RABs Subject to Counter Check Item | 1 ..  <maxnoof Bearers> | EACH | ignore |
| >>E-RAB ID                    | M | 9.2.23 |       |
| >>UL COUNT                    | M | INTEGER(0..4294967295) | Indicates the value of uplink COUNT associated to this E-RAB. | - | - |
| >>DL COUNT                    | M | INTEGER(0..4294967295) | Indicates the value of downlink COUNT associated to this E-RAB. | - | - |
| MeNB UE X2AP ID Extension    | O | Extended eNB UE X2AP ID 9.2.86 | Allocated at the MeNB | YES | ignore |
| SeNB UE X2AP ID Extension    | O | Extended eNB UE X2AP ID 9.2.86 | Allocated at the SeNB | YES | ignore |

### Range bound

| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |

### 9.1.4 Messages for E-UTRAN-NR Dual Connectivity Procedures

#### 9.1.4.1 SGNB ADDITION REQUEST

This message is sent by the MeNB to the en-gNB to request the preparation of resources for EN-DC operation for a specific UE.

Direction: MeNB → en-gNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>NR UE Security Capabilities</td>
<td>M</td>
<td>9.2.107</td>
<td></td>
<td>The S-KgNB which is provided by the MeNB, see TS 33.401 [18].</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SgNB Security Key</td>
<td>M</td>
<td>9.2.101</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SgNB UE Aggregate Maximum Bit Rate</td>
<td>M</td>
<td>UE Aggregate Maximum Bit Rate 9.2.12</td>
<td>The UE Aggregate Maximum Bit Rate is split into MeNB UE Aggregate Maximum Bit Rate and SgNB UE Aggregate Maximum Bit Rate which are enforced by MeNB and en-gNB respectively.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Selected PLMN</td>
<td>O</td>
<td>PLMN Identity 9.2.4</td>
<td>The selected PLMN of the SCG in the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Handover Restriction List</td>
<td>O</td>
<td>9.2.3</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-RABs To Be Added List</td>
<td>1</td>
<td></td>
<td></td>
<td>EACH reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs To Be Added Item</td>
<td>1 .. &lt;maxnoof Bearers&gt;</td>
<td></td>
<td></td>
<td>EACH reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DRB ID</td>
<td>M</td>
<td>9.2.122</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td>EN-DC Resource Configuration 9.2.108</td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP present in SN</td>
<td>C-ifMCGandSCGpresent, GBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Full E-RAB Level QoS Parameters</td>
<td>M</td>
<td>E-RAB Level QoS Parameters 9.2.9</td>
<td>Includes the E-RAB level QoS parameters as received on S1-MME.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Maximum MCG admissible E-RAB Level QoS Parameters</td>
<td>C-ifMCGandSCGpresent, GBR</td>
<td>GBR QoS Information 9.2.10</td>
<td>Includes the GBR QoS Information admissible by the MCG.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DL Forwarding</td>
<td>O</td>
<td>9.2.5</td>
<td></td>
<td>MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;MeNB DL GTP TEID at MCG</td>
<td>C-ifMCGpresent</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;S1 UL GTP Tunnel Endpoint</td>
<td>M</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SGW endpoint of the S1-U transport bearer. For delivery of UL PDU's from the en-gNB.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter</td>
<td>Type</td>
<td>Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDCP not present in SN</td>
<td></td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;not present&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requested SCG E-RAB Level QoS Parameters</td>
<td>M</td>
<td>Includes E-RAB level QoS parameters requested to be provided by the SCG.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB UL GTP TEID at PDCP</td>
<td>M</td>
<td>MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary MeNB UL GTP TEID at PDCP</td>
<td>O</td>
<td>MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs in case of PDCP duplication.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RLC Mode</td>
<td>M</td>
<td>Indicates the RLC mode.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UL configuration</td>
<td>C- ifMCGand SCGprese nt</td>
<td>Information about UL usage in the en-gNB.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB to SgNB Container</td>
<td>M OCTET STRING</td>
<td>Includes the CG-ConfigInfo message as defined in TS 38.331 [31].</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>O</td>
<td>Allocated at the en-gNB.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected UE Behaviour</td>
<td>O 9.2.70</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requested split SRBs</td>
<td>O ENUMERATED (srb1, srb2, srb1&amp;2,...)</td>
<td>Indicates that resources for Split SRB are requested.</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB Resource Coordination Information</td>
<td>O 9.2.116</td>
<td>Information used to coordinate resources utilisation between MeNB and en-gNB.</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SGNB Addition Trigger Indication</td>
<td>O ENUMERATED (SN change, inter-eNB HO, intra-eNB HO,...)</td>
<td>This IE indicates the trigger for SGNB Addition procedure.</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscriber Profile ID for RAT/Frequency priority</td>
<td>O 9.2.25</td>
<td>Indicates the cell ID for PCell in MeNB.</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB Cell ID</td>
<td>M ECGI 9.2.14</td>
<td>Indicates the cell ID for PCell in MeNB.</td>
<td>YES reject</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Range bound**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256.</td>
</tr>
</tbody>
</table>
9.1.4.2 SGNB ADDITION REQUEST ACKNOWLEDGE

This message is sent by the en-gNB to confirm the MeNB about the SgNB addition preparation.

Direction: en-gNB → MeNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID</td>
<td>9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td>en-gNB UE X2AP ID</td>
<td>9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>E-RABs Admitted To Be Added List</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;E-RABs Admitted To Be Added Item</td>
<td>1 .. &lt;maxnoofBearers&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td>EN-DC Resource Configuration</td>
<td>9.2.108</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;PDPC present in SN</td>
<td></td>
<td></td>
<td></td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;S1 DL GTP TEID at the SgNB</td>
<td>M</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>en-gNB endpoint of the S1 transport bearer. For delivery of DL PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;SgNB UL GTP TEID at PDCP</td>
<td>C-</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>en-gNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;RLC Mode</td>
<td>C-</td>
<td>RLC Mode 9.2.119</td>
<td>Indicates the RLC mode.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;UL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Requested MCG E-RAB Level QoS Parameters</td>
<td>C-</td>
<td>E-RAB Level QoS Parameters 9.2.9</td>
<td>Includes E-RAB level QoS parameters requested to be provided by the MCG.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;UL configuration</td>
<td>C-</td>
<td>9.2.118</td>
<td>Information about UL usage in the MeNB.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;PDPC not present in SN</td>
<td></td>
<td></td>
<td></td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;not present&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range bound</td>
<td>Explanation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifMCGpresent</td>
<td>This IE shall be present if, for the E-RAB admitted to be added, the MCG resources IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
</tr>
<tr>
<td>ifMCGandSCGpresent</td>
<td>This IE shall be present if, for the E-RAB admitted to be added, the MCG resources and SCG resources IEs in the EN-DC Resource Configuration IE are set to the value &quot;present&quot;.</td>
</tr>
<tr>
<td>C-ifMCGandSCGpresent_GBRpresent</td>
<td>This IE shall be present if, for the E-RAB admitted to be added, the MCG resources and SCG resources IEs in the EN-DC Resource Configuration IE are set to the value &quot;present&quot;, and the GBR QoS Information IE is present in the Requested MCG E-RAB Level QoS Parameters IE.</td>
</tr>
</tbody>
</table>

### 9.1.4.3 SGNB ADDITION REQUEST REJECT

This message is sent by the en-gNB to inform the MeNB that the SgNB Addition Preparation has failed.

Direction: en-gNB → MeNB.
### 9.1.4.4 SGNB RECONFIGURATION COMPLETE

This message is sent by the MeNB to the en-gNB to indicate whether the configuration requested by the en-gNB was applied by the UE.

Direction: MeNB → en-gNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>O</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>

**Response Information**

- **Configuration successfully applied**
  - **MeNB to SgNB Container**
    - Presence: O
    - Range: OCTET STRING
    - Semantics description: Includes the NR RRCReconfiguration Complete message as defined in TS 38.331 [31].
    - Criticality: -
  - **Configuration rejected**
    - **Cause**
      - Presence: M
      - Range: 9.2.6
      - Assigned Criticality: -

### 9.1.4.5 SGNB MODIFICATION REQUEST

This message is sent by the MeNB to the en-gNB to request the preparation to modify en-gNB resources for a specific UE, to query for the current SCG configuration, or to provide the S-RLF-related information to the en-gNB.

Direction: MeNB → en-gNB.
<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>9.2.13</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Selected PLMN</td>
<td>O</td>
<td>9.2.4</td>
<td></td>
<td>The selected PLMN of the SCG in the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Handover Restriction List</td>
<td>O</td>
<td>9.2.3</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SCG Configuration Query</td>
<td>O</td>
<td>9.2.103</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>UE Context Information</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;NR UE Security Capabilities</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;SgNB Security Key</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;SgNB UE Aggregate Maximum Bit Rate</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;E-RABs To Be Added List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;E-RABs To Be Added Item</td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;DRB ID</td>
<td>M</td>
<td>9.2.122</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td>9.2.108</td>
<td></td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;PDCP present in SN</td>
<td></td>
<td></td>
<td></td>
<td>This choice tag is used if the PDCP at SgNBIE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Full E-RAB Level QoS Parameters</td>
<td>M</td>
<td>E-RAB Level QoS Parameters 9.2.9</td>
<td>Includes E-RAB level QoS parameters as received on S1-MME.</td>
<td></td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Maximum MCG admissible E-RAB Level QoS Parameters</td>
<td>C-ifMCGandSCGpresent_GBR</td>
<td>GBR QoS Information 9.2.10</td>
<td>Includes the GBR QoS Information admissible by the MCG.</td>
<td></td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL Forwarding</td>
<td>O</td>
<td>9.2.5</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;MeNB DL GTP TEID at MCG</td>
<td>C-ifMCGpresent</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs.</td>
<td></td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;S1 UL GTP Tunnel Endpoint</td>
<td>M</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SGW endpoint of the S1-U transport bearer. For delivery of UL PDUs from the en-gNB.</td>
<td></td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;PDCP not present in SN</td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Requested SCG E-RAB Level QoS Parameters</td>
<td>Includes necessary E-RAB level QoS parameters requested to be provided by the SCG.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;MeNB UL GTP TEID at PDCP</td>
<td>MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Secondary MeNB UL GTP TEID at PDCP</td>
<td>MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs in case of PDCP duplication.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;RLC Mode</td>
<td>Indicates the RLC mode.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;UL configuration</td>
<td>Information about UL usage in the eNB.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs To Be Modified List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs To Be Modified Item</td>
<td>1..&lt;maxnoofBearers&gt; EACH ignore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;E-RAB ID</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;EN-DC Resource Configuration</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;PDCP present in SN</td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Full E-RAB Level QoS Parameters</td>
<td>Includes E-RAB level QoS parameters to be modified as received on S1-MME.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Maximum MCG admissible E-RAB Level QoS Parameters</td>
<td>Includes the E-RAB Level QoS parameters admissible by the MCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;MeNB GTP TEID at MCG</td>
<td>MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETSI TS 136 423 V15.2.0 (2018-07)</td>
<td>144</td>
<td>3GPP TS 36.423 version 15.2.0 Release 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| | | |
| >>>>> S1 UL GTP Tunnel Endpoint | O | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1-U transport bearer. For delivery of UL PDUs from the en-gNB. |
| >>>>> PDCP not present in SN | | This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value "not present". |
| >>>>> Requested SCG E-RAB Level QoS Parameters | O | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the SCG. |
| >>>>> MeNB UL GTP TEID at PDCP | O | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs. |
| >>>>> UL configuration | O | 9.2.118 Information about UL usage in the en-gNB. |

<p>| | | |
| | | |
| &gt;E-RABs To Be Released List | 0..1 | |
| &gt;&gt;E-RABs To Be Released Item | 1..&lt;maxnoofBearers&gt; | EACH | ignore |
| &gt;&gt;E-RAB ID | M | 9.2.23 | |
| &gt;&gt;&gt;EN-DC Resource Configuration | M | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. |
| &gt;&gt;&gt;CHOICE Resource Configuration | M | |
| &gt;&gt;&gt;&gt;&gt; PDCP present in SN | | This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;. |
| &gt;&gt;&gt;&gt;&gt; DL Forwarding GTP Tunnel Endpoint | O | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs |
| &gt;&gt;&gt;&gt;&gt; UL Forwarding GTP Tunnel Endpoint | O | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs |
| &gt;&gt;&gt;&gt;&gt; PDCP not present in SN | | This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;not present&quot;. |
| &gt;Subscriber Profile ID for RAT/Frequency priority | O | 9.2.25 | - | - |
| MeNB to SgNB Container | O | OCTET STRING | Includes the CG-ConfigInfo message as defined in TS 38.331 [31]. | YES | reject |</p>
<table>
<thead>
<tr>
<th>MeNB UE X2AP ID Extension</th>
<th>O</th>
<th>Extended eNB UE X2AP ID 9.2.86</th>
<th>Allocated at the MeNB</th>
<th>YES</th>
<th>reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>MeNB Resource Coordination Information</td>
<td>O</td>
<td>9.2.116</td>
<td>Information used to coordinate resources utilisation between MeNB and en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Requested split SRBs</td>
<td>O</td>
<td>ENUMERATED (srb1, srb2, srb1&amp;2, ...)</td>
<td>Indicates that resources for Split SRB are requested.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Requested split SRBs release</td>
<td>O</td>
<td>ENUMERATED (srb1, srb2, srb1&amp;2, ...)</td>
<td>Indicates that resources for Split SRB are requested to be released.</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>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifMCGandSCGpresent</td>
<td>This IE shall be present if, for the E-RAB requested to be added, the MCG resources and SCG resources IEs in the EN-DC Resource Configuration IE are set to the value &quot;present&quot;.</td>
</tr>
<tr>
<td>ifMCGpresent</td>
<td>This IE shall be present if, for the E-RAB requested to be added, the MCG resources IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
</tr>
<tr>
<td>C-ifMCGandSCGpresent_GBR</td>
<td>This IE shall be present if, for the E-RAB requested to be added, the MCG resources and SCG resources IEs in the EN-DC Resource Configuration IE are set to the value &quot;present&quot;, and GBR QoS Information IE is present in Full E-RAB Level QoS Parameters IE.</td>
</tr>
</tbody>
</table>

### 9.1.4.6 SGNB MODIFICATION REQUEST ACKNOWLEDGE

This message is sent by the en-gNB to confirm the MeNB’s request to modify the en-gNB resources for a specific UE.

Direction: en-gNB → MeNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES reject</td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES ignore</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES ignore</td>
<td></td>
</tr>
<tr>
<td>E-RABs Admitted List</td>
<td>0..1</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs Admitted To Be Added List</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs Admitted To Be Added Item</td>
<td>1..&lt;maxnof Beacers&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td>EN-DC Resource Configuration 9.2.108</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;PDCP present in SN</td>
<td></td>
<td></td>
<td></td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;S1 DL GTP TEID at the SgNB</td>
<td>M</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SgNB endpoint of the S1 transport bearer. For delivery of DL PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;SgNB UL GTP TEID at PDCP</td>
<td>C-ifMCGpresent</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;RLC Mode</td>
<td>C-ifMCGpresent</td>
<td>RLC Mode 9.2.119</td>
<td>Indicates the RLC mode.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;UL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Requested MCG E-RAB Level QoS Parameters</td>
<td>C-ifMCGand SCGpresent_GBRpresent</td>
<td>E-RAB Level QoS Parameters 9.2.9</td>
<td>Includes E-RAB level QoS parameters requested to be provided by the MCG.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;UL configuration</td>
<td>C-ifMCGand SCGpresent</td>
<td>9.2.118</td>
<td>Information about UL usage in the MeNB.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;PDCP not present in SN</td>
<td></td>
<td></td>
<td></td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;not present&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;SgNB DL GTP TEID at SCG</td>
<td>M</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Type</td>
<td>Value</td>
<td>Description</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary SgNB DL GTP TEID at SCG</td>
<td>O</td>
<td></td>
<td>Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs in case of PDCP duplication.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs Admitted To Be Modified List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs Admitted To Be Modified Item</td>
<td>1..&lt;maxnoof Bearers&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP present in SN</td>
<td></td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;S1 DL GTP Tunnel Endpoint</td>
<td>O</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SgNB endpoint of the S1 transport bearer. For delivery of DL PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;SgNB UL GTP TEID at PDCP</td>
<td>O</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Requested MCG E-RAB Level QoS Parameters</td>
<td>O</td>
<td>E-RAB Level QoS Parameters 9.2.9</td>
<td>Includes E-RAB level QoS parameters requested to be provided by the MCG.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;UL configuration</td>
<td>O</td>
<td>9.2.118</td>
<td>Information about UL usage in the MeNB.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP not present in SN</td>
<td></td>
<td>This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value &quot;not present&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;SgNB DL GTP TEID at SCG</td>
<td>O</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RABs Admitted To Be Released List</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RABs Admitted To Be Released Item</td>
<td>1..&lt;maxnoof Bearers&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td>Note: no further information contained in the IE container</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-RABs Not Admitted List</td>
<td>O</td>
<td>E-RAB List 9.2.28</td>
<td>A value for E-RAB ID shall only be present once in E-RABs Admitted List IE and in E-RABs Not Admitted List IE.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>---</td>
<td>-----------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>SgNB to MeNB Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the NR CG-Config message as defined in TS 38.331 [31].</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SgNB Resource Coordination Information</td>
<td>O</td>
<td>9.2.117</td>
<td>Information used to coordinate resources utilisation between en-gNB and MeNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Admitted split SRBs</td>
<td>O</td>
<td>ENUMERATE D (srb1, srb2, srb1&amp;2, ...)</td>
<td>Indicates admitted SRBs</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Admitted split SRBs release</td>
<td>O</td>
<td>ENUMERATE D (srb1, srb2, srb1&amp;2, ...)</td>
<td>Indicates admitted SRBs release</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

Range bound

| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifMCGandSCGpresent</td>
<td>This IE shall be present if, for the E-RAB admitted to be added, the MCG resources and SCG resources IEs in the EN-DC Resource Configuration IE are set to the value &quot;present&quot;.</td>
</tr>
<tr>
<td>ifMCGpresent</td>
<td>This IE shall be present if, for the E-RAB admitted to be added, the MCG resources IE in the EN-DC Resource Configuration IE is set to the value &quot;present&quot;.</td>
</tr>
<tr>
<td>C-ifMCGandSCGpresent_GBRpresent</td>
<td>This IE shall be present if, for the E-RAB admitted to be added, the MCG resources and SCG resources IEs in the EN-DC Resource Configuration IE are set to the value &quot;present&quot;, and the GBR QoS Information IE is present in the Requested MCG E-RAB Level QoS Parameters IE.</td>
</tr>
</tbody>
</table>

9.1.4.7 SGNB MODIFICATION REQUEST REJECT

This message is sent by the en-gNB to inform the MeNB that the MeNB initiated SgNB Modification Preparation has failed.

Direction: en-gNB → MeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>
9.1.4.8 SGNB MODIFICATION REQUIRED

This message is sent by the en-gNB to the MeNB to request the modification of en-gNB resources for a specific UE.

Direction: en-gNB → MeNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES reject</td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDCP Change Indication</td>
<td>O</td>
<td>9.2.109</td>
<td></td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>E-RABs To Be Released List</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES ignore</td>
<td></td>
</tr>
<tr>
<td><strong>E-RABs To Be Released Item</strong></td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td></td>
<td>EACH ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SgNB to MeNB Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the NR CG-Config message as defined in TS 38.331 [31].</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>E-RABs To Be Modified List</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES ignore</td>
<td></td>
</tr>
<tr>
<td><strong>E-RABs To Be Modified Item</strong></td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td></td>
<td>EACH ignore</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td>EN-DC Resource Configuration 9.2.108</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDPC present in SN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Requested MCG E-RAB Level QoS Parameters</td>
<td>O</td>
<td>E-RAB Level QoS Parameters 9.2.9</td>
<td>Includes E-RAB level QoS parameters requested to be provided by the MCG.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;UL configuration</td>
<td>O</td>
<td>9.2.118</td>
<td>Information about UL usage in the MeNB.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;SgNB UL GTP TEID at PDCP</td>
<td>O</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;S1 DL GTP TEID at the SgNB</td>
<td>O</td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>en-gNB endpoint of the S1 transport bearer. For delivery of DL PDUs.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
>>>PDCP not present in SN

This choice tag is used if the PDCP at SgNB IE in the EN-DC Resource Configuration IE is set to the value "not present".

| >>>>>SgNB DL GTP TEID at SCG | O | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs. | – |

| >>>>>>Secondary SgNB DL GTP TEID at SCG | O | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs for PDCP duplication. | – |

| SgNB Resource Coordination Information | O | 9.2.117 | Information used to coordinate resources utilisation between the en-gNB and the MeNB. | YES | ignore |

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

9.1.4.9  SGNB MODIFICATION CONFIRM

This message is sent by the MeNB to inform the en-gNB about the successful modification.

Direction: MeNB → en-gNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RABs Admitted To Be Modified List</td>
<td></td>
<td>0..1</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;E-RABs To Be Modified Item</td>
<td></td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td></td>
<td>9.2.23</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td></td>
<td>EN-DC Resource Configuratio n 9.2.108</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP not present in SN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;Secondary MeNB UL GTP TEID at PDCP</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>MeNB endpoint of the X2-U transport bearer at the PDCP. For delivery of UL PDCP PDUs for PDCP duplication.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>MeNB to SgNB Container</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>Includes the NR RRCReconfiguration message as defined in TS 38.331 [31].</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB Resource Coordination Information</td>
<td>O</td>
<td></td>
<td>9.2.116</td>
<td>Information used to coordinate resources utilisation between the MeNB and the en-gNB.</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>maxnoOfBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

**9.1.4.10 SGNB MODIFICATION REFUSE**

This message is sent by the MeNB to inform the en-gNB that the SgNB initiated SgNB Modification has failed.

Direction: MeNB → en-gNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB to SgNB Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the CG-ConfigInfo message as defined in TS 38.331 [31].</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
</tr>
</tbody>
</table>

### 9.1.4.11 SGNB RELEASE REQUEST

This message is sent by the MeNB to the en-gNB to request the release of resources.

Direction: MeNB → en-gNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>O</td>
<td>en-gNB UE X2AP ID</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RABs To Be Released List</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt; E-RABs To Be Released Item</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td>EN-DC Resource Configuration</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP present in SN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;UL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td>GTP Tunnel Endpoint</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td>GTP Tunnel Endpoint</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;PDCP not present in SN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UE Context Kept Indicator</td>
<td>O</td>
<td>9.2.85</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>MeNB to SgNB Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the CG-ConfigInfo message as defined in TS 38.331 [31]</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>
9.1.4.12  SGNB RELEASE REQUEST ACKNOWLEDGE

This message is sent by the en-gNB to the MeNB to confirm the request to release en-gNB resources.

Direction: en-gNB → MeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>

9.1.4.13  SGNB RELEASE REQUEST REJECT

This message is sent by the en-gNB to the MeNB to reject the request to release en-gNB resources.

Direction: en-gNB → MeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>O</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>

9.1.4.14  SGNB RELEASE REQUIRED

This message is sent by the en-gNB to request the release of all resources for a specific UE at the en-gNB.

Direction: en-gNB → MeNB.

Range bound

maxnoofBearers

Explanation

Maximum no. of E-RABs. Value is 256
<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>9.2.13</td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>9.2.24</td>
<td>en-gNB UE X2AP ID</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

### 9.1.4.15 SGNB RELEASE CONFIRM

This message is sent by the MeNB to confirm the release of all resources for a specific UE at the en-gNB.

Direction: MeNB \(\rightarrow\) en-gNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RABs to be Released List</td>
<td></td>
<td>0..1</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;E-RABs To Be Released Item</td>
<td></td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td></td>
<td>9.2.23</td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td></td>
<td>EN-DC Resource Configuratio n 9.2.108</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP present in SN</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;UL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP not present in SN</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</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>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>
9.1.4.16 SGNB COUNTER CHECK REQUEST

This message is sent by the en-gNB to request the verification of the value of the PDCP COUNTs associated with the bearers established in the en-gNB.

Direction: en-gNB → MeNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RABs Subject to Counter Check List</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;E-RABs Subject to Counter Check Item</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;UL COUNT</td>
<td>M</td>
<td>INTEGER(0..4294967295)</td>
<td>Indicates the value of uplink COUNT associated to this E-RAB.</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;DL COUNT</td>
<td>M</td>
<td>INTEGER(0..4294967295)</td>
<td>Indicates the value of downlink COUNT associated to this E-RAB.</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

Range bound | Explanation
---|----------------
maxnoofBearers | Maximum no. of E-RABs. Value is 256

9.1.4.17 SGNB CHANGE REQUIRED

This message is sent by the en-gNB to the MeNB to request the change of en-gNB for a specific UE.

Direction: en-gNB → MeNB.
<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>Target SgNB ID Information</td>
<td>M</td>
<td>9.2.102</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SgNB to MeNB Container</td>
<td>O</td>
<td>OCTET STRING</td>
<td>Includes the CG-Config message as defined in TS 38.331 [31].</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
</tbody>
</table>

### 9.1.4.18 SGNB CHANGE CONFIRM

This message is sent by the MeNB to inform the en-gNB about the successful change.

Direction: MeNB → en-gNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RABs to be Released List</td>
<td></td>
<td>0..1</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;E-RABs To Be Released Item</td>
<td></td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;E-RAB ID</td>
<td>M</td>
<td></td>
<td>9.2.23</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;EN-DC Resource Configuration</td>
<td>M</td>
<td></td>
<td>EN-DC Resource Configuratio 9.2.108</td>
<td>Indicates the PDCP and Lower Layer MCG/SCG configuration.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;CHOICE Resource Configuration</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP present in SN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of DL PDUs</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;UL Forwarding GTP Tunnel Endpoint</td>
<td>O</td>
<td></td>
<td>GTP Tunnel Endpoint 9.2.1</td>
<td>Identifies the X2 transport bearer used for forwarding of UL PDUs</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;PDCP not present in SN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td></td>
<td>9.2.7</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</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>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>
9.1.4.19  SGNB CHANGE REFUSE

This message is sent by the MeNB to inform the en-gNB that the SgNB initiated SgNB Change has failed.

Direction: MeNB → en-gNB.

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Cause</td>
<td>M</td>
<td>9.2.6</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Criticality Diagnostics</td>
<td>O</td>
<td>9.2.7</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

9.1.4.20  SECONDARY RAT DATA USAGE REPORT

This message is sent by the en-gNB to report data volumes for secondary RAT.

Direction: en-gNB → MeNB

<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>9.2.13</td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID</td>
<td>Allocated at the MeNB</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>Secondary RAT Usage Report list</td>
<td>M</td>
<td>9.2.120</td>
<td></td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE X2AP ID</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

9.1.4.21  RRC TRANSFER

This message is sent by the MeNB to the en-gNB or by the en-gNB to the MeNB to transfer an RRC message.

Direction: MeNB → en-gNB or en-gNB → MeNB.
### 9.1.4.22 PARTIAL RESET REQUIRED

This message is sent by an initiating node to a neighbouring node, both nodes able to interact for EN-DC, to release all the resources for selected UEs.

Direction: en-gNB → MeNB, MeNB → en-gNB.

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

#### split SRB

- **> RRC Container**
  - Presence: O
  - Range: 0..1
  - IE type and reference: OCTET STRING
  - Semantics description: RRC message encapsulated in a PDCP-C PDU and ciphered with the key of the MeNB
  - Criticality: YES reject

- **> SRB Type**
  - Presence: M
  - Range: 9.2.104
  - IE type and reference: ENUMERATED (srb1, srb2, ...)
  - Semantics description: The SRB type
  - Criticality: YES reject

- **> Delivery status**
  - Presence: O
  - Range: 9.2.104
  - IE type and reference: DL RRC delivery status of split SRB
  - Semantics description: YES reject

#### NR UE Measurement Report

- **> RRC Container**
  - Presence: M
  - Range: "<maxnoof UEs>
  - IE type and reference: OCTET STRING
  - Semantics description: Includes the UL-DCCCH-Message as defined in subclause 6.2.1 of TS 38.331 [31] containing the MeasurementReport message.
  - Criticality: YES reject

- **MeNB UE X2AP ID Extension**
  - Presence: O
  - Range: 9.2.86
  - IE type and reference: Extended eNB UE X2AP ID 9.2.86
  - Semantics description: Allocated at the MeNB.
  - Criticality: YES reject

<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>UEs to be Reset List</td>
<td>M</td>
<td></td>
<td>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

#### >UEs To Be Reset Item

- **>>MeNB UE X2AP ID**
  - Presence: M
  - Range: 9.2.24
  - IE type and reference: eNB UE X2AP ID 9.2.24
  - Semantics description: Allocated at the MeNB.

- **>>SgNB UE X2AP ID**
  - Presence: O
  - Range: 9.2.100
  - IE type and reference: en-gNB UE X2AP ID 9.2.100
  - Semantics description: Allocated at the en-gNB.

- **>>MeNB UE X2AP ID Extension**
  - Presence: O
  - Range: 9.2.86
  - IE type and reference: Extended eNB UE X2AP ID 9.2.86
  - Semantics description: Allocated at the MeNB.

<table>
<thead>
<tr>
<th>Cause</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>9.2.6</td>
<td></td>
<td></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>maxnoofUEs</td>
<td>Maximum no. of UEs. Value is 8192.</td>
</tr>
</tbody>
</table>
9.1.4.23  PARTIAL RESET CONFIRM

This message is sent by an initiating node to a neighbouring node, both nodes able to interact for EN-DC, to confirm the release all the resources for selected UEs.

Direction: en-gNB → MeNB, MeNB → en-gNB.

<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>9.2.13</td>
<td></td>
<td>YES reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UEs Admitted to be Reset List</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;UEs Admitted To Be Reset Item</td>
<td>1 ..</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;maxnoof</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UEsineng</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NBDU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID</td>
<td>9.2.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Allocated at the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MeNB.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;SgNB UE X2AP ID</td>
<td>O</td>
<td></td>
<td>en-gNB UE X2AP ID</td>
<td>9.2.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Allocated at the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>en-gNB.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>Extended eNB UE</td>
<td>9.2.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X2AP ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Allocated at the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MeNB.</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>maxnoofUEsinengNBDU</td>
<td>Maximum no. of UEs. Value is 8192.</td>
</tr>
</tbody>
</table>

9.1.4.24  E-UTRA – NR CELL RESOURCE COORDINATION REQUEST

Direction: eNB → en-gNB, en-gNB → eNB.

This message is sent by a neighbouring eNB to a peer en-gNB or by a neighbouring en-gNB to a peer eNB, both nodes able to interact for EN-DC, to express the desired resource allocation for data traffic, for the sake of E-UTRA - NR Cell Resource Coordination.
### Message Type M 9.2.13 YES reject

- **IE/Group Name**: Message Type
- **Presence**: M
- **Range**: 9.2.13
- **Semantics**: Indicates resource allocations for data traffic.
- **Criticality**: YES reject

### CHOICE Initiating Node Type M

- **IE/Group Name**: CHOICE Initiating Node Type
- **Presence**: M
- **Range**: 9.2.126
- **Semantics**: Indicates the E-UTRA cells involved in resource coordination with the NR cells affiliated with the same Spectrum Sharing Group ID.
- **Criticality**: YES reject

### >>Data Traffic Resource Indication M 9.2.126

- **IE/Group Name**: >>Data Traffic Resource Indication
- **Presence**: M
- **Range**: 9.2.126
- **Semantics**: Indicates resource allocations for data traffic.
- **Criticality**: YES reject

### >>Spectrum Sharing Group ID M

- **IE/Group Name**: >>Spectrum Sharing Group ID
- **Presence**: M
- **Range**: INTEGER (1..maxCellineNB)
- **Semantics**: Indicates the E-UTRA cells involved in resource coordination with the NR cells affiliated with the same Spectrum Sharing Group ID.
- **Criticality**: YES reject

### >>List of E-UTRA Cells in E-UTRA Coordination Request 0..<maxCellineNB

- **IE/Group Name**: >>List of E-UTRA Cells in E-UTRA Coordination Request
- **Presence**: M
- **Range**: 0..<maxCellineNB
- **Semantics**: List of applicable E-UTRA cells.
- **Criticality**: YES reject

### >>EUTRA Cell ID M

- **IE/Group Name**: >>EUTRA Cell ID
- **Presence**: M
- **Range**: ECGI 9.2.14
- **Criticality**: – –

### >>en-gNB

- **IE/Group Name**: >>en-gNB
- **Presence**: M
- **Range**: 9.2.126
- **Semantics**: Indicates resource allocations for data traffic.
- **Criticality**: YES reject

### >>List of E-UTRA Cells in NR Coordination Request 1..<maxCellineNB

- **IE/Group Name**: >>List of E-UTRA Cells in NR Coordination Request
- **Presence**: M
- **Range**: 1..<maxCellineNB
- **Semantics**: List of applicable E-UTRA cells.
- **Criticality**: YES reject

### >>EUTRA Cell ID M

- **IE/Group Name**: >>EUTRA Cell ID
- **Presence**: M
- **Range**: ECGI 9.2.14
- **Criticality**: – –

### >>Spectrum Sharing Group ID M

- **IE/Group Name**: >>Spectrum Sharing Group ID
- **Presence**: M
- **Range**: INTEGER (1..maxCellineNB)
- **Semantics**: Indicates the NR cells involved in resource coordination with the E-UTRA cells affiliated with the same Spectrum Sharing Group ID.
- **Criticality**: YES reject

### >>List of NR Cells in NR Coordination Request 0..<maxnoNRcellsSpectrumSharingwithE-UTRA

- **IE/Group Name**: >>List of NR Cells in NR Coordination Request
- **Presence**: M
- **Range**: 0..<maxnoNRcellsSpectrumSharingwithE-UTRA
- **Semantics**: List of applicable NR cells.
- **Criticality**: YES reject

### >>NR-Cell ID M

- **IE/Group Name**: >>NR-Cell ID
- **Presence**: M
- **Range**: NR-CGI 9.2.105
- **Criticality**: – –

---

### Range bound

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellineNB</td>
<td>Maximum no. of E-UTRA cells in eNB. Value is 256.</td>
</tr>
<tr>
<td>maxnoNRcellsSpectrumSharingwithE-UTRA</td>
<td>Maximum no. of NR cells involved in spectrum sharing with an eNB. Value is 64.</td>
</tr>
</tbody>
</table>

### 9.1.4.25 E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE

**Direction**: eNB → en-gNB, en-gNB → eNB.

This message is sent by a neighbouring eNB to a peer en-gNB or by a neighbouring en-gNB to a peer eNB, both nodes able to interact for EN-DC, as a response to the E-UTRA – NR CELL RESOURCE COORDINATION REQUEST.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>CHOICE</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NodeType</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;eNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Data Traffic Resource Indication</td>
<td>M</td>
<td>9.2.126</td>
<td></td>
<td>Indicates resource allocations for data traffic.</td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>&gt;&gt;Spectrum Sharing Group ID</td>
<td>M</td>
<td>INTEGER (1..maxCellineNB)</td>
<td>Indicates the E-UTRA cells involved in resource coordination with the NR cells affiliated with the same Spectrum Sharing Group ID.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;List of E-UTRA Cells in E-UTRA Coordination Response</td>
<td>1..&lt;maxCellineNB&gt;</td>
<td>List of applicable E-UTRA cells</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;EUTRA Cell ID</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;en-gNB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Data Traffic Resource Indication</td>
<td>M</td>
<td>9.2.126</td>
<td>Indicates resource allocations for data traffic.</td>
<td>YES</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>Indicates the NR cells involved in resource coordination with the E-UTRA cells affiliated with the same Spectrum Sharing Group ID.</td>
<td>YES</td>
<td>reject</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;List of NR Cells in NR Coordination Response</td>
<td>1..&lt;maxnoNRcellsSpectrumSharingwithE-UTRA&gt;</td>
<td>List of applicable NR cells</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;NR Cell ID</td>
<td>M</td>
<td>NR-CGI 9.2.105</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>maxCellineNB</td>
<td>Maximum no. of E-UTRA cells in eNB. Value is 256.</td>
</tr>
<tr>
<td>maxnoNRcellsSpectrumSharingwithE-UTRA</td>
<td>Maximum no. of NR cells involved in spectrum sharing with an eNB. Value is 64.</td>
</tr>
</tbody>
</table>

### 9.1.4.26 SGNB ACTIVITY NOTIFICATION

This message is sent by the en-gNB to inform the MeNB that resources for E-RABs controlled by the en-gNB have not been used or are in use again.

Direction: en-gNB → MeNB.
<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>9.2.13</td>
<td></td>
<td>YES</td>
<td>reject</td>
</tr>
<tr>
<td>MeNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>eNB UE X2AP ID 9.2.24</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>SgNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>en-gNB UE X2AP ID 9.2.100</td>
<td>Allocated at the en-gNB.</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>UE Context level user plane activity report</td>
<td>O</td>
<td></td>
<td>User plane traffic activity report 9.2.130</td>
<td></td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>E-RAB Activity Notify Item List</td>
<td>0..&lt;maxnoofBearers&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RAB ID</td>
<td>M</td>
<td></td>
<td>9.2.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;User plane traffic activity report</td>
<td>M</td>
<td></td>
<td>9.2.130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeNB UE X2AP ID Extension</td>
<td>O</td>
<td></td>
<td>eNB UE X2AP ID 9.2.86</td>
<td>Allocated at the MeNB.</td>
<td>YES</td>
<td>reject</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofBearers</td>
<td>Maximum no. of E-RABs. Value is 256</td>
</tr>
</tbody>
</table>

### 9.2 Information Element definitions

#### 9.2.0 General

When specifying information elements which are to be represented by bit strings, 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 bit strings from other specifications, the first bit of the bit string contains the first bit of the concerned information.

#### 9.2.1 GTP Tunnel Endpoint

The **GTP Tunnel Endpoint** IE identifies an X2 transport bearer or the S-GW endpoint of the S1 transport bearer associated to an E-RAB. 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 X2 user plane transport (see TS 36.424 [8]) or for the S1 user plane transport (see TS 36.414 [19]). The GTP Tunnel Endpoint Identifier is to be used for the user plane transport between eNB and the S-GW, between eNBs, between eNB and en-gNB, or between en-gNBs.

<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>Transport Layer Address</td>
<td>M</td>
<td></td>
<td>BIT STRING (1..160, ...)</td>
<td>For details on the Transport Layer Address, see TS 36.424 [8], TS 36.414 [19]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GTP TEID</td>
<td>M</td>
<td></td>
<td>OCTET STRING (4)</td>
<td>For details and range, see TS 29.281 [26]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.2.2 Trace Activation

Defines parameters related to trace activation.

<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-UTRAN Trace ID</td>
<td>M</td>
<td></td>
<td>OCTET STRING (8)</td>
<td>The E-UTRAN Trace ID IE is composed of the following: Trace Reference defined in TS 32.422 [6] (leftmost 6 octets, with PLMN information coded as in 9.2.4), and Trace Recording Session Reference defined in TS 32.422 [6] (last 2 octets)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Interfaces To Trace</td>
<td>M</td>
<td></td>
<td>BIT STRING (8)</td>
<td>Each position in the bitmap represents a eNB interface: first bit =S1-MME, second bit =X2, third bit =Uu. Other bits reserved for future use. Value ‘1’ indicates ‘should be traced’. Value ‘0’ indicates ‘should not be traced’.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Trace Depth</td>
<td>M</td>
<td></td>
<td>ENUMERATED( minimum, medium, maximum, MinimumWithoutVendorSpecificExtension, MediumWithoutVendorSpecificExtension, MaximumWithoutVendorSpecificExtension, ... )</td>
<td>Defined in TS 32.421 [7]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Trace Collection Entity IP Address</td>
<td>M</td>
<td></td>
<td>BIT STRING (1..160,...)</td>
<td>For details on the Transport Layer Address, see TS 36.424 [8], TS 36.414 [19]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>MDT Configuration</td>
<td>O</td>
<td>9.2.56</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td>ignore</td>
</tr>
<tr>
<td>UE Application layer measurement configuration</td>
<td>O</td>
<td>9.2.121</td>
<td>YES ignore</td>
<td></td>
<td></td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.2.3 Handover Restriction List

This IE defines roaming or access restrictions for subsequent mobility action for which the eNB provides information about the target of the mobility action towards the UE, e.g., handover and CCO, or for SCG selection during dual connectivity operation.
<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>Serving PLMN</td>
<td>M</td>
<td>PLMN Identity 9.2.4</td>
<td>Allowed PLMNs in addition to Serving PLMN.</td>
<td>This list corresponds to the list of &quot;equivalent PLMNs list&quot; as defined in TS 24.301 [14]. This list is part of the roaming restriction information. Roaming restrictions apply to PLMNs other than the serving PLMN and Equivalent PLMNs.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Equivalent PLMNs</td>
<td></td>
<td>0..&lt;maxnoof EPLMNs&gt;</td>
<td>intra E-UTRAN roaming restrictions</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;PLMN Identity</td>
<td>M</td>
<td>9.2.4</td>
<td>The PLMN of forbidden TACs</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Forbidden TAs</td>
<td></td>
<td>1..&lt;maxnoof ForbTACs&gt;</td>
<td>inter-3GPP RAT roaming restrictions</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;TAC</td>
<td>M</td>
<td>OCTET STRING(2)</td>
<td>The forbidden TAC</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Forbidden LAs</td>
<td></td>
<td>0..&lt;maxnoof EPLMNsPlusOne&gt;</td>
<td>inter-3GPP RAT roaming restrictions</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;PLMN Identity</td>
<td>M</td>
<td>9.2.4</td>
<td>The PLMN of forbidden LACs</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;Forbidden LACs</td>
<td></td>
<td>1..&lt;maxnoof ForbLACs&gt;</td>
<td>inter-3GPP and 3GPP2 RAT access restrictions. “ALL” means that all RATs mentioned in the enumeration of this IE are restricted.</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;LAC</td>
<td>M</td>
<td>OCTET STRING(2)</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Forbidden inter RATs</td>
<td>O</td>
<td>ENUMERATED(ALL, GERAN, UTRAN, CDMA2000, …,GERAN and UTRAN, CDMA2000 and UTRAN)</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>NR restriction</td>
<td>O</td>
<td>ENUMERATED(NRrestricted, …)</td>
<td>Restriction to use NR.</td>
<td>YES ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core Network Type</td>
<td></td>
<td>0..&lt;maxnoof EPLMNsPlusOne&gt;</td>
<td>Core network type restriction information as specified in TS 23.501 [38].</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrictions</td>
<td></td>
<td>9.2.4</td>
<td>The PLMN of forbidden core network.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Core Network Type</td>
<td></td>
<td>ENUMERATED(5GForbidden, …)</td>
<td>The indication indicates whether UE is allowed to connect to 5GC for this PLMN.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.2.4 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-3 - 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>

9.2.5 DL Forwarding

This element indicates that the E-RAB is proposed for forwarding of downlink packets.

<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>DL Forwarding</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(DL forwarding proposed, ...)</td>
</tr>
</tbody>
</table>

9.2.6 Cause

The purpose of the cause information element is to indicate the reason for a particular event for the whole protocol.
<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 Cause Group</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Radio Network Layer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Transport Layer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Transport Layer Cause</td>
<td>M</td>
<td></td>
<td></td>
<td>(Transport Resource Unavailable, Unspecified,...)</td>
</tr>
<tr>
<td>&gt;Protocol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The meaning of the different cause values is described in the following table. In general, "not supported" cause values indicate that the concerned capability is missing. On the other hand, "not available" cause values indicate that the concerned capability is present, but insufficient resources were available to perform the requested action.

<table>
<thead>
<tr>
<th>Cause Type</th>
<th>M</th>
<th>ENUMERATED or Misc</th>
<th>Possible Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol Cause</td>
<td></td>
<td>ENUMERATED</td>
<td>(Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State, Semantic Error, Unspecified, Abstract Syntax Error (Falsely Constructed Message), ...)</td>
</tr>
<tr>
<td>Misc</td>
<td></td>
<td>Misc</td>
<td>(Control Processing Overload, Hardware Failure, O&amp;M Intervention, Not enough User Plane Processing Resources, Unspecified, ...)</td>
</tr>
<tr>
<td>Miscellaneous Cause</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(Control Processing Overload, Hardware Failure, O&amp;M Intervention, Not enough User Plane Processing Resources, Unspecified, ...)</td>
</tr>
<tr>
<td>Radio Network Layer cause</td>
<td>Meaning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell not Available</td>
<td>The concerned cell is not available.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handover Desirable for Radio Reasons</td>
<td>The reason for requesting handover is radio related.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handover Target Not Allowed</td>
<td>Handover to the indicated target cell is not allowed for the UE in question.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invalid MME Group ID</td>
<td>The target eNB doesn’t belong to the same pool area of the source eNB i.e. S1 handovers should be attempted instead.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Radio Resources Available in Target Cell</td>
<td>The target cell doesn’t have sufficient radio resources available.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Handover</td>
<td>Provides a reason for the handover cancellation. The target eNB did not admit all E-RABs included in the HANDOVER REQUEST and the source eNB estimated service continuity for the UE would be better by not proceeding with handover towards this particular target eNB.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce Load in Serving Cell</td>
<td>Load in serving cell needs to be reduced. When applied to handover preparation, it indicates the handover is triggered due to load balancing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Optimisation Handover</td>
<td>The reason for requesting handover is to improve the load distribution with the neighbour cells.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Critical Handover</td>
<td>Handover is requested for time critical reason i.e. this cause value is reserved to represent all critical cases where the connection is likely to be dropped if handover is not performed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX2RELOCoverall Expiry</td>
<td>The reason for the action is expiry of timer TX2RELOCoverall.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRELOCprep Expiry</td>
<td>Handover Preparation procedure is cancelled when timer TRELOCprep expires.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown MME Code</td>
<td>The target eNB belongs to the same pool area of the source eNB and recognizes the MME Group ID. However, the MME Code is unknown to the target eNB.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown New eNB UE X2AP ID</td>
<td>The action failed because the New eNB UE X2AP ID or the MeNB UE X2AP ID is unknown.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown Old eNB UE X2AP ID</td>
<td>The action failed because the Old eNB UE X2AP ID or the SeNB UE X2AP ID is unknown.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown Pair of UE X2AP ID</td>
<td>The action failed because the pair of UE X2AP IDs is unknown.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encryption And/Or Integrity Protection Algorithms Not Supported</td>
<td>The target eNB is unable to support any of the encryption and/or integrity protection algorithms supported by the UE, or the en-gNB is unable to support any of the NR encryption and/or integrity protection algorithms supported by the UE for EN-DC operation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Balancing</td>
<td>The reason for mobility settings change is load balancing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handover Optimisation</td>
<td>The reason for mobility settings change is handover optimisation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value out of allowed range</td>
<td>The action failed because the proposed Handover Trigger parameter change in the eNBs Proposed Mobility Parameters IE is too low or too high.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple E-RAB ID Instances</td>
<td>The action failed because multiple instances of the same E-RAB had been provided to the eNB.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch Off Ongoing</td>
<td>The reason for the action is an ongoing switch off i.e. the concerned cell will be switched off after offloading and not be available. It aides the receiving eNB in taking subsequent actions, e.g. selecting the target cell for subsequent handovers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not supported QCI value</td>
<td>The action failed because the requested QCI is not supported.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified</td>
<td>Sent when none of the above cause values applies but still the cause is Radio Network Layer related.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement not Supported For The Object</td>
<td>At least one of the concerned cell(s) does not support the requested measurement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDCoverall Expiry</td>
<td>The reason for the action is expiry of timer TDCoverall.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDCprep Expiry</td>
<td>The reason for the action is expiry of timer TDCprep.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action Desirable for Radio Reasons</td>
<td>The reason for requesting the action is radio related. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce Load</td>
<td>Load in the cell/group served by the requesting node needs to be reduced. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cause Description</td>
<td>Meaning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Optimisation</td>
<td>The reason for requesting this action is to improve the load distribution with the neighbour cells. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Critical action</td>
<td>The action is requested for time critical reason i.e. this cause value is reserved to represent all critical cases where radio resources are likely to be dropped if the requested action is not performed. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target not Allowed</td>
<td>Requested action towards the indicated target cell is not allowed for the UE in question. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Radio Resources Available</td>
<td>The cell(s) in the requested node don’t have sufficient radio resources available. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invalid QoS combination</td>
<td>The action was failed because of invalid QoS combination. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encryption Algorithms Not Supported</td>
<td>The requested eNB is unable to support any of the encryption algorithms supported by the UE. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedure cancelled</td>
<td>The sending node cancelled the procedure due to other urgent actions to be performed. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RRM purpose</td>
<td>The procedure is initiated due to node internal RRM purposes. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve User Bit Rate</td>
<td>The reason for requesting this action is to improve the user bit rate. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Inactivity</td>
<td>The action is requested due to user inactivity on all E-RABs, e.g., S1 is requested to be released in order to optimise the radio resources; or SeNB/en-gNB didn’t see activity on the DRB recently. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio Connection With UE Lost</td>
<td>The action is requested due to losing the radio connection to the UE. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure in the Radio Interface Procedure</td>
<td>Radio interface procedure has failed. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearer Option not Supported</td>
<td>The requested bearer option is not supported by the sending node. In the current version of this specification applicable for Dual Connectivity only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCG Mobility</td>
<td>The procedure is initiated due to mobility related at MCG radio resource.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCG Mobility</td>
<td>The procedure is initiated due to mobility related at SCG radio resource.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count reaches max value</td>
<td>Indicates the PDCP COUNT for UL or DL reached the max value and the bearer may be released.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown Old en-gNB UE X2AP ID</td>
<td>The action failed because the Old en-gNB UE X2AP ID or the SeNB UE X2AP ID is unknown.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDCP Overload</td>
<td>The procedure is initiated due to PDCP/SDAP resource limitation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport Network Layer cause</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport resource unavailable</td>
<td>The required transport resources are not available.</td>
</tr>
<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>Protocol cause</td>
<td>Meaning</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Abstract Syntax Error (Reject)</td>
<td>The received message included an abstract syntax error and the concerned criticality indicated “reject” (see sub clause 10.3 of TS 36.413 [4]).</td>
</tr>
<tr>
<td>Abstract Syntax Error (Ignore and Notify)</td>
<td>The received message included an abstract syntax error and the concerned criticality indicated “ignore and notify” (see sub clause 10.3 of TS 36.413 [4]).</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 (see sub clause 10.3 of TS 36.413 [4]).</td>
</tr>
<tr>
<td>Message not Compatible with Receiver State</td>
<td>The received message was not compatible with the receiver state (see sub clause 10.4 of TS 36.413 [4]).</td>
</tr>
<tr>
<td>Semantic Error</td>
<td>The received message included a semantic error (see sub clause 10.4 of TS 36.413 [4]).</td>
</tr>
<tr>
<td>Transfer Syntax Error</td>
<td>The received message included a transfer syntax error (see sub clause 10.2 of TS 36.413 [4]).</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>

<table>
<thead>
<tr>
<th>Miscellaneous cause</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Processing Overload</td>
<td>eNB control processing overload</td>
</tr>
<tr>
<td>Hardware Failure</td>
<td>eNB hardware failure</td>
</tr>
<tr>
<td>Not enough User Plane Processing Resources</td>
<td>eNB has insufficient user plane processing resources available.</td>
</tr>
<tr>
<td>O&amp;M Intervention</td>
<td>Operation and Maintenance intervention related to eNB equipment</td>
</tr>
<tr>
<td>Unspecified</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 or Protocol</td>
</tr>
</tbody>
</table>

9.2.7 Criticality Diagnostics

The Criticality Diagnostics IE is sent by the eNB/en-gNB 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.
<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>Information Element Criticality Diagnostics</td>
<td>0..&lt;maxNrOfErrors</td>
<td></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 &quot;ignore&quot; 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>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxNrOfErrors</td>
<td>Maximum no. of IE errors allowed to be reported with a single message. The value for maxnooferrors is 256.</td>
</tr>
</tbody>
</table>

### 9.2.8 Served Cell Information

This IE contains cell configuration information of a cell that a neighbour eNB may need for the X2 AP interface.
<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>PCI</td>
<td>M</td>
<td></td>
<td>INTEGER (0..503, ...)</td>
<td>Physical Cell ID</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI 9.2.14</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>TAC</td>
<td>M</td>
<td></td>
<td>OCTET STRING(2)</td>
<td>Tracking Area Code</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Broadcast PLMNs</td>
<td>IPO</td>
<td>1..&lt;maxnoof BPLMNs&gt;</td>
<td></td>
<td>Broadcast PLMNs</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>PLMN Identity</td>
<td>M</td>
<td>9.2.4</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Choice EUTRA-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 EARFCN</td>
<td>M</td>
<td></td>
<td>EARFCN 9.2.26</td>
<td>Corresponds to NUL in TS 36.104 [16] for E-UTRA operating bands for which it is defined; ignored for E-UTRA operating bands for which NUL is not defined</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;DL EARFCN</td>
<td>M</td>
<td></td>
<td>EARFCN 9.2.26</td>
<td>Corresponds to NUL in TS 36.104 [16] for E-UTRA operating bands for which it is defined; ignored for E-UTRA operating bands for which NUL is not defined</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL Transmission Bandwidth</td>
<td>M</td>
<td></td>
<td>Transmission Bandwidth 9.2.27</td>
<td>Same as DL Transmission Bandwidth in this release; ignored in case UL EARFCN value is ignored</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;DL Transmission Bandwidth</td>
<td>M</td>
<td></td>
<td>Transmission Bandwidth 9.2.27</td>
<td>Same as DL Transmission Bandwidth in this release; ignored in case UL EARFCN value is ignored</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;UL EARFCN Extension</td>
<td>O</td>
<td></td>
<td>EARFCN Extension 9.2.65</td>
<td>If this IE is present, the value signalled in the UL EARFCN IE is ignored.</td>
<td>YES reject</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;DL EARFCN Extension</td>
<td>O</td>
<td></td>
<td>EARFCN Extension 9.2.65</td>
<td>If this IE is present, the value signalled in the DL EARFCN IE is ignored.</td>
<td>YES reject</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Offset of NB-IoT Channel Number to DL EARFCN</td>
<td>O</td>
<td></td>
<td>Offset of NB-IoT Channel Number to EARFCN 9.2.94</td>
<td>Corresponds to MUL in TS 36.104 [16] for E-UTRA operating bands for which it is defined; ignored for E-UTRA operating bands for which NUL is not defined</td>
<td>YES reject</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Offset of NB-IoT Channel Number to UL EARFCN</td>
<td>O</td>
<td></td>
<td>Offset of NB-IoT Channel Number to EARFCN 9.2.94</td>
<td>Corresponds to MUL in TS 36.104 [16] for E-UTRA operating bands for which it is defined; ignored for E-UTRA operating bands for which NUL is not defined</td>
<td>YES reject</td>
<td>–</td>
</tr>
<tr>
<td>&gt;&gt;&gt;NRS-NSSS-PowerOffset</td>
<td>O</td>
<td></td>
<td>ENUMERATED (-3, 0, 3, ...)</td>
<td>NRS to NSSS power ratio, as defined in TS6.213 [11].</td>
<td>YES Ignore</td>
<td>–</td>
</tr>
<tr>
<td>Field</td>
<td>Type</td>
<td>Value</td>
<td>Description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------</td>
<td>-------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;NSSS-NumOccasionDifferentPrecoder</td>
<td>O</td>
<td></td>
<td>The number of consecutive NSSS occasions that use different precoders for NSSS transmission, as defined in TS6.213 [11].</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>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;EARFCN</td>
<td>M</td>
<td>9.2.26</td>
<td>Corresponds to NDL/NUL in TS 36.104 [16]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Transmission Bandwidth</td>
<td>M</td>
<td></td>
<td>Transmission Bandwidth 9.2.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Subframe Assignment</td>
<td>M</td>
<td></td>
<td>Uplink-downlink subframe configuration information defined in TS 36.211 [10]. In NB-IOT, sa0 and sa6 are not applicable.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Special Subframe Info</td>
<td>I</td>
<td></td>
<td>Special subframe configuration information defined in TS 36.211 [10]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Special Subframe Patterns</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(ssp0, ssp1, ssp2, ssp3, ssp4, ssp5, ssp6, ssp7, ssp8, ...)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Cyclic Prefix DL</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(Normal, Extended,...)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Cyclic Prefix UL</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(Normal, Extended,...)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Additional Special Subframe Info</td>
<td>O</td>
<td></td>
<td>Special subframe configuration information defined in TS 36.211 [10]. Only for newly defined configuration of special subframe from Release 11.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Additional Special Subframe Patterns</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(ssp0, ssp1, ssp2, ssp3, ssp4, ssp5, ssp6, ssp7, ssp8, ssp9, ...)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Cyclic Prefix DL</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(Normal, Extended,...)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;Cyclic Prefix UL</strong></td>
<td>M</td>
<td>ENUMERATED (Normal, Extended,...)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>---</td>
<td>---------------------------------</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;EARFCN Extension</strong></td>
<td>O</td>
<td>9.2.65 If this IE is present, the value signalled in the EARFCN IE is ignored.</td>
<td>YES</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;Additional Special Subframe Extension Info</strong></td>
<td>O</td>
<td>Special subframe configuration information defined in TS 36.211 [10]. Only for newly defined configuration of special subframe from Release 14.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;Additional Special Subframe Patterns Extension</strong></td>
<td>M</td>
<td>ENUMERATED (ssp10, ...)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;Cyclic Prefix DL</strong></td>
<td>M</td>
<td>ENUMERATED (Normal, Extended,...)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;&gt;&gt;Cyclic Prefix UL</strong></td>
<td>M</td>
<td>ENUMERATED (Normal, Extended,...)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of Antenna Ports</strong></td>
<td>O</td>
<td>9.2.43</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PRACH Configuration</strong></td>
<td>O</td>
<td>PRACH Configuration 9.2.50</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MBSFN Subframe Info</strong></td>
<td>0..&lt;maxnoof MBSFN&gt;</td>
<td>MBSFN subframe defined in TS 36.331 [9]</td>
<td>GLOBAL</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;Radioframe Allocation Period</strong></td>
<td>M</td>
<td>ENUMERATED (n1, n2, n4, n8, n16, n32, ...)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;Radioframe Allocation Offset</strong></td>
<td>M</td>
<td>INTEGER (0..7, ...)</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;Subframe Allocation</strong></td>
<td>M</td>
<td>9.2.51</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CSG ID</strong></td>
<td>O</td>
<td>9.2.53</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MBMS Service Area Identity List</strong></td>
<td>0..&lt;maxnoof MBMSServiceAreaIdentiti es &gt;</td>
<td>Supported MBMS Service Area Identities in the cell</td>
<td>GLOBAL</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>&gt;MBMS Service Area Identity</strong></td>
<td>OCTET STRING(2)</td>
<td>MBMS Service Area Identities as defined in TS 23.003 [29]</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MultibandInfoList</strong></td>
<td>O</td>
<td>9.2.60</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FreqBandIndicatorPriority</strong></td>
<td>O</td>
<td>ENUMERATED (not-broadcasted, broadcasted, ...) This IE indicates that the eNodeB supports FreqBandIndicationPriority, and whether FreqBandIndicatorPriority is broadcasted in SIB 1 (see TS 36.331 [9])</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BandwidthReducedSI | O | ENUMERATED (scheduled, ...) | This IE indicates that the SystemInformationBlockType1-BR is scheduled in the cell (see TS 36.331 [9]) | YES | ignore

Protected E-UTRA Resource Indication | O | 9.2.125 | This IE indicates which E-UTRA control/reference signal resources are protected and are not subject to E-UTRA - NR Cell Resource Coordination. | YES | ignore

### 9.2.9 E-RAB Level QoS Parameters

This IE defines the QoS to be applied to an E-RAB.

<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 [12]. Logical range and coding specified in TS 23.203 [13].</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Allocation and Retention Priority</td>
<td>M</td>
<td></td>
<td>9.2.31</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>GBR QoS Information</td>
<td>O</td>
<td></td>
<td>9.2.10</td>
<td>This IE applies to GBR bearers only and shall be ignored otherwise.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Downlink Maximum Packet Loss Rate</td>
<td>O</td>
<td></td>
<td>Packet Loss Rate 9.2.124</td>
<td>This IE applies only to bearers with specific QCI (see TS 23.401 [12]) and indicates the maximum allowed packet loss rate for downlink as specified in TS 23.401 [12].</td>
<td>YES</td>
<td>ignore</td>
</tr>
<tr>
<td>Uplink Maximum Packet Loss Rate</td>
<td>O</td>
<td></td>
<td>Packet Loss Rate 9.2.124</td>
<td>This IE applies only to bearers with specific QCI (see TS 23.401 [12]) and indicates the maximum allowed packet loss rate for uplink as specified in TS 23.401 [12].</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

### 9.2.10 GBR QoS Information

This IE indicates the maximum and guaranteed bit rates of a GBR E-RAB for downlink and uplink.
NOTE: For LTE DC, the SeNB regards the GBR QoS Information IE as an E-RAB level parameter also for E-RABs configured with the split bearer option, although for the split bearer option the bitrates signalled by the MeNB are typically not equal to the bitrates signalled by the MME for that E-RAB (see TS 36.300 [15]).
<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 9.2.11</td>
<td>Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [12]. If the Extended E-RAB Maximum Bit Rate Downlink IE is included, the E-RAB Maximum Bit Rate Downlink IE shall be ignored.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-RAB Maximum Bit Rate Uplink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.2.11</td>
<td>Maximum Bit Rate in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [12]. If the Extended E-RAB Maximum Bit Rate Uplink IE is included, the E-RAB Maximum Bit Rate Uplink IE shall be ignored.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-RAB Guaranteed Bit Rate Downlink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.2.11</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 [12]. If the Extended E-RAB Guaranteed Bit Rate Downlink IE is included, the E-RAB Guaranteed Bit Rate Downlink IE shall be ignored.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-RAB Guaranteed Bit Rate Uplink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.2.11</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 [12]. If the Extended E-RAB Guaranteed Bit Rate Uplink IE is included, the E-RAB Guaranteed Bit Rate Uplink IE shall be ignored.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended E-RAB Maximum Bit Rate Downlink</td>
<td>O</td>
<td></td>
<td>Extended Bit Rate 9.2.99</td>
<td>Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [12]. If the Extended E-RAB Maximum Bit Rate Downlink IE is included, the E-RAB Maximum Bit Rate Downlink IE shall be ignored.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.2.11 Bit Rate

This IE indicates the number of bits delivered by E-UTRAN in UL or to E-UTRAN in DL or by UE in sidelink 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 E-RAB, 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>INTEGER (0..10,000,000,000)</td>
<td>The unit is: bit/s</td>
<td></td>
</tr>
</tbody>
</table>

9.2.12 UE Aggregate Maximum Bit Rate

On Handover Aggregate Maximum Bitrate is transferred to the target eNB. In Dual Connectivity, UE Aggregate Maximum Bit Rate is split into MeNB UE Aggregate Maximum Bit Rate and SeNB UE Aggregate Maximum Bit Rate which are enforced by MeNB and SeNB respectively as specified in TS 36.300 [15]. The UE Aggregate Maximum Bitrate is applicable for all Non-GBR bearers per UE which is defined for the Downlink and the Uplink direction and provided by the MME to the eNB.
<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>UE Aggregate Maximum Bit Rate Downlink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.2.11</td>
<td>If the Extended UE Aggregate Maximum Bit Rate Downlink IE is included, the UE Aggregate Maximum Bit Rate Downlink IE shall be ignored.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>UE Aggregate Maximum Bit Rate Uplink</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.2.11</td>
<td>If the Extended UE Aggregate Maximum Bit Rate Uplink IE is included, the UE Aggregate Maximum Bit Rate Uplink IE shall be ignored.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Extended UE Aggregate Maximum Bit Rate Downlink</td>
<td>O</td>
<td></td>
<td>Extended Bit Rate 9.2.99</td>
<td>UE Aggregate Maximum Bit Rate in DL. Details in TS 23.401[12].</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Extended UE Aggregate Maximum Bit Rate Uplink</td>
<td>O</td>
<td></td>
<td>Extended Bit Rate 9.2.99</td>
<td>UE Aggregate Maximum Bit Rate in UL. Details in TS 23.401[12].</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### 9.2.13 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>Procedure Code</td>
<td>M</td>
<td></td>
<td>INTEGER (0..255)</td>
<td></td>
</tr>
<tr>
<td>Type of Message</td>
<td>M</td>
<td></td>
<td>CHOICE</td>
<td>(Initiating Message, Successful Outcome, Unsuccessful Outcome, …)</td>
</tr>
</tbody>
</table>

### 9.2.14 ECGI

The E-UTRAN Cell Global Identifier (ECGI) is used to globally identify a cell (see TS 36.401[2]).

<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>PLMN Identity</td>
<td>M</td>
<td></td>
<td>9.2.4</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>E-UTRAN Cell Identifier</td>
<td>M</td>
<td></td>
<td>BIT STRING (28)</td>
<td>The leftmost bits of the E-UTRAN Cell Identifier IE value correspond to the value of the eNB ID IE contained in the Global eNB ID IE (defined in section 9.2.22) identifying the eNB that controls the cell.</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### 9.2.15 COUNT Value

This information element indicates the 12 bit PDCP sequence number and the corresponding 20 bit Hyper frame number.
### 9.2.16 GUMMEI

This information element indicates the globally unique MME 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>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>GU Group Id</td>
<td>M</td>
<td>9.2.20</td>
<td>INTEGER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MME code</td>
<td>M</td>
<td>OCTET STRING (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.17 UL Interference Overload Indication

This IE provides, per PRB, a report on interference overload. The interaction between the indication of UL Interference Overload and UL High Interference is implementation specific.

<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>UL Interference Overload Indication List</td>
<td>1..&lt;maxnoofPRBs</td>
<td></td>
<td>ENUMERATED</td>
<td>(high interference, medium interference, low interference, …)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UL Interference Overload Indication</td>
<td>M</td>
<td>ENUMERATED</td>
<td></td>
<td>Each PRB is identified by its position in the list: the first element in the list corresponds to PRB 0, the second to PRB 1, etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofPRBs</td>
<td>Maximum no. Physical Resource Blocks. Value is 110.</td>
</tr>
</tbody>
</table>

### 9.2.18 UL High Interference Indication

This IE provides, per PRB, a 2 level report on interference sensitivity. The interaction between the indication of UL Overload and UL High Interference is implementation specific.

<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>HII</td>
<td>M</td>
<td>BIT STRING (1..110, …)</td>
<td></td>
<td>Each position in the bitmap represents a PRB (first bit=PRB 0 and so on), for which value “1” indicates 'high interference sensitivity' and value “0” indicates 'low interference sensitivity'. The maximum number of Physical Resource Blocks is 110.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.19 Relative Narrowband Tx Power (RNTP)

This IE provides an indication on DL power restriction per PRB or per subframe per PRB (Enhanced RNTP) in a cell and other information needed by a neighbour eNB for interference aware scheduling.
<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>RNTP Per PRB</td>
<td>M</td>
<td>BIT STRING</td>
<td>(6..110, …)</td>
<td>Each position in the bitmap represents a nPRB value (i.e. first bit=PRB 0 and so on), for which the bit value represents RNTP (nPRB), defined in TS 36.213 [11]. Value 0 indicates &quot;Tx not exceeding RNTP threshold&quot;. Value 1 indicates &quot;no promise on the Tx power is given&quot;. The IE is ignored if the Enhanced RNTP IE is included.</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>RNTP Threshold</td>
<td>M</td>
<td>ENUMERATE D</td>
<td>(-∞, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, …)</td>
<td>RNTP threshold is defined in TS 36.213 [11].</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Number Of Cell-specific</td>
<td>M</td>
<td>ENUMERATE D</td>
<td>(1, 2, 4, …)</td>
<td>P (number of antenna ports for cell-specific reference signals) defined in TS 36.211 [10]</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Antenna Ports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>P_B</td>
<td>M</td>
<td>INTEGER</td>
<td>(0,3, …)</td>
<td>P₀ is defined in TS 36.213 [11].</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>PDCCH Interference Impact</td>
<td>M</td>
<td>INTEGER</td>
<td>(0,4, …)</td>
<td>Measured by Predicted Number Of Occupied PDCCH OFDM Symbols (see TS 36.211 [10]). Value 0 means &quot;no prediction is available&quot;.</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Enhanced RNTP</td>
<td>O</td>
<td></td>
<td></td>
<td>YES ignore</td>
<td></td>
<td>yes ignore</td>
</tr>
<tr>
<td>Enhanced RNTP Bitmap</td>
<td>M</td>
<td>BIT STRING (12..8800, …)</td>
<td>Each position in the bitmap represents a PRB in a subframe; value &quot;00&quot; indicates &quot;Tx not exceeding RNTP Threshold&quot;, value &quot;01&quot; indicates &quot;Tx not exceeding RNTP High Power Threshold&quot;, value &quot;11&quot; indicates that &quot;no promise on the Tx power is given&quot;. Value &quot;10&quot; is ignored by the receiver. Each position is applicable only in positions corresponding to DL subframes. The first 2 bits correspond to PRB 0 of the first subframe for which the IE is valid, the following 2 bits correspond to PRB 1 of the first subframe for which the IE is valid, and so on. The bit string may span across multiple contiguous subframes (maximum 40). The length of the bit string is an integer multiple of $2 \times N_{RB}^{DL}$. $N_{RB}^{DL}$ is defined in TS 36.211 [10]. The Enhanced RNTP pattern is continuously repeated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced RNTP Threshold</td>
<td>M</td>
<td>ENUMERATE D ((-\infty, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, \ldots))</td>
<td>Defined as the RNTP threshold in TS 36.213 [11].</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced RNTP Start Time</td>
<td>0..1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start SFN</td>
<td>M</td>
<td>INTEGER (0..1023, …)</td>
<td>SFN of the radio frame containing the first subframe when the Enhanced RNTP IE is valid.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start Subframe Number</td>
<td>M</td>
<td>INTEGER (0..9, …)</td>
<td>Subframe number, within the radio frame indicated by the Start SFN IE, of the first subframe when the Enhanced RNTP IE is valid.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.2.20 GU Group Id

The GU Group Id IE is the globally unique group id corresponding to a pool area.

<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>PLMN Id</td>
<td>M</td>
<td></td>
<td>PLMN Identity</td>
<td>9.2.4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>MME Group Id</td>
<td>M</td>
<td></td>
<td>OCTET STRING(2)</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

9.2.21 Location Reporting Information

This information element indicates how the location information should be reported.

<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>Event</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(Change of serving cell, ...)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Report Area</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(ECGI, ...)</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

9.2.22 Global eNB ID

This IE is used to globally identify an eNB (see TS 36.401 [2]).

<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>PLMN Identity</td>
<td>M</td>
<td>9.2.4</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>CHOICE eNB ID</td>
<td>M</td>
<td>9.2.4</td>
<td></td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

>Macro eNB ID

| M                | BIT STRING (20) | Equal to the 20 leftmost bits of the value of the E-UTRAN Cell Identifier IE contained in the ECGI IE (see section 9.2.14) identifying each cell controlled by the eNB | – | – |

>Home eNB ID

| M                | BIT STRING (28) | Equal to the value of the E-UTRAN Cell Identifier IE contained in the ECGI IE (see section 9.2.14) identifying the cell controlled by the eNB | – | – |

>Short Macro eNB ID

| M                | BIT STRING (SIZE(18)) | Equal to the 18 leftmost bits of the value of the E-UTRAN Cell Identifier IE contained in the ECGI IE (see section 9.2.14) identifying each cell controlled by the eNB | – | – |

>Long Macro eNB ID

| M                | BIT STRING (SIZE(21)) | Equal to the 21 leftmost bits of the value of the E-UTRAN Cell Identifier IE contained in the ECGI IE (see section 9.2.14) identifying each cell controlled by the eNB | – | – |

9.2.23 E-RAB ID

This IE uniquely identifies an E-RAB 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>E-RAB ID</td>
<td>M</td>
<td></td>
<td>INTEGER</td>
<td>(0..15, ...)</td>
</tr>
</tbody>
</table>
9.2.24 eNB UE X2AP ID

This information element, combined with the eNB UE X2AP ID Extension when present regardless its value, uniquely identifies an UE over the X2 interface within an eNB.

The usage of this IE is defined in TS 36.401 [2].

<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>eNB UE X2AP ID</td>
<td>M</td>
<td>INTEGER</td>
<td>(0..4095)</td>
<td></td>
</tr>
</tbody>
</table>

9.2.25 Subscriber Profile ID for RAT/Frequency priority

The *Subscriber Profile ID* IE for RAT/Frequency Selection Priority is used to define camp priorities in Idle mode and to control inter-RAT/inter-frequency handover in Active mode (TS 36.300 [15]).

<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>Subscriber Profile ID for RAT/Frequency Priority</td>
<td>M</td>
<td>INTEGER</td>
<td>(1..256)</td>
<td></td>
</tr>
</tbody>
</table>

9.2.26 EARFCN

The E-UTRA Absolute Radio Frequency Channel Number 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.

<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>EARFCN</td>
<td>M</td>
<td>INTEGER</td>
<td>(0..maxEARFCN)</td>
<td>The relation between EARFCN and carrier frequency (in MHz) are defined in TS 36.104 [16].</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxEARFCN</td>
<td>Maximum value of EARFCNs. Value is 65535.</td>
</tr>
</tbody>
</table>

9.2.27 Transmission Bandwidth

The *Transmission Bandwidth* IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "N_{RB}" (TS 36.104 [16]). The values bw1, bw6, bw15, bw25, bw50, bw75, bw100 correspond to the number of resource blocks “N_{RB}”, 6, 15, 25, 50, 75, 100.

<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 Bandwidth</td>
<td>M</td>
<td>ENUMERATED</td>
<td>(bw6, bw15, bw25, bw50, bw75, bw100,..., bw1)</td>
<td></td>
</tr>
</tbody>
</table>

9.2.28 E-RAB List

The IE contains a list of E-RAB identities with a cause value. It is used for example to indicate not admitted bearers.

<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 List Item</td>
<td>1..&lt;maxnoofBearers&gt;</td>
<td>EACH</td>
<td>ignore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RAB ID</td>
<td>M</td>
<td>9.2.23</td>
<td>--</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cause</td>
<td>M</td>
<td>9.2.6</td>
<td>--</td>
<td>--</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.2.29 UE Security Capabilities

The UE Security Capabilities IE defines the supported algorithms for encryption and integrity protection 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>Encryption Algorithms</td>
<td>M</td>
<td>BIT STRING (16, ...)</td>
<td>Each position in the bitmap represents an encryption algorithm:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;all bits equal to 0&quot; - UE supports no other algorithm than EEA0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;first bit&quot; - 128-EEA1,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;second bit&quot; - 128-EEA2,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;third bit&quot; - 128-EEA3,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>other bits reserved for future use. Value '1' indicates support and value &quot;0&quot; indicates no support of the algorithm.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Algorithms are defined in TS 33.401 [18].</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Integrity Protection Algorithms</th>
<th>M</th>
<th>BIT STRING (16, ...)</th>
<th>Each position in the bitmap represents an integrity protection algorithm:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;all bits equal to 0&quot; - UE supports no other algorithm than EIA0 (TS 33.401 [18])</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;first bit&quot; - 128-EIA1,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;second bit&quot; - 128-EIA2,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;third bit&quot; - 128-EIA3,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>other bits reserved for future use. Value '1' indicates support and value &quot;0&quot; indicates no support of the algorithm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Algorithms are defined in TS 33.401 [18].</td>
</tr>
</tbody>
</table>

9.2.30 AS Security Information

The AS Security Information IE is used to generate the key material to be used for AS security with 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>Key eNodeB Star</td>
<td>M</td>
<td>BIT STRING (256)</td>
<td>KeNB* defined in TS 33.401 [18]. If the target cell belongs to multiple frequency bands, the source eNB selects the DL-EARFCN for KeNB* calculation as specified in section 10.3 of TS 36.331 [9].</td>
<td></td>
</tr>
<tr>
<td>Next Hop Chaining Count</td>
<td>M</td>
<td>INTEGER (0..7)</td>
<td>Next Hop Chaining Count (NCC) defined in TS 33.401 [18]</td>
<td></td>
</tr>
</tbody>
</table>

9.2.31 Allocation and Retention Priority

This IE specifies the relative importance compared to other E-RABs for allocation and retention of the E-UTRAN Radio Access Bearer.
<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><strong>Desc.:</strong> This IE should be understood as “priority of allocation and retention” (see TS 23.401 [12]). <strong>Usage:</strong> Value 15 means “no priority”. Values between 1 and 14 are ordered in decreasing order of priority, i.e. 1 is the highest and 14 the lowest. Value 0 shall be treated as a logical error if received.</td>
</tr>
<tr>
<td>Pre-emption Capability</td>
<td>M</td>
<td></td>
<td>ENUMERATED(small not trigger pre-emption, may trigger pre-emption)</td>
<td><strong>Descr.:</strong> This IE indicates the pre-emption capability of the request on other E-RABs <strong>Usage:</strong> 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><strong>Desc.:</strong> This IE indicates the vulnerability of the E-RAB to pre-emption of other E-RABs. <strong>Usage:</strong> 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>

### 9.2.32 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>

### 9.2.33 SRVCC Operation Possible

The IE indicates that both the UE and the MME are SRVCC-capable. E-UTRAN behaviour on reception of this is specified in TS 23.216 [20].

<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>SRVCC Operation Possible</td>
<td>M</td>
<td></td>
<td>ENUMERATED(Possible, …)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.34 Hardware Load Indicator

The **Hardware Load Indicator** IE indicates the status of the Hardware Load experienced by the cell.
### 9.2.35 S1 TNL Load Indicator

The **S1 TNL Load Indicator** IE indicates the status of the S1 Transport Network Load experienced by the cell.

<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>DL S1 TNL Load Indicator</td>
<td>M</td>
<td></td>
<td>Load Indicator</td>
<td>9.2.35</td>
</tr>
<tr>
<td>UL S1 TNL Load Indicator</td>
<td>M</td>
<td></td>
<td>Load Indicator</td>
<td>9.2.36</td>
</tr>
</tbody>
</table>

### 9.2.36 Load Indicator

The **Load Indicator** IE indicates the status of Load.

<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>Load Indicator</td>
<td>M</td>
<td></td>
<td>ENUMERATED (LowLoad,</td>
<td>MediumLoad, HighLoad, Overload, ...)</td>
</tr>
</tbody>
</table>

### 9.2.37 Radio Resource Status

The **Radio Resource Status** IE indicates the usage of the PRBs for all traffic in Downlink and Uplink (TS 36.314 [22], TS 23.203 [13]) and the usage of PDCCH CCEs for Downlink and Uplink scheduling.

<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>DL GBR PRB usage</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
<tr>
<td>UL GBR PRB usage</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
<tr>
<td>DL non-GBR PRB usage</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
<tr>
<td>UL non-GBR PRB usage</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
<tr>
<td>DL Total PRB usage</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
<tr>
<td>UL Total PRB usage</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
<tr>
<td>DL scheduling PDCCH CCE usage</td>
<td>O</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
<tr>
<td>UL scheduling PDCCH CCE usage</td>
<td>O</td>
<td></td>
<td>INTEGER (0..100)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.38 UE History Information

The **UE History Information** IE contains information about cells that a UE has been served by in active state prior to the target cell. The overall mechanism is described in TS 36.300 [15].

**NOTE:** The definition of this IE is aligned with the definition of the **UE History Information** IE in TS 36.413 [4].

<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>Last Visited Cell List</td>
<td></td>
<td>1..&lt;maxnoofCells &gt;</td>
<td></td>
<td>Most recent information is added to the top of this list</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Last Visited Cell Information</td>
<td>M</td>
<td></td>
<td>9.2.39</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>maxnoofCells</td>
<td>Maximum number of last visited cell information records that can be reported in the IE. Value is 16.</td>
</tr>
</tbody>
</table>
9.2.39 Last Visited Cell Information

The Last Visited Cell Information may contain E-UTRAN or UTRAN or GERAN cell specific 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>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOICE Last Visited Cell Information</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-UTRAN Cell</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Last Visited E-UTRAN Cell Information</td>
<td>M</td>
<td></td>
<td>9.2.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UTRAN Cell</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Last Visited UTRAN Cell Information</td>
<td>M</td>
<td></td>
<td>OCTET STRING</td>
<td>Defined in TS 25.413 [24]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;GERAN Cell</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Last Visited GERAN Cell Information</td>
<td>M</td>
<td></td>
<td>9.2.41</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.2.40 Last Visited E-UTRAN Cell Information

The Last Visited E-UTRAN Cell Information contains information about a cell that is to be used for RRM purposes.

<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>Global Cell ID</td>
<td>M</td>
<td>ECGI</td>
<td>9.2.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Type</td>
<td>M</td>
<td>9.2.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time UE stayed in Cell</td>
<td>M</td>
<td>INTEGER (0..4095)</td>
<td>The duration of the time the UE stayed in the cell in seconds. If the UE stays in a cell more than 4095s, this IE is set to 4095.</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Time UE stayed in Cell Enhanced Granularity</td>
<td>O</td>
<td>INTEGER (0..40950)</td>
<td>The duration of the time the UE stayed in the cell in 1/10 seconds. If the UE stays in a cell more than 4095s, this IE is set to 40950.</td>
<td>YES ignore</td>
<td>YES ignore</td>
<td></td>
</tr>
<tr>
<td>HO Cause Value</td>
<td>O</td>
<td>Cause</td>
<td>9.2.6</td>
<td>The cause for the handover from the E-UTRAN cell.</td>
<td>YES ignore</td>
<td>YES ignore</td>
</tr>
</tbody>
</table>

9.2.41 Last Visited GERAN Cell Information

The Last Visited Cell Information for GERAN is currently undefined.

NOTE: If in later Releases this is defined, the choice type may be extended with the actual GERAN specific 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>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHOICE Last Visited GERAN Cell Information</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Undefined</td>
<td>M</td>
<td>NULL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.2.42 Cell Type

The cell type provides the cell coverage area.
<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>Cell Size</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(verysmall, small, medium, large, …)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 9.2.43 Number of Antenna Ports

The *Number of Antenna Ports* IE is used to indicate the number of cell specific antenna ports.

<table>
<thead>
<tr>
<th>IE/Group Name</th>
<th>Presence</th>
<th>Range</th>
<th>IE Type and</th>
<th>Reference</th>
<th>Semantics Description</th>
<th>Criticality</th>
<th>Assigned Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Antenna Ports</td>
<td></td>
<td></td>
<td>ENUMERATED (an1, an2, an4,...)</td>
<td></td>
<td>an1 = One antenna port an2 = Two antenna ports an4 = Four antenna ports</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 9.2.44 Composite Available Capacity Group

The *Composite Available Capacity Group* IE indicates the overall available resource level in the cell in 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>Composite Available Capacity Downlink</td>
<td>M</td>
<td></td>
<td>Composite Available Capacity 9.2.45</td>
<td>For the Downlink</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Composite Available Capacity Uplink</td>
<td>M</td>
<td></td>
<td>Composite Available Capacity 9.2.45</td>
<td>For the Uplink</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 9.2.45 Composite Available Capacity

The *Composite Available Capacity* IE indicates the overall available resource level in the cell in either Downlink or 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>Cell Capacity Class Value</td>
<td>O</td>
<td>9.2.46</td>
<td>9.2.46</td>
<td>‘0’ indicates no resource is available, Measured on a linear scale.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Capacity Value</td>
<td>M</td>
<td>9.2.47</td>
<td>9.2.47</td>
<td>Value 1 shall indicate the minimum cell capacity, and 100 shall indicate the maximum cell capacity. There should be a linear relation between cell capacity and Cell Capacity Class Value.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 9.2.46 Cell Capacity Class Value

The *Cell Capacity Class Value* IE indicates the value that classifies the cell capacity with regards to the other cells. The *Cell Capacity Class Value* IE only indicates resources that are configured for traffic purposes.

<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>Cell Capacity Class Value</td>
<td>M</td>
<td></td>
<td>INTEGER (1..100,...)</td>
<td>Value 1 shall indicate the minimum cell capacity, and 100 shall indicate the maximum cell capacity. There should be a linear relation between cell capacity and Cell Capacity Class Value.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
9.2.47 Capacity Value

The Capacity Value IE indicates the amount of resources that are available relative to the total E-UTRAN resources. The capacity value should be measured and reported so that the minimum E-UTRAN resource usage of existing services is reserved according to implementation. The Capacity Value IE can be weighted according to the ratio of cell capacity class values, if available.

<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>Capacity Value</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td>Value 0 shall indicate no available capacity, and 100 shall indicate maximum available capacity. Capacity Value should be measured on a linear scale.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

9.2.48 Mobility Parameters Information

The Mobility Parameters Information IE contains the change of the Handover Trigger as compared to its current value. The Handover Trigger corresponds to the threshold at which a cell initialises the handover preparation procedure towards a specific neighbour cell. Positive value of the change means the handover is proposed to take place later.

<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>Handover Trigger Change</td>
<td>M</td>
<td></td>
<td>INTEGER (-20..20)</td>
<td>The actual value is IE value * 0.5 dB.</td>
</tr>
</tbody>
</table>

9.2.49 Mobility Parameters Modification Range

The Mobility Parameters Modification Range IE contains the range of Handover Trigger Change values permitted by the eNB2 at the moment the MOBILITY CHANGE FAILURE message is sent.

<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>Handover Trigger Change Lower Limit</td>
<td>M</td>
<td></td>
<td>INTEGER (-20..20)</td>
<td>The actual value is IE value * 0.5 dB.</td>
</tr>
<tr>
<td>Handover Trigger Change Upper Limit</td>
<td>M</td>
<td></td>
<td>INTEGER (-20..20)</td>
<td>The actual value is IE value * 0.5 dB.</td>
</tr>
</tbody>
</table>

9.2.50 PRACH Configuration

This IE indicates the PRACH resources used in neighbor cell.
<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>RootSequenceIndex</td>
<td>M</td>
<td></td>
<td>INTEGER (0..837)</td>
<td>See section 5.7.2. in TS 36.211 [10]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>ZeroCorrelationZoneConfiguration</td>
<td>M</td>
<td></td>
<td>INTEGER (0..15)</td>
<td>See section 5.7.2. in TS 36.211 [10]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>HighSpeedFlag</td>
<td>M</td>
<td></td>
<td>BOOLEAN</td>
<td>TRUE corresponds to Restricted set and FALSE to Unrestricted set. See section 5.7.2 in TS 36.211 [10]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>PRACH-FrequencyOffset</td>
<td>M</td>
<td></td>
<td>INTEGER (0..94)</td>
<td>See section 5.7.1 of TS 36.211 [10]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>PRACH-ConfigurationIndex</td>
<td>O</td>
<td></td>
<td>INTEGER (0..63)</td>
<td>Mandatory for TDD, shall not be present for FDD. See section 5.7.1. in TS 36.211 [10]</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### 9.2.51 Subframe Allocation

The *Subframe Allocation* IE is used to indicate the subframes that are allocated for MBSFN within the radio frame allocation period as defined in TS 36.331 [9].

<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 Subframe Allocation</td>
<td>M</td>
<td></td>
<td>BITSTRING (SIZE(6))</td>
<td></td>
</tr>
<tr>
<td>&gt;Oneframe</td>
<td>M</td>
<td></td>
<td>BITSTRING (SIZE(24))</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.52 CSG Membership Status

This element indicates the membership status of the UE to a particular CSG.

<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>CSG Membership Status</td>
<td>M</td>
<td></td>
<td>ENUMERATED (member, not-member)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.53 CSG ID

This element indicates the identifier of the Closed Subscriber Group.

<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>CSG ID</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(27))</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.54 ABS Information

This IE provides information about which sub frames the sending eNB is configuring as almost blank subframes and which subset of almost blank subframes are recommended for configuring measurements towards the UE. Almost blank subframes are subframes with reduced power on some physical channels and/or reduced activity.
<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 ABS Information</td>
<td>M</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;FDD</td>
<td></td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;ABS Pattern Info</td>
<td>M</td>
<td>BIT STRING (SIZE(40))</td>
<td>Each position in the bitmap represents a DL subframe, for which value &quot;1&quot; indicates 'ABS' and value &quot;0&quot; indicates 'non ABS'. The first position of the ABS pattern corresponds to subframe 0 in a radio frame where SFN = 0. The ABS pattern is continuously repeated in all radio frames. The maximum number of subframes is 40.</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Number Of Cell-specific Antenna Ports</td>
<td>M</td>
<td>ENUMERATED (1, 2, 4, ...)</td>
<td>P (number of antenna ports for cell-specific reference signals) defined in TS 36.211 [10]</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Measurement Subset</td>
<td>M</td>
<td>BIT STRING (SIZE(40))</td>
<td>Indicates a subset of the ABS Pattern Info above, and is used to configure specific measurements towards the UE.</td>
<td></td>
</tr>
<tr>
<td>&gt;TDD</td>
<td></td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;ABS Pattern Info</td>
<td>M</td>
<td>BIT STRING (1..70, ...)</td>
<td>Each position in the bitmap represents a subframe. Value &quot;1&quot; indicates 'ABS' and value &quot;0&quot; indicates 'non ABS' which is applicable only in positions corresponding to the DL direction. The maximum number of subframes depends on UL/DL subframe configuration. The maximum number of subframes is 20 for UL/DL subframe configuration 1~5; 60 for UL/DL subframe configuration 6; 70 for UL/DL subframe configuration 0. UL/DL subframe configuration defined in TS 36.211 [10]. The first position of the ABS pattern corresponds to subframe 0 in a radio frame where SFN = 0. The ABS pattern is continuously repeated in all radio frames, and restarted each time SFN = 0.</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Number Of Cell-specific Antenna Ports</td>
<td>M</td>
<td>ENUMERATED (1, 2, 4, ...)</td>
<td>P (number of antenna ports for cell-specific reference signals) defined in TS 36.211 [10]</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Measurement Subset</td>
<td>M</td>
<td>BIT STRING (1..70, ...)</td>
<td>Indicates a subset of the ABS Pattern Info above, and is used to configure specific measurements towards the UE.</td>
<td></td>
</tr>
</tbody>
</table>
>ABS Inactive | M | NULL | Indicates that interference coordination by means of almost blank sub frames is not active

### 9.2.55 Invoke Indication

This IE provides an indication about which type of information the sending eNB would like the receiving eNB to send back.

<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>Invoke Indication</td>
<td>M</td>
<td></td>
<td>ENUMERATED (ABS Information, ..., Start NAICS Information, Stop NAICS Information)</td>
<td>--</td>
</tr>
</tbody>
</table>

### 9.2.56 MDT Configuration

The IE defines the MDT configuration parameters.
<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>MDT Activation</td>
<td>M</td>
<td></td>
<td>ENUMERATED(Immediate MDT only, Immediate MDT and Trace, …)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHOICE Area Scope of MDT</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell Based</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Cell ID List for MDT</td>
<td>M</td>
<td>1..&lt;maxno ofCellIDfor MDT&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;ECGI</td>
<td>M</td>
<td>9.2.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;TA Based</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;TA List for MDT</td>
<td>M</td>
<td>1..&lt;maxno ofTAforMDT&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;TAC</td>
<td>M</td>
<td>OCTET STRING (2)</td>
<td>Tracking Area Code. The TAI is derived using the current serving PLMN.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;PLMN Wide</td>
<td>M</td>
<td>NULL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;TAI based</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;TAI List for MDT</td>
<td>M</td>
<td>1..&lt;maxno ofTAforMDT&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;TAC</td>
<td>M</td>
<td>OCTET STRING (2)</td>
<td>Tracking Area Code</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;PLMN Identity</td>
<td>M</td>
<td>9.2.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurements to Activate</td>
<td>M</td>
<td>BITSTRING (SIZE(8))</td>
<td>Each position in the bitmap indicates a MDT measurement, as defined in TS 37.320 [25]. First Bit = M1, Second Bit = M2, Third Bit = M3, Fourth Bit = M4, Fifth Bit = M5, Sixth Bit = logging of M1 from event triggered measurement reports according to existing RRM configuration. Seventh Bit = M6, Eighth Bit = M7. Value “1” indicates “activate” and value “0” indicates “do not activate”.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1 Reporting Trigger</td>
<td>M</td>
<td>ENUMERATED (periodic, A2event-triggered, …, A2event-triggered periodic)</td>
<td>This IE shall be ignored if the Measurements to Activate IE has the first bit set to “0”.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1 Threshold Event A2</td>
<td>M</td>
<td></td>
<td></td>
<td>Included in case of event-triggered or event-triggered periodic reporting for measurement M1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;CHOICE Threshold</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;RSRP</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Threshold RSRP</td>
<td>M</td>
<td>INTEGER (0..97)</td>
<td>This IE is defined in TS 36.331 [9].</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;RSRQ</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Threshold RSRQ</td>
<td>M</td>
<td>INTEGER (0..34)</td>
<td>This IE is defined in TS 36.331 [9].</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1 Periodic reporting</td>
<td>C- (\text{ifperiodicMDT})</td>
<td>Included in case of periodic or event-triggered periodic reporting for measurement M1</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Report interval M</td>
<td>ENUMERATED (ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, min1, min6, min12, min30, min60)</td>
<td>This IE is defined in TS 36.331 [9].</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Report amount M</td>
<td>ENUMERATED (1, 2, 4, 8, 16, 32, 64, infinity)</td>
<td>Number of reports</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3 Configuration C-(\text{ifM3})</td>
<td>9.2.61</td>
<td>YES ignore</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M4 Configuration C-(\text{ifM4})</td>
<td>9.2.62</td>
<td>YES ignore</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M5 Configuration C-(\text{ifM5})</td>
<td>9.2.63</td>
<td>YES ignore</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDT Location Information</td>
<td>BITSTRING(SIZE(8))</td>
<td>Each position in the bitmap represents requested location information as defined in TS 37.320 [31]. First Bit = GNSS Second Bit = E-CID information. Other bits are reserved for future use and are ignored if received. Value “1” indicates “activate” and value “0” indicates “do not activate”. The eNB shall ignore the first bit unless the Measurements to Activate IE has the first bit or the sixth bit set to “1”.</td>
<td>YES</td>
<td>ignore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signalling based MDT PLMN List O</td>
<td>MDT PLMN List 9.2.64</td>
<td>YES ignore</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M6 Configuration C-(\text{ifM6})</td>
<td>9.2.87</td>
<td>YES ignore</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M7 Configuration C-(\text{ifM7})</td>
<td>9.2.88</td>
<td>YES ignore</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>maxnoofCellIDforMDT</td>
<td>Maximum no. of Cell ID subject for MDT scope. Value is 32.</td>
</tr>
<tr>
<td>maxnoofTARMDT</td>
<td>Maximum no. of TA subject for MDT scope. Value is 8.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>if(M1A2\text{trigger})</td>
<td>This IE shall be present if the Measurements to Activate IE has the first bit set to “1” and the (M1) Reporting Trigger IE is set to “A2event-triggered” or to “A2event-triggered periodic”.</td>
</tr>
<tr>
<td>if(\text{periodicMDT})</td>
<td>This IE shall be present if the (M1) Reporting Trigger IE is set to “periodic” or to “A2event-triggered periodic”.</td>
</tr>
<tr>
<td>if(M3)</td>
<td>This IE shall be present if the Measurements to Activate IE has the third bit set to “1”.</td>
</tr>
<tr>
<td>if(M4)</td>
<td>This IE shall be present if the Measurements to Activate IE has the fourth bit set to “1”.</td>
</tr>
<tr>
<td>if(M5)</td>
<td>This IE shall be present if the Measurements to Activate IE has the fifth bit set to “1”.</td>
</tr>
<tr>
<td>if(M6)</td>
<td>This IE shall be present if the Measurements to Activate IE has the seventh bit set to “1”.</td>
</tr>
<tr>
<td>if(M7)</td>
<td>This IE shall be present if the Measurements to Activate IE has the eighth bit set to “1”.</td>
</tr>
</tbody>
</table>
9.2.57 Void

9.2.58 ABS Status

The ABS Status IE is used to aid the eNB designating ABS to evaluate the need for modification of the ABS pattern.

<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>DL ABS status</td>
<td>M</td>
<td></td>
<td>INTEGER (0..100)</td>
<td>Percentage of used ABS resources. The numerator of the percentage calculation consists of resource blocks within the ABS indicated in the Usable ABS Pattern Info IE allocated by the eNB2 for DL traffic needing protection by ABS from inter-cell interference for DL scheduling, or allocated by the eNB2 for other reasons (e.g., some control channels). The denominator of the percentage calculation is the total quantity of resource blocks within the ABS indicated in the Usable ABS Pattern Info IE.</td>
</tr>
<tr>
<td>CHOICE Usable ABS Information</td>
<td>M</td>
<td>−−</td>
<td>−−</td>
<td>−−</td>
</tr>
<tr>
<td>&gt;FDD</td>
<td>−−</td>
<td>−−</td>
<td>−−</td>
<td>−−</td>
</tr>
<tr>
<td>&gt;&gt;Usable ABS Pattern Info</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(40))</td>
<td>Each position in the bitmap represents a subframe, for which value &quot;1&quot; indicates 'ABS that has been designated as protected from inter-cell interference by the eNB1, and available to serve this purpose for DL scheduling in the eNB2' and value &quot;0&quot; is used for all other subframes. The pattern represented by the bitmap is a subset of, or the same as, the corresponding ABS Pattern Info IE conveyed in the LOAD INFORMATION message from the eNB1.</td>
</tr>
<tr>
<td>&gt;TDD</td>
<td>−−</td>
<td>−−</td>
<td>−−</td>
<td>−−</td>
</tr>
<tr>
<td>&gt;&gt;Usable ABS Pattern Info</td>
<td>M</td>
<td></td>
<td>BIT STRING (1..70)</td>
<td>Each position in the bitmap represents a subframe, for which value &quot;1&quot; indicates 'ABS that has been designated as protected from inter-cell interference by the eNB1, and available to serve this purpose for DL scheduling in the eNB2' and value &quot;0&quot; is used for all other subframes. The pattern represented by the bitmap is a subset of, or the same as, the corresponding ABS Pattern Info IE conveyed in the LOAD INFORMATION message from the eNB1.</td>
</tr>
</tbody>
</table>

9.2.59 Management Based MDT Allowed

This information element is used by the eNB to allow selection of the UE for management based MDT as described in TS 32.422 [6].
9.2.60 MultibandInfoList

The MultibandInfoList IE contains the additional frequency band indicators that a cell belongs to listed in decreasing order of preference, see TS 36.331 [9].

<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>BandInfo</td>
<td></td>
<td>1..&lt;maxnoofBands&gt;</td>
<td>INTEGER (1.. 256, ...)</td>
<td>E-UTRA operating band as defined in TS 36.101 [42, table 5.5-1]</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

<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>&gt;FrequencyBandIndicator</td>
<td>M</td>
<td></td>
<td>INTEGER (1.. 256, ...)</td>
<td>E-UTRA operating band as defined in TS 36.101 [42, table 5.5-1]</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofBands</td>
<td>Maximum number of frequency bands that a cell belongs to. The value is 16.</td>
</tr>
</tbody>
</table>

9.2.61 M3 Configuration

This IE defines the parameters for M3 measurement collection.

<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>M3 Collection Period</td>
<td>M</td>
<td></td>
<td>ENUMERATED (ms100, ms1000, ms10000, ...)</td>
<td></td>
</tr>
</tbody>
</table>

9.2.62 M4 Configuration

This IE defines the parameters for M4 measurement collection.

<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>M4 Collection Period</td>
<td>M</td>
<td></td>
<td>ENUMERATED (ms1024, ms2048, ms5120, ms10240, min1, ...)</td>
<td></td>
</tr>
<tr>
<td>M4 Links to log</td>
<td>M</td>
<td></td>
<td>ENUMERATED (uplink, downlink, both-uplink-and-downlink, ...)</td>
<td></td>
</tr>
</tbody>
</table>

9.2.63 M5 Configuration

This IE defines the parameters for M5 measurement collection.
<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>M5 Collection Period</td>
<td>M</td>
<td>(ms1024, ms2048, ms5120, ms10240, min1, …)</td>
<td>ENUMERATED</td>
<td></td>
</tr>
<tr>
<td>M5 Links to log</td>
<td>M</td>
<td>ENUMERATED(uplink, downlink, both-uplink-and-downlink, …)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.64 MDT PLMN List

The purpose of the *MDT PLMN List* IE is to provide the list of PLMNs allowed for MDT.

<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>MDT PLMN List</td>
<td></td>
<td>1..&lt;maxnoof MDTPLMNs</td>
<td>ENUMERATED</td>
<td></td>
</tr>
<tr>
<td>&gt;PLMN Identity</td>
<td>M</td>
<td>9.2.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofMDTPLMNs</td>
<td>Maximum no. of PLMNs in the MDT PLMN list. Value is 16.</td>
</tr>
</tbody>
</table>

### 9.2.65 EARFCN Extension

The E-UTRA Absolute Radio Frequency Channel Number Extension 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.

<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>EARFCN Extension</td>
<td>M</td>
<td>INTEGER</td>
<td>(maxEARFCN+1 .. newmaxEARFCN, …)</td>
<td>The relation between EARFCN and carrier frequency (in MHz) are defined in TS 36.104 [16].</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxEARFCN</td>
<td>Maximum value of EARFCNs. Value is 65535.</td>
</tr>
<tr>
<td>newmaxEARFCN</td>
<td>New maximum value of EARFCNs. Value is 262143.</td>
</tr>
</tbody>
</table>

### 9.2.66 COUNT Value Extended

This information element indicates the 15 bit long PDCP SN and the corresponding 17 bit long Hyper Frame Number.

<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>PDCP-SN Extended</td>
<td>M</td>
<td>INTEGER</td>
<td>(0..32767)</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>HFN Modified</td>
<td>M</td>
<td>INTEGER</td>
<td>(0..131071)</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### 9.2.67 Extended UL Interference Overload Info

This IE provides report on interference overload for the set of subframes that are subject to UL-DL subframe reconfiguration. This IE applies to TDD only.
### IE/Group Name

<table>
<thead>
<tr>
<th>Presence</th>
<th>Range</th>
<th>IE type and reference</th>
<th>Semantics description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td></td>
<td>BITSTRING (SIZE(5))</td>
<td>The set of subframe(s) to which the Extended UL interference overload indication is applicable. The bitmap from the least significant bit position to the most significant bit position represents subframes #3, 4, 7, 8, 9 in a radio frame. Value &quot;1&quot; in a bit position indicates that the Extended UL interference overload indication is applicable to the corresponding subframe; and value &quot;0&quot; indicates otherwise.</td>
</tr>
</tbody>
</table>

### 9.2.68 RNL Header

The *RNL Header* IE indicates the target eNB ID and source eNB ID.

<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>Source eNB ID</td>
<td>M</td>
<td></td>
<td>Global eNB ID 9.2.22</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Target eNB ID</td>
<td>O</td>
<td></td>
<td>Global eNB ID 9.2.22</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### 9.2.69 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 [29] with the last 4 digits of the SNR masked by setting the corresponding bits to 1.</td>
</tr>
</tbody>
</table>
9.2.70  Expected UE Behaviour

This IE defines the behaviour of a UE with predictable activity and/or mobility behaviour, to assist the eNB/en-gNB in determining the optimum RRC connection time.

<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>Expected UE Activity Behaviour</td>
<td>M</td>
<td></td>
<td>9.2.71</td>
<td></td>
</tr>
<tr>
<td>Expected HO Interval</td>
<td>O</td>
<td></td>
<td>ENUMERATED (sec15, sec30, sec60, sec90, sec120, sec180, long-time, ...)</td>
<td>Indicates the expected time interval between inter-eNB handovers. If &quot;long-time&quot; is included, the interval between inter-eNB handovers is expected to be longer than 180 seconds.</td>
</tr>
</tbody>
</table>

9.2.71  Expected UE Activity Behaviour

Indicates information about the expected "UE activity behaviour" as defined in TS 23.401 [12].

<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>Expected Activity Period</td>
<td>O</td>
<td></td>
<td>INTEGER (1..30</td>
<td>40</td>
</tr>
<tr>
<td>Expected Idle Period</td>
<td>O</td>
<td></td>
<td>INTEGER (1..30</td>
<td>40</td>
</tr>
<tr>
<td>Source of UE Activity Behaviour Information</td>
<td>O</td>
<td></td>
<td>ENUMERATED (subscription information, statistics, ...)</td>
<td>If &quot;subscription information&quot; is indicated, the information contained in the Expected Activity Period IE and the Expected Idle Period IE, if present, is derived from subscription information. If &quot;statistics&quot; is indicated, the information contained in the Expected Activity Period IE and the Expected Idle Period IE, if present, is derived from statistical information.</td>
</tr>
</tbody>
</table>

9.2.72  SeNB Security Key

The SeNB Security Key IE is used to apply security in the SeNB as defined in TS 33.401 [18].

<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>SeNB Security Key</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(256))</td>
<td>The S-KeNB which is provided by the MeNB, see TS 33.401 [18].</td>
</tr>
</tbody>
</table>

9.2.73  SCG Change Indication

The SCG Change Indication IE is either used to request the SeNB to prepare the SCG Change in the SeNB or to request the MeNB to initiate the SCG Change towards the UE (see TS 36.300 [15]).
### 9.2.74 CoMP Information

This IE provides the list of CoMP hypothesis sets, where each CoMP hypothesis set is the collection of CoMP hypothesis(es) of one or multiple cells and each CoMP hypothesis set is associated with a benefit metric.

<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>SCG Change Indication</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(PDCPCountWrapAround,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PSCellChange, other, ...)</td>
</tr>
</tbody>
</table>

### 9.2.75 CoMP Hypothesis Set

This IE provides a set of CoMP hypotheses. A CoMP hypothesis is hypothetical PRB-specific resource allocation information for a cell.
### 9.2.14 CoMP Hypothesis Set Item

<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>CoMP Hypothesis Set Item</td>
<td></td>
<td>1..&lt;maxnoofCoMPCells&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI 9.2.14</td>
<td>ID of the cell for which the CoMP Hypothesis IE is applied.</td>
</tr>
<tr>
<td>&gt;CoMP Hypothesis</td>
<td>M</td>
<td></td>
<td>BIT STRING (6..4400, ...)</td>
<td>Each position in the bitmap represents a PRB in a subframe, for which value &quot;1&quot; indicates 'interference protected resource' and value &quot;0&quot; indicates 'resource with no utilization constraints,' which is applicable only in positions corresponding to the DL direction. The first bit corresponds to PRB 0 of the first subframe for which the IE is valid, the second bit corresponds to PRB 1 of the first subframe for which the IE is valid, and so on. The bit string may span across multiple contiguous subframes. The length of the bit string is an integer (maximum 40) multiple of DL_RB_N. DL_RB_N is defined in TS 36.211 [10]. The CoMP hypothesis pattern is continuously repeated.</td>
</tr>
</tbody>
</table>

#### Range bound

| maxnoofCoMPCells | Maximum number of cells in a CoMP hypothesis set. Value is 32. |

### 9.2.76 RSRP Measurement Report List

This IE provides RSRP measurement reports of UEs served by the sending eNB.

<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>RSRP Measurement Report Item</td>
<td></td>
<td>1..&lt;maxUEReport&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;RSRP Measurement Result</td>
<td></td>
<td>1..&lt;maxCellReport&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;RSRP Cell ID</td>
<td>M</td>
<td></td>
<td>ECGI 9.2.14</td>
<td>ID of the cell on which the RSRP is measured.</td>
</tr>
<tr>
<td>&gt;&gt;RSRP Measured</td>
<td>M</td>
<td></td>
<td>INTEGER (0..97, ...)</td>
<td>Measured RSRP. Defined in TS 36.331 [9].</td>
</tr>
<tr>
<td>&gt;UE ID</td>
<td>O</td>
<td></td>
<td>BIT STRING (SIZE(16))</td>
<td>ID assigned by eNB_B for the UE.</td>
</tr>
</tbody>
</table>

#### Range bound

| maxUEReport | Maximum number of UE measurement reports. Value is 128. |
| maxCellReport | Maximum number of reported cells. The value is 9. |
9.2.77 Dynamic DL transmission information

This IE contains assistance information for DL interference mitigation.

<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 NAICS Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;NAICS Active</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Transmission Modes</td>
<td>O</td>
<td></td>
<td>BIT STRING (SIZE(8))</td>
<td>The set bits indicate some or all transmission modes: 1, 2, 3, 4, 6, 8, 9, 10, as defined in TS 36.213 [23, 7.1]. The first/ leftmost bit is for transmission mode 1, the second bit is for transmission mode 2, and so on.</td>
</tr>
<tr>
<td>&gt;&gt;P_B</td>
<td>O</td>
<td></td>
<td>INTEGER (0..3)</td>
<td>See TS 36.213 [23, Table 5.2-1]</td>
</tr>
<tr>
<td>&gt;&gt;&gt;P_A_list</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;P_A</td>
<td>M</td>
<td></td>
<td>ENUMERATED (dB-6, dB-4.77, dB-3, dB-1.77, dB0, dB1, dB2, dB3,...)</td>
<td>See PA TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4.77 corresponds to -4.77 dB etc.</td>
</tr>
</tbody>
</table>

Range bound | Explanation
maxnoofPA | Maximum no of PA values that can be configured. Value is 3.

9.2.78 ProSe Authorized

This IE provides information on the authorization status of the UE for ProSe service(s).

<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>ProSe Direct Discovery</td>
<td>O</td>
<td></td>
<td>ENUMERATED (authorized, not authorized, ...)</td>
<td>Indicates whether the UE is authorized for ProSe Direct Discovery</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ProSe Direct Communication</td>
<td>O</td>
<td></td>
<td>ENUMERATED (authorized, not authorized, ...)</td>
<td>Indicates whether the UE is authorized for ProSe Direct Communication</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ProSe UE-to-Network Relaying</td>
<td>O</td>
<td></td>
<td>ENUMERATED (authorized, not authorized, ...)</td>
<td>Indicates whether the UE is authorized to act as ProSe UE-to-Network Relay</td>
<td>YES</td>
<td>ignore</td>
</tr>
</tbody>
</table>

9.2.79 CSI Report

This IE provides CSI reports of UEs served by the cell for which the information is provided.
<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>CSI Report per Cell</td>
<td></td>
<td>1..&lt;maxUEReport&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;UE ID</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(16))</td>
<td>ID assigned by eNB₂ for the UE.</td>
</tr>
<tr>
<td>&gt;CSI Report per CSI Process</td>
<td></td>
<td>1..&lt;maxCSIProcess&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CSI Process Configuration Index</td>
<td>M</td>
<td></td>
<td>INTEGER (1..7, ...)</td>
<td>Indicates one of the possible CSI Process configurations in the serving cell.</td>
</tr>
<tr>
<td>&gt;&gt;CSI Report per CSI Process Item</td>
<td></td>
<td>1..&lt;maxCSIReport&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;RI</td>
<td>M</td>
<td></td>
<td>INTEGER (1..8, ...)</td>
<td>The RI corresponding to the CQI being reported for this CSI process item. Value defined in TS 36.213 [11].</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Wideband CQI</td>
<td>M</td>
<td></td>
<td>9.2.80</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Subband Size</td>
<td>M</td>
<td></td>
<td>ENUMERATED (2, 3, 4, 6, 8, ...)</td>
<td>Corresponds to a value of subband size (k) defined in TS 36.213 [11] for the system bandwidth (N_{DL}^{RB}).</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Subband CQI List</td>
<td></td>
<td>0..&lt;maxSubband&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Subband CQI</td>
<td>M</td>
<td></td>
<td>9.2.81</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;Subband Index</td>
<td>M</td>
<td></td>
<td>INTEGER (0..27, ...)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxUEReport</td>
<td>Maximum number of UE. Value is 128.</td>
</tr>
<tr>
<td>maxCSIProcess</td>
<td>Maximum number of CSI processes per UE. The value is 4.</td>
</tr>
<tr>
<td>maxCSIReport</td>
<td>Maximum number of CSI Reports per CSI Process. The value is 2.</td>
</tr>
<tr>
<td>maxSubband</td>
<td>Maximum number of subbands. The value is 14.</td>
</tr>
</tbody>
</table>

9.2.80 Wideband CQI

This IE indicates the Wideband CQI as defined in TS 36.213 [11].

<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>Wideband CQI Codeword 0</td>
<td>M</td>
<td></td>
<td>INTEGER (0..15, ...)</td>
<td>Value defined in TS 36.213 [11].</td>
</tr>
<tr>
<td>CHOICE Wideband CQI Codeword 1</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;4-bit CQI</td>
<td>M</td>
<td></td>
<td>INTEGER (0..15, ...)</td>
<td>Value defined in TS 36.213 [11].</td>
</tr>
<tr>
<td>&gt;3-bit spatial differential CQI</td>
<td>M</td>
<td></td>
<td>INTEGER (0..7, ...)</td>
<td>Value defined in TS 36.213 [11].</td>
</tr>
</tbody>
</table>

9.2.81 Subband CQI

This IE indicates the Subband CQI as defined in TS 36.213 [11].
9.2.82 COUNT Value for PDCP SN Length 18

This information element indicates the 18 bit long PDCP SN and the corresponding 14 bit long Hyper Frame Number.

<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>PDCP-SN Length 18</td>
<td>M</td>
<td></td>
<td>INTEGER (0..262143)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>HFN for PDCP-SN Length 18</td>
<td>M</td>
<td></td>
<td>INTEGER (0..16383)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

9.2.83 LHN ID

The LHN ID IE is used to indicate the LHN ID of the eNB, as defined in TS 23.003 [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>Local Home Network ID</td>
<td>M</td>
<td></td>
<td>OCTET STRING (SIZE(32...256))</td>
<td>Identifies the Local Home Network.</td>
</tr>
</tbody>
</table>

9.2.84 Correlation ID

This information element is the GTP Tunnel Endpoint Identifier or GRE key to be used for the user plane transport between eNB and the L-GW described in TS 23.401 [12].

<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>Correlation ID</td>
<td>M</td>
<td></td>
<td>OCTET STRING (SIZE(4))</td>
<td></td>
</tr>
</tbody>
</table>

9.2.85 UE Context Kept Indicator

This IE indicates that the UE Context at the SeNB is kept in case of inter-MeNB handover without SeNB/SgNB Change procedure, as specified in TS 36.300 [15] or TS37.340 [32].

<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 Context Kept Indicator</td>
<td>M</td>
<td></td>
<td>ENUMERATED (True, …)</td>
<td></td>
</tr>
</tbody>
</table>

9.2.86 eNB UE X2AP ID Extension

This information element combined with the eNB UE X2AP ID uniquely identifies an UE over the X2 interface within an eNB. If the setup of an UE associated signalling connection was initiated including the eNB UE X2AP ID Extension,
the eNB UE X2AP ID Extension shall be used by both peers for the life-time of the respective UE-associated signalling connection.

The usage of this IE is defined in TS 36.401 [2].

<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>eNB UE X2AP ID Extension</td>
<td>M</td>
<td></td>
<td>INTEGER</td>
<td>(0..4095,...)</td>
</tr>
</tbody>
</table>

### 9.2.87 M6 Configuration

This IE defines the parameters for M6 measurement collection.

<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>M6 Report Interval</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(ms1024, ms2048, ms5120, ms10240, ...)</td>
</tr>
<tr>
<td>M6 Delay Threshold</td>
<td>C-ifUL</td>
<td></td>
<td>ENUMERATED</td>
<td>(ms30, ms40, ms50, ms60, ms70, ms80, ms90, ms100, ms150, ms300, ms500, ms750, ...)</td>
</tr>
<tr>
<td>M6 Links to log</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(uplink, downlink, both-uplink-and-downlink, ...)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifUL</td>
<td>This IE shall be present if the M6 Links to log IE is set to “uplink” or to “both-uplink-and-downlink”.</td>
</tr>
</tbody>
</table>

### 9.2.88 M7 Configuration

This IE defines the parameters for M7 measurement collection.

<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>M7 Collection Period</td>
<td>M</td>
<td></td>
<td>INTEGER</td>
<td>(1..60,...)</td>
</tr>
<tr>
<td>M7 Links to log</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(uplink, downlink, both-uplink-and-downlink, ...)</td>
</tr>
</tbody>
</table>

### 9.2.89 Tunnel Information

The *Tunnel Information* IE indicates the transport layer address and UDP port number.

<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</td>
<td>(1..160,...)</td>
</tr>
<tr>
<td>UDP Port Numbers</td>
<td>O</td>
<td></td>
<td>OCTET STRING</td>
<td>(SIZE(2))</td>
</tr>
</tbody>
</table>

*UDP Port Numbers if NAT/NAPT is deployed in the BBF access network.*
9.2.90 X2 Benefit Value

The X2 Benefit Value IE indicates the quantified benefit of the signalling connection.

<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>X2 Benefit Value</td>
<td>M</td>
<td></td>
<td>INTEGER (1..8, …)</td>
<td>Value 1 indicates low benefit, and 8 indicates high benefit.</td>
</tr>
</tbody>
</table>

9.2.91 Resume ID

The Resume ID IE is used to address a suspended UE Context within an eNB.

<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 Resume ID</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Resume ID not truncated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Resume ID not truncated</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE (40))</td>
<td>40 bit Resume Resume Identity contained in the RRCConnection ResumeRequest message (TS 36.331 [9]). The 20 most significant bits refer to the eNB ID of the eNB that allocated the Resume ID, the 20 least significant bits identify the UE Context stored at the eNB that allocated the Resume ID.</td>
</tr>
<tr>
<td>&gt;Resume ID truncated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Resume ID truncated</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE (24))</td>
<td>24 bit Resume Identity contained in the RRCConnection ResumeRequest message (TS 36.331 [9]). The 12 most significant bits refer to the 12 least significant bits of the eNB ID of the eNB that allocated the Resume ID. The 12 least significant bits refer to the 12 least significant bits that identify the UE Context stored at the eNB that allocated the Resume ID.</td>
</tr>
</tbody>
</table>

9.2.92 Bearer Type

This IE is used to support Non-IP data as specified in TS 23.401 [11].

<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>Bearer Type</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(non IP, …)</td>
</tr>
</tbody>
</table>

9.2.93 V2X Services Authorized

This IE provides information on the authorization status of the UE to use the sidelink for V2X services.
### 9.2.94 Offset of NB-IoT Channel Number to EARFCN

This IE is used to indicate the offset of the NB-IoT Channel Number to the EARFCN (TS 36.104 [16]).

<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>Offset of NB-IoT Channel Number to EARFCN</td>
<td>M</td>
<td></td>
<td>ENUMERATED (-10,-9,-8,-7,-6,-5,</td>
<td>Indicates whether the UE is authorized as Vehicle UE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-4,-3,-2,-1,-0.5,0,1,2,3,4,5,6,7,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8,9,...)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.95 WT ID

This IE is used to identify a WT.

<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 WT ID Type</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;WT ID Type 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;PLMN ID</td>
<td>M</td>
<td></td>
<td></td>
<td>PLMN Identity</td>
</tr>
<tr>
<td>&gt;&gt;Short WT ID</td>
<td>M</td>
<td></td>
<td></td>
<td>BIT STRING (24)</td>
</tr>
<tr>
<td>&gt;WT ID Type 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Long WT ID</td>
<td>M</td>
<td></td>
<td></td>
<td>BIT STRING (48)</td>
</tr>
</tbody>
</table>

### 9.2.96 WT UE XwAP ID

The WT UE XwAP ID is allocated by the WT and uniquely identifies a UE over the Xw interface.

<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>WT UE XwAP ID</td>
<td>M</td>
<td></td>
<td>OCTET STRING (SIZE(3))</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.97 UE Sidelink Aggregate Maximum Bit Rate

This IE indicates the aggregate maximum bit rate for all radio bearers per UE in the sidelink for V2X services.

<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 Sidelink Aggregate Maximum Bit Rate</td>
<td>M</td>
<td></td>
<td>Bit Rate 9.2.11</td>
<td>Value 0 shall be considered as a logical error by the receiving eNB.</td>
</tr>
</tbody>
</table>

### 9.2.98 NR Neighbour Information

This IE contains cell configuration information of NR cells that a neighbour node may need for the X2 AP interface.
<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 Neighbour Information</td>
<td>1..</td>
<td>&lt;maxnoofNR Neighbours&gt;</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR Neighbour Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;NRPCI</td>
<td>M</td>
<td>INTEGER (0..1007)</td>
<td>NR Physical Cell ID</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR-CGI</td>
<td>M</td>
<td>9.2.111</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CHOICE NR-Neighbour-Mode-Info</td>
<td>M</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;FDD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;FDD Info</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;ARFCNFreqInfo</td>
<td>M</td>
<td>NR ARFCN Frequency Info 9.2.106</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;DL ARFCNFreqInfo</td>
<td>M</td>
<td>NR ARFCN Frequency Info 9.2.106</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;TDD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;TDD Info</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;&gt;ARFCNNRFreqInfo</td>
<td>M</td>
<td>NR ARFCN Frequency Info 9.2.106</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;5GS-TAC</td>
<td>M</td>
<td>OCTET STRING(3)</td>
<td>Broadcast 5GS Tracking Area Code</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Configured TAC</td>
<td>O</td>
<td>TAC 9.2.3.7</td>
<td>This is the TAC configured in the en-gNB, different from the 5GS TAC broadcast in the NR cell and enables application of Roaming and Access Restrictions for EN-DC as specified in TS 37.340 [32].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Measurement Timing Configuration</td>
<td>M</td>
<td>OCTET STRING</td>
<td>Contains the MeasurementTimingConfiguration inter-node message for the neighbour cell, as defined in TS 38.331 [31].</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>maxnoofNRNeighbours</td>
<td>Maximum no. of neighbour NR cells associated to a given served cell. Value is 1024.</td>
</tr>
</tbody>
</table>

9.2.99 Extended Bit Rate

This IE indicates the number of bits delivered by E-UTRAN in UL or to E-UTRAN 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 bearer, or an aggregated maximum bit rate.
### 9.2.100 en-gNB UE X2AP ID

This information element uniquely identifies an UE over the X2 interface within an en-gNB.

The usage of this IE is defined in TS 36.401 [2].

<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>en-gNB UE X2AP ID</td>
<td>M</td>
<td></td>
<td>INTEGER</td>
<td></td>
</tr>
</tbody>
</table>

| 9.2.101 SgNB Security Key |

The SgNB Security Key IE is used to apply security in the en-gNB as defined in TS 33.401 [18].

<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>SgNB Security Key</td>
<td>M</td>
<td></td>
<td>BIT STRING (SIZE(256))</td>
<td>The S-KgNB which is provided by the MeNB, see TS 33.401 [18].</td>
</tr>
</tbody>
</table>

### 9.2.102 Target SgNB ID Information

This IE contains the target SgNB ID used by MeNB to find the target en-gNB.

<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>Target SgNB ID</td>
<td>M</td>
<td></td>
<td>9.2.112</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.103 SCG Configuration Query

The SCG Configuration Query IE is used to request the en-gNB to provide current SCG configuration.

<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>SCG Configuration Query</td>
<td>M</td>
<td></td>
<td>ENUMERATED (True, ...)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.104 Delivery Status

This IE defines the Delivery Status IE of RRC Transfer 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>Highest successfully delivered NR PDCP Sequence Number</td>
<td>M</td>
<td>0..2^{12}-1</td>
<td>INTEGER (0..2^{12}-1)</td>
<td>Highest successfully delivered NR PDCP SN, as defined in 38.323 [33].</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.105 Void

Void
9.2.106 NR Frequency Info

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

<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>NRARFCN</td>
<td>M</td>
<td>INTEGER (0..maxNRARFCN)</td>
<td></td>
<td>RF Reference Frequency as defined in TS 38.104 [37] 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>
<tr>
<td>SUL Information</td>
<td>O</td>
<td>9.2.123</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency Band List</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;Frequency Band Item</td>
<td></td>
<td>1..&lt;maxnoofNrCellBands&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;NR Frequency Band</td>
<td>M</td>
<td>INTEGER (1..1024, ...)</td>
<td></td>
<td>Primary NR Operating Band as defined in TS38.104 [37] section 5.4.2.3. The value 1 corresponds e n1, value 2 corresponds to NR operating band n2, etc.</td>
</tr>
<tr>
<td>&gt;&gt;Supported SUL band List</td>
<td></td>
<td>0..&lt;maxnoofNrCellBands&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Supported SUL band Item</td>
<td></td>
<td>INTEGER (1..1024, ...)</td>
<td></td>
<td>Supplementary NR Operating Band as defined in TS 38.104 [37] 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxNRARFCN</td>
<td>Maximum value of NRARFCNs. 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>

9.2.107 NR UE Security Capabilities

This IE defines the supported algorithms for encryption and integrity protection in NR as defined in TS 33.401 [18].
9.2.108 EN-DC Resource Configuration

This IE contains the EN-DC resource configuration for an E-RAB, indicating the presence of PDCP at the en-gNB and Lower Layers at MCG and SCG.

<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>PDCP at SgNB</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>ED (present, not present)</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>MCG resources</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>ED (present, not present)</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>SCG resources</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>ED (present, not present)</td>
<td></td>
<td>–</td>
</tr>
</tbody>
</table>

9.2.109 PDCP Change Indication

The PDCP Change Indication IE is used to require the MeNB to either initiate the security key update or to perform PDCP data recovery towards the UE (see TS 37.340 [15]).

<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>PDCP Change Indication</td>
<td>M</td>
<td></td>
<td>ENUMERATED</td>
<td>(S-KgNB update required, PDCP data recovery required, ...)</td>
</tr>
</tbody>
</table>
9.2.110 Served NR Cell Information

This IE contains cell configuration information of an NR cell that a neighbour eNB may need for the X2 AP interface.

<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-PCI</td>
<td>M</td>
<td>INTEGRER (0..1007, …)</td>
<td>NR Physical Cell ID</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cell ID</td>
<td>M</td>
<td>NR CGI 9.2.111</td>
<td>NR CGI</td>
<td>Broadcast NR Cell ID</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>5GS-TAC</td>
<td>M</td>
<td>OCTET STRING(3)</td>
<td>5GS-TAC</td>
<td>Broadcast 5GS Tracking Area Code</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Configured TAC</td>
<td>O</td>
<td>OCTET STRING (2)</td>
<td>Configured TAC</td>
<td>This is the TAC configured in the en-gNB, different from the 5GS TAC broadcast in the NR cell and enables application of Roaming and Access Restrictions for EN-DC as specified in TS 37.340 [32].</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Served PLMNs**

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

9.2.111 NR CGI

The NR Cell Global Identifier (NR CGI) is used to globally identify an NR cell (see TS 38.401 [34]).
### 9.2.112 Global en-gNB ID

This IE is used to globally identify an en-gNB (see TS 37.340 [32]).

<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></td>
<td>9.2.4</td>
<td></td>
</tr>
<tr>
<td>NR Cell Identity</td>
<td>M</td>
<td></td>
<td>BIT STRING (36)</td>
<td>The leftmost bits of the NR Cell Identity IE value correspond to the value of the en-gNB ID IE contained in the Global en-gNB ID IE (defined in section 9.2.112) identifying the en-gNB that controls the cell.</td>
</tr>
</tbody>
</table>

### 9.2.113 NR Carrier Information

This IE contains information for an NR carrier that a neighbour eNB may need to configure inter-RAT measurements.

<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>Broadcast PLMNs</td>
<td></td>
<td>1..&lt;max noofBPLMNsin gNB&gt;</td>
<td></td>
<td>Broadcast PLMNs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;PLMN Identity</td>
<td>M</td>
<td></td>
<td>9.2.4</td>
<td></td>
<td></td>
<td></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 ARFCN</td>
<td>M</td>
<td>NR ARFCN 9.2.106</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;DL ARFCN</td>
<td>M</td>
<td>NR ARFCN 9.2.106</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;ARFCN</td>
<td>M</td>
<td>NR ARFCN 9.2.106</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>max noofBPLMNsin gNB</td>
<td>Maximum no. of broadcast PLMN Ids in the gNB. Value is 6</td>
</tr>
</tbody>
</table>

### 9.2.114 NR Transmission Bandwidth

The NR 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></td>
<td>ENUMERATED (scs15, sccs30, sccs60, sccs120, ...)</td>
<td>The values scs15, sccs30, sccs60 and sccs120 corresponds to the sub carrier spacing in TS 38.104 [37].</td>
</tr>
<tr>
<td>NR NRB</td>
<td>M</td>
<td></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 “NRB” (TS 38.104 [37]). The values nrb11, nrb18, etc. correspond to the number of resource blocks “NRB” 11, 18, etc.</td>
</tr>
</tbody>
</table>

9.2.115 Cell Assistance Information

The Cell Assistance Information IE is used by the eNB to request information about NR cells.

<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 Cell Assistance Type</td>
<td>M</td>
<td>1 .. &lt; maxCellInenGNB</td>
<td>ENUMERATED (allServedNRCells, ...)</td>
<td>This IE may be refined.</td>
</tr>
<tr>
<td>&gt;&gt;List of Requested NR Cells</td>
<td></td>
<td></td>
<td>9.2.111</td>
<td>Included when the eNB requests a limited list of served NR cells.</td>
</tr>
<tr>
<td>&gt;&gt;&gt;NR-CGI</td>
<td>M</td>
<td>1 .. &lt; maxCellInenGNB</td>
<td>9.2.111</td>
<td>NR cell for which served NR cell information is requested.</td>
</tr>
<tr>
<td>&gt;&gt;Complete Information Request Indicator</td>
<td>M</td>
<td>1 .. &lt; maxCellInenGNB</td>
<td>ENUMERATED (allServedNRCells, ...)</td>
<td>Included when the eNB requests the complete list of served NR cells.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxCellInenGNB</td>
<td>Maximum no. cells that can be served by an en-gNB. Value is 16384.</td>
</tr>
</tbody>
</table>

9.2.116 MeNB Resource Coordination Information

The MeNB Resource Coordination Information IE is LTE resource allocation at MeNB and used at the en-gNB to coordinate resource utilisation between the MeNB and the en-gNB.
<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>EUTRA Cell ID</td>
<td>M</td>
<td>ECGI 9.2.14</td>
<td></td>
<td>Each position in the bitmap represents a PRB pair in a subframe; value &quot;0&quot; indicates &quot;resource not intended to be used for transmission&quot;, value &quot;1&quot; indicates &quot;resource intended to be used for transmission&quot;. The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to UL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the UL Coordination Information corresponds to subframe 0 in a radio frame where SFN = 0. The length of the bit string is an integer multiple of $N_{RB}^{UL}$. $N_{RB}^{UL}$ is defined in TS 36.211 [10]. The UL Coordination Information is continuously repeated.</td>
</tr>
<tr>
<td>UL Coordination Information</td>
<td>M</td>
<td>BIT STRING (6..4400, ...)</td>
<td></td>
<td>Each position in the bitmap represents a PRB pair in a subframe; value &quot;0&quot; indicates &quot;resource not intended to be used for transmission&quot;, value &quot;1&quot; indicates &quot;resource intended to be used for transmission&quot;. The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to UL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the UL Coordination Information corresponds to subframe 0 in a radio frame where SFN = 0. The length of the bit string is an integer multiple of $N_{RB}^{UL}$. $N_{RB}^{UL}$ is defined in TS 36.211 [10]. The UL Coordination Information is continuously repeated.</td>
</tr>
</tbody>
</table>
### DL Coordination Information

<table>
<thead>
<tr>
<th>DL Coordination Information</th>
<th>O</th>
<th>BIT STRING (6..4400, …)</th>
</tr>
</thead>
</table>

Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "resource not intended to be used for transmission", value "1" indicates "resource intended to be used for transmission". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to DL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the DL Coordination Information corresponds to the receiving node’s subframe 0 in a receiving node’s radio frame where $SFN = 0$. The length of the bit string is an integer multiple of $N_{BS}^{DL}$. $N_{BS}^{DL}$ is defined in TS 36.211 [10]. The DL Coordination Information is continuously repeated.

---

### 9.2.117 SgNB Resource Coordination Information

The SgNB Resource Coordination Information IE is LTE resource allocation at MeNB and used at the MeNB to coordinate resource utilisation between the en-gNB and the MeNB.
<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 CGI</td>
<td>M</td>
<td>9.2.111</td>
<td></td>
<td>Each position in the bitmap represents a PRB pair in a subframe; value “0” indicates “resource not intended to be used for transmission”; value “1” indicates “resource intended to be used for transmission”. The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to UL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the UL Coordination Information corresponds to the receiving node’s subframe 0 in a receiving node’s radio frame where SFN = 0. The length of the bit string is an integer multiple of $N_{RB}^{UL}$. $N_{RB}^{UL}$ is defined in TS 36.211 [10]. The UL Coordination Information is continuously repeated.</td>
</tr>
<tr>
<td>UL Coordination Information</td>
<td>M</td>
<td>BIT STRING (6..4400, ...)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Each position in the bitmap represents a PRB in a subframe; value "0" indicates "resource not intended to be used for transmission", value "1" indicates "resource intended to be used for transmission ". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to DL subframes.

The bit string may span across multiple contiguous subframes (maximum 40). The first position of the DL Coordination Information corresponds to the receiving node's subframe 0 in a receiving node's radio frame where $SFN = 0$.

The length of the bit string is an integer multiple of $\frac{N_{RB}}{N_{SS}}$.

$N_{SS}$ is defined in TS 36.211 [10]. The DL Coordination Information is continuously repeated.

### 9.2.118 UL Configuration

This IE indicates how the UL PDCP is configured for the assisting node.

<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 the assisting node.</td>
</tr>
</tbody>
</table>

### 9.2.119 RLC Mode

The RLC Mode IE indicates the RLC Mode used for an E-RAB.

<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>M</td>
<td></td>
<td>ENUMERATED (RLC-AM, RLC-UM)</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.120 Secondary RAT Usage Report List

This IE provides information on the NR resources used with EN-DC.
### Secondary RAT usage report Item

<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>Secondary RAT usage report</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>item</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;E-RAB ID</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;E-RAB Usage Report Item</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>EACH</td>
<td>ignore</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Start timestamp</td>
<td>M</td>
<td></td>
<td>OCTET STRING (SIZE(4))</td>
<td>encoded in the same format as the first four octets of the 64-bit timestamp format as</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>defined in section 6 of IETF RFC 5905 [35]. It indicates the UTC time when the</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>recording of the Secondary RAT Data Volume was started.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;End timestamp</td>
<td>M</td>
<td></td>
<td>OCTET STRING (SIZE(4))</td>
<td>encoded in the same format as the first four octets of the 64-bit timestamp format as</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>defined in section 6 of IETF RFC 5905 [35]. It indicates the UTC time when the</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>recording of the Secondary RAT Data Volume was ended.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Usage count UL</td>
<td>M</td>
<td></td>
<td>INTEGER (0..2^{54} - 1)</td>
<td>The unit is: octets.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;Usage count DL</td>
<td>M</td>
<td></td>
<td>INTEGER (0..2^{54} - 1)</td>
<td>The unit is: octets.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range bound</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofbearers</td>
<td>Maximum no. of E-RABs. Value is 256.</td>
</tr>
<tr>
<td>maxnoof time periods</td>
<td>Maximum no. of time reporting periods. Value is 2.</td>
</tr>
</tbody>
</table>

### 9.2.121 UE Application layer measurement configuration

The IE defines configuration information for the QoE Measurement Collection (QMC) function.
### 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>Assign Criticality</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Octet string (1..1000)</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Octet string (1..1000)</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Octet string (1..1000)</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1 .. &lt;maxno ofCellID forQMC&gt;</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1 .. &lt;maxno ofTAforQMC&gt;</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1 .. &lt;maxno ofTAforQMC&gt;</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1 .. &lt;maxno ofTAforQMC&gt;</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1 .. &lt;maxno ofTAforQMC&gt;</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
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</tr>
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</tr>
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<td>1 .. &lt;maxno ofTAforQMC&gt;</td>
<td>Indicates application layer measurement configuration, see Annex L in [36].</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### Range bound

| maxnoOfCellIDForQMC | Maximum no. of Cell ID subject for QMC scope. Value is 32. |
| maxnoOfTAforQMC     | Maximum no. of TA subject for QMC scope. Value is 8. |
| maxnoOfPLMNforQMC   | Maximum no. of PLMNs in the PLMN list for QMC scope. Value is 16. |

### 9.2.122 DRB ID

This information element uniquely identifies a DRB over the X2 interface within an en-gNB.

The usage of this IE is defined in TS 36.331 [9].

<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>INTEGER (1..32)</td>
<td>This IE indicates the service type of UE application layer measurements.</td>
<td></td>
</tr>
</tbody>
</table>

### 9.2.123 SUL Information

This IE provides information about the SUL carrier.
### 9.2.124 Packet Loss Rate

This IE indicates the 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>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>

### 9.2.125 Protected E-UTRA Resource Indication

This IE indicates the resources allocated for E-UTRA DL and UL reference and control signals (hereby referred to as protected resources). This information is used in the process of E-UTRA – NR Cell Resource Coordination.

<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>Protected E-UTRA Resource Indication</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>
<tr>
<td>IE/Group Name</td>
<td>Presence</td>
<td>Range</td>
<td>IE type and reference</td>
<td>Semantics description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------</td>
<td>----------------</td>
<td>-----------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Activation SFN</td>
<td>M</td>
<td></td>
<td>INTEGER (0..1023)</td>
<td>Indicates from which SFN of the receiving node the resource allocation is valid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protected Resource List</td>
<td></td>
<td>1..&lt;maxnoofProtectedResourcePatterns&gt;</td>
<td></td>
<td>The protected resource pattern is continuously repeated, and it is valid until stated otherwise or until replaced by a new pattern. The pattern does not apply in reserved subframes.</td>
</tr>
<tr>
<td>&gt;Protected Resource List Item</td>
<td></td>
<td></td>
<td></td>
<td>Each item describes one transmission pattern. A pattern may comprise several control signals.</td>
</tr>
<tr>
<td>&gt;Resource Type</td>
<td>M</td>
<td></td>
<td>ENUMERATED (downlinknonCRS, CRS, uplink...)</td>
<td>Indicates whether the protected resource is E-UTRA DL non-CRS, E-UTRA CRS or E-UTRA UL.</td>
</tr>
<tr>
<td>Intra-PRB Protected Resource Footprint</td>
<td>M</td>
<td>BIT STRING (84,..)</td>
<td>The bitmap of REs occupied by the protected signal within one PRB. Each position in the bitmap represents an RE in one PRB; value &quot;0&quot; indicates &quot;resource not protected&quot;, value &quot;1&quot; indicates &quot;resource protected&quot;. The first bit of the string corresponds to the RE with the smallest time and frequency index in the PRB, where the indexing first goes into the frequency domain. The length of the bit string equals the product of $N_{RB}^b$ and the length of PRB in time dimension, measured in REs. $N_{RB}^b$ is defined in TS 36.211 [10]. The intra-PRB pattern consisting of all &quot;1&quot;s is equivalent to PRB-level granularity.</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Protected Footprint Frequency Pattern</td>
<td>M</td>
<td>BIT STRING(6..110..)</td>
<td>The bit string indicates in which PRBs inside carrier bandwidth the Intra-PRB Protected Resource Footprint applies. How often in time dimension this frequency pattern applies, depends on time periodicity of Intra-PRB Protected Resource Footprint. The first bit of the bit string corresponds to the PRB occupying the lowest subcarrier frequencies of the carrier bandwidth, where the indexing first goes into the frequency domain. Each position in the string represents a PRB; value &quot;0&quot; indicates &quot;Intra-PRB Protected Resource Footprint does not appear in PRB&quot;, value &quot;1&quot; indicates &quot;Intra-PRB Protected Resource Footprint appears in PRB&quot;. The length of the bit string equals the number of PRBs in the carrier bandwidth.</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;Protected Footprint Time Pattern</td>
<td>M</td>
<td></td>
<td>The description of time periodicity of the Intra-PRB Protected Resource Footprint.</td>
<td></td>
</tr>
</tbody>
</table>
### 9.2.126 Data Traffic Resource Indication

This IE indicates the intended data traffic resource allocation for E-UTRA - NR Cell Resource Coordination.

<table>
<thead>
<tr>
<th><strong>Range bound</strong></th>
<th><strong>Explanation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>maxnoofProtectedResourcePatterns</td>
<td>Maximum no. protected resource patterns. Value is 16.</td>
</tr>
<tr>
<td>IE/Group Name</td>
<td>Presence</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Activation SFN</td>
<td>M</td>
</tr>
<tr>
<td>CHOICE Shared Resource Type</td>
<td>M</td>
</tr>
<tr>
<td>&gt;UL Only Sharing</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;UL Resource Bitmap</td>
<td>M</td>
</tr>
<tr>
<td>&gt;UL and DL Sharing</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;CHOICE UL Resources</td>
<td>M</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Unchanged</td>
<td>M</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Changed</td>
<td>M</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;UL Resource Bitmap</td>
<td>M</td>
</tr>
<tr>
<td>&gt;&gt;CHOICE DL Resources</td>
<td>M</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Unchanged</td>
<td>M</td>
</tr>
<tr>
<td>&gt;&gt;&gt;Changed</td>
<td>M</td>
</tr>
<tr>
<td>&gt;&gt;&gt;&gt;DL Resource Bitmap</td>
<td>M</td>
</tr>
<tr>
<td>Reserved Subframe Pattern</td>
<td>O</td>
</tr>
</tbody>
</table>

### 9.2.127 Data Traffic Resources

The *Data Traffic Resources* IE indicates the intended data traffic resource allocation for E-UTRA - NR Cell Resource Coordination.
<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>Data Traffic Resources</td>
<td>M</td>
<td></td>
<td>BIT STRING (12..8800)</td>
<td>The indication of resources allocated to E-UTRA PDSCH/PUSCH. Each position in the bitmap represents a PRB in a subframe; value “0” indicates &quot;resource not intended to be used for transmission&quot;, value “1” indicates &quot;resource intended to be used for transmission &quot;. The first bit of the bit string corresponds to the PRB occupying the lowest subcarrier frequencies of the carrier, where the indexing first goes into the frequency domain. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the Data Traffic Resource Indication corresponds to the receiving node’s subframe 0 in a receiving node’s radio frame where SFN = Activation SFN. The length of the bit string is an integer multiple of ( N_{P_{DL}} ) or ( N_{P_{UL}} ), defined in TS 36.211 [10]. Data Traffic Resource Indication is continuously repeated, and it is valid until stated otherwise, or until replaced by a new pattern.</td>
</tr>
</tbody>
</table>

9.2.128 Reserved Subframe Pattern

The **Reserved Subframe Pattern** IE indicates the pattern of subframes in which the *Protected E-UTRA Resource Indication* and *Data Traffic Resource Indication* do not hold.
<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>Subframe Type</td>
<td>M</td>
<td></td>
<td>ENUMERATED(MBSFN, non-MBSFN, …)</td>
<td>Indicates what type of non-regular subframes the Reserved Subframe Pattern refers to (e.g. MBSFN).</td>
</tr>
<tr>
<td>Reserved Subframe Pattern</td>
<td>M</td>
<td></td>
<td>BIT STRING (10..40)</td>
<td>Each position in the bitmap represents a subframe. Value '0' indicates &quot;regular subframe&quot;. Value '1' indicates &quot;reserved subframe&quot;. For MBSFN subframes, the exception refers only to the non-control region of the subframe. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the Subframe Configuration IE corresponds to the receiving node's subframe 0 in a receiving node's radio frame where SFN = Activation SFN. The IE is ignored if received by the eNB.</td>
</tr>
<tr>
<td>MBSFN Control Region Length</td>
<td>O</td>
<td></td>
<td>INTEGER(0..3)</td>
<td>Length of control region in MBSFN subframes. Expressed in REs, in the time dimension.</td>
</tr>
</tbody>
</table>

9.2.129 Aerial UE subscription information

This information element is used by the eNB to know if the UE is allowed to use aerial UE function, refer to TS 23.401[12].

<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>Aerial UE subscription information</td>
<td>M</td>
<td></td>
<td>ENUMERATED (allowed, not allowed, ...)</td>
<td></td>
</tr>
</tbody>
</table>

9.2.130 User plane traffic activity report

This IE is used to indicate user plane traffic activity.

<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>User plane traffic activity report</td>
<td>M</td>
<td></td>
<td>ENUMERATED (inactive, re-activated, ...)</td>
<td>&quot;re-activated&quot; shall be only set after &quot;inactive&quot; has been reported for the concerned reporting object</td>
</tr>
</tbody>
</table>
9.3 Message and Information Element Abstract Syntax (with ASN.1)

9.3.1 General

X2AP ASN.1 definition conforms to ITU-T Rec. X.680 [27] and ITU-T Rec. X.681 [28].

Sub clause 9.3 presents the Abstract Syntax of the X2AP protocol with ASN.1. In case there is contradiction between the ASN.1 definition in this sub clause and the tabular format in sub clause 9.1 and 9.2, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional elements, in which the tabular format shall take precedence.

The ASN.1 definition specifies the structure and content of X2AP messages. X2AP 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 X2AP 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 in which 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 have different IE IDs.

If an X2AP 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.

9.3.2 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.

9.3.3 Elementary Procedure Definitions

--- ******************************************************************************
---
--- Elementary Procedure definitions
---
-- ************************************************************

\texttt{IMPORTS}

Criticality,

ProcedureCode

FROM X2AP-CommonDataTypes

CellActivationRequest,

CellActivationResponse,

CellActivationFailure,

ENBConfigurationUpdate,

ENBConfigurationUpdateAcknowledge,

ENBConfigurationUpdateFailure,

ErrorIndication,

HandoverCancel,

HandoverReport,

HandoverPreparationFailure,

HandoverRequest,

HandoverRequestAcknowledge,

LoadInformation,

PrivateMessage,

ResetRequest,

ResetResponse,

ResourceStatusFailure,

ResourceStatusRequest,

ResourceStatusResponse,

ResourceStatusUpdate,

RLFIndication,

SNStatusTransfer,

UEContextRelease,

X2SetupFailure,

X2SetupRequest,

X2SetupResponse,

MobilityChangeRequest,

MobilityChangeAcknowledge,

MobilityChangeFailure,

X2Release,

X2APMessageTransfer,

SeNBAdditionRequest,
SeNBAdditionRequestAcknowledge,
SeNBAdditionRequestReject,
SeNBReconfigurationComplete,
SeNBModificationRequest,
SeNBModificationRequestAcknowledge,
SeNBModificationRequestReject,
SeNBModificationRequired,
SeNBModificationConfirm,
SeNBModificationRefuse,
SeNBReleaseRequest,
SeNBReleaseRequired,
SeNBReleaseConfirm,
SeNBCounterCheckRequest,
X2RemovalFailure,
X2RemovalRequest,
X2RemovalResponse,
RetrieveUEContextRequest,
RetrieveUEContextResponse,
RetrieveUEContextFailure,
SgNBAdditionRequest,
SgNBAdditionRequestAcknowledge,
SgNBAdditionRequestReject,
SgNBReconfigurationComplete,
SgNBModificationRequest,
SgNBModificationRequestAcknowledge,
SgNBModificationRequestReject,
SgNBModificationRequired,
SgNBModificationConfirm,
SgNBModificationRefuse,
SgNBReleaseRequest,
SgNBReleaseRequestAcknowledge,
SgNBReleaseRequestReject,
SgNBReleaseRequired,
SgNBReleaseConfirm,
SgNBCounterCheckRequest,
SgNBChangeRequired,
SgNBChangeConfirm,
SgNBChangeRefuse,
RRCTransfer,
ENDCX2SetupRequest,
ENDCX2SetupResponse,
ENDCX2SetupFailure,
ENDCConfigurationUpdate,
ENDCConfigurationUpdateAcknowledge,
ENDCConfigurationUpdateFailure,
SecondaryRATDataUsageReport,
ENDCCellActivationRequest,
ENDCCellActivationResponse,
ENDCCellActivationFailure,
ENDEndUserRequired,
ENDEndUserRequiredConf,
ENDEndUserActivityNotification,
ENDCX2RemovalRequest,
ENDCX2RemovalResponse,
ENDCX2RemovalFailure

FROM X2AP-PDU-Contents

id-cellActivation,
id-eNBConfigurationUpdate,
id-errorIndication,
id-handoverCancel,
id-handoverReport,
id-handoverPreparation,

id-loadIndication,
id-privateMessage,
id-reset,

id-resourceStatusReporting,
id-resourceStatusReportingInitiation,
id-rLFIndication,
id-snStatusTransfer,
id-uEContextRelease,
id-x2Setup,
id-mobilitySettingsChange,
id-x2Release,
id-x2APMessageTransfer,
id-seNBAdditionPreparation,
id-seNBRconfigurationCompletion,
id-meNBinitiatedSeNBModificationPreparation,
id-seNBinitiatedSeNBModification,
id-meNBinitiatedSeNBRelease,
id-seNBinitiatedSeNBRelease,
id-seNBCounterCheck,
id-x2Removal,
id-retrieveUEContext,
id-sgNBAdditionPreparation,
id-sgNBRconfigurationCompletion,
id-meNBinitiatedSgNBModificationPreparation,
id-sgNBinitiatedSgNBModification,
id-meNBinitiatedSgNBRelease,
id-sgNBinitiatedSgNBRelease,
id-sgNBCounterCheck,
id-rRCTSTRransfer,
id-endcX2Setup,
id-endcConfigurationUpdate,
id-secondaryRATDataUsageReport,
id-endcCellActivation,
id-endcPartialReset,
id-eUTRANRCellResourceCoordination,
id-SgNBActivityNotification,
id-endcX2Removal
FROM X2AP-Constants;

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

X2AP-ELEMENTARY-PROCEDURE ::= CLASS {
    &InitiatingMessage ,
    &SuccessfulOutcome   OPTIONAL,
    &UnsuccessfulOutcome  OPTIONAL,
    &procedureCode        ProcedureCode  UNIQUE,
    &criticality          Criticality    DEFAULT ignore
}

WITH SYNTAX {
    INITIATING MESSAGE &InitiatingMessage
    [SUCCESSFUL OUTCOME &SuccessfulOutcome]
    [UNSUCCESSFUL OUTCOME &UnsuccessfulOutcome]
    PROCEDURE CODE &procedureCode
    [CRITICALITY   &criticality]
}

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

X2AP-PDU ::= CHOICE {
    initiatingMessage InitiatingMessage,
    successfulOutcome SuccessfulOutcome,
    unsuccessfulOutcome UnsuccessfulOutcome,
    ...
}

InitiatingMessage ::= SEQUENCE {
    procedureCode  X2AP-ELEMENTARY-PROCEDURE.&procedureCode  {{X2AP-ELEMENTARY-PROCEDURES}},
    criticality    X2AP-ELEMENTARY-PROCEDURE.&criticality   {{X2AP-ELEMENTARY-PROCEDURES}{@procedureCode}},
    value          X2AP-ELEMENTARY-PROCEDURE.&InitiatingMessage {{X2AP-ELEMENTARY-PROCEDURES}{@procedureCode}}
}

SuccessfulOutcome ::= SEQUENCE {
    procedureCode  X2AP-ELEMENTARY-PROCEDURE.&procedureCode  {{X2AP-ELEMENTARY-PROCEDURES}},
    criticality    X2AP-ELEMENTARY-PROCEDURE.&criticality   {{X2AP-ELEMENTARY-PROCEDURES}{@procedureCode}},
    value          X2AP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome {{X2AP-ELEMENTARY-PROCEDURES}{@procedureCode}}
}

UnsuccessfulOutcome ::= SEQUENCE {
    procedureCode  X2AP-ELEMENTARY-PROCEDURE.&procedureCode  {{X2AP-ELEMENTARY-PROCEDURES}},
    criticality    X2AP-ELEMENTARY-PROCEDURE.&criticality   {{X2AP-ELEMENTARY-PROCEDURES}{@procedureCode}},
    value          X2AP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome {{X2AP-ELEMENTARY-PROCEDURES}{@procedureCode}}
}
X2AP-ELEMENTARY-PROCEDURES ::= { X2AP-ELEMENTARY-PROCEDURES-CLASS-1 | X2AP-ELEMENTARY-PROCEDURES-CLASS-2, ...

X2AP-ELEMENTARY-PROCEDURES-CLASS-1 ::= {
  handoverPreparation
  reset
  x2Setup
  resourceStatusReportingInitiation
  eNBConfigurationUpdate
  mobilitySettingsChange
  cellActivation
  seNBAdditionPreparation
  meNBInitiatedSeNBModificationPreparation
  seNBInitiatedSeNBModification
  seNBInitiatedSeNBRelease
  x2Removal
  retrieveUEContext
  sgNBAdditionPreparation
  meNBInitiatedSgNBModificationPreparation
  sgNBInitiatedSgNBModification
  meNBInitiatedSgNBRelease
  sgNBInitiatedSgNBRelease
  sgNBChange
  endcX2Setup
  endcConfigurationUpdate
  endcCellActivation
  endcPartialReset
  eUTRANRCellResourceCoordination
  endcX2Removal
  ...

X2AP-ELEMENTARY-PROCEDURES-CLASS-2 ::= {
  snStatusTransfer
  uEContextRelease
  handoverCancel
  errorIndication
  resourceStatusReporting
  loadIndication
  privateMessage
  rLFIndication
  handoverReport
  x2Release
  x2APMessageTransfer
  ...

-- **************************************************************
-- Interface Elementary Procedure List
-- **************************************************************
seNBReconfigurationCompletion
meNBinitiatedSeNBRelease
seNBCounterCheck
gsNBReconfigurationCompletion
gsNBCounterCheck
rRCEtransfer
secondaryRATDataUsageReport
gsNBActivityNotification,
...
}

-- ************************************************************
--
-- Interface Elementary Procedures
--
-- ************************************************************

handoverPreparation X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    HandoverRequest
  SUCCESSFUL OUTCOME    HandoverRequestAcknowledge
  UNSUCCESSFUL OUTCOME  HandoverPreparationFailure
  PROCEDURE CODE        id-handoverPreparation
  CRITICALITY           reject
}

snStatusTransfer X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    SNStatusTransfer
  PROCEDURE CODE        id-snStatusTransfer
  CRITICALITY           ignore
}

uEContextRelease X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    UEContextRelease
  PROCEDURE CODE        id-uEContextRelease
  CRITICALITY           ignore
}

handoverCancel X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    HandoverCancel
  PROCEDURE CODE        id-handoverCancel
  CRITICALITY           ignore
}

handoverReport X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    HandoverReport
  PROCEDURE CODE        id-handoverReport
  CRITICALITY           ignore
}

errorIndication X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    ErrorIndication

loadIndication X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE LoadInformation
  PROCEDURE CODE id-loadIndication
  CRITICALITY ignore
}

reset X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ResetRequest
  SUCCESSFUL OUTCOME ResetResponse
  PROCEDURE CODE id-reset
  CRITICALITY reject
}

x2Setup X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE X2SetupRequest
  SUCCESSFUL OUTCOME X2SetupResponse
  UNSUCCESSFUL OUTCOME X2SetupFailure
  PROCEDURE CODE id-x2Setup
  CRITICALITY reject
}

eNBConfigurationUpdate X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ENBConfigurationUpdate
  SUCCESSFUL OUTCOME ENBConfigurationUpdateAcknowledge
  UNSUCCESSFUL OUTCOME ENBConfigurationUpdateFailure
  PROCEDURE CODE id-eNBConfigurationUpdate
  CRITICALITY reject
}

resourceStatusReportingInitiation X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ResourceStatusRequest
  SUCCESSFUL OUTCOME ResourceStatusResponse
  UNSUCCESSFUL OUTCOME ResourceStatusFailure
  PROCEDURE CODE id-resourceStatusReportingInitiation
  CRITICALITY reject
}

resourceStatusReporting X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ResourceStatusUpdate
  PROCEDURE CODE id-resourceStatusReporting
  CRITICALITY ignore
}

rLFIndication X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE RLFIndication
  PROCEDURE CODE id-rLFIndication
  CRITICALITY ignore
}
privateMessage  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  PrivateMessage
    PROCEDURE CODE  id-privateMessage
    CRITICALITY  ignore
}

mobilitySettingsChange  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  MobilityChangeRequest
    SUCCESSFUL OUTCOME  MobilityChangeAcknowledge
    UNSUCCESSFUL OUTCOME  MobilityChangeFailure
    PROCEDURE CODE  id-mobilitySettingsChange
    CRITICALITY  reject
}

cellActivation  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  CellActivationRequest
    SUCCESSFUL OUTCOME  CellActivationResponse
    UNSUCCESSFUL OUTCOME  CellActivationFailure
    PROCEDURE CODE  id-cellActivation
    CRITICALITY  reject
}

x2Release  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  X2Release
    PROCEDURE CODE  id-x2Release
    CRITICALITY  reject
}

x2APMessageTransfer  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  X2APMessageTransfer
    PROCEDURE CODE  id-x2APMessageTransfer
    CRITICALITY  reject
}

seNBAdditionPreparation  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SeNBAdditionRequest
    SUCCESSFUL OUTCOME  SeNBAdditionRequestAcknowledge
    UNSUCCESSFUL OUTCOME  SeNBAdditionRequestReject
    PROCEDURE CODE  id-seNBAdditionPreparation
    CRITICALITY  reject
}

seNBReconfigurationCompletion  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SeNBReconfigurationComplete
    PROCEDURE CODE  id-seNBReconfigurationCompletion
    CRITICALITY  ignore
}

meNBinitiatedSeNBModificationPreparation  
X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SeNBModificationRequest
    SUCCESSFUL OUTCOME  SeNBModificationRequestAcknowledge
    UNSUCCESSFUL OUTCOME  SeNBModificationRequestReject
    PROCEDURE CODE  id-meNBinitiatedSeNBModificationPreparation
    CRITICALITY  reject
seNBinitiatedSeNBModification X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE SeNBModificationRequired
  SUCCESSFUL OUTCOME SeNBModificationConfirm
  UNSUCCESSFUL OUTCOME SeNBModificationRefuse
  PROCEDURE CODE id-seNBinitiatedSeNBModification
  CRITICALITY reject
}

meNBinitiatedSeNBRelease X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE SeNBReleaseRequest
  PROCEDURE CODE id-meNBinitiatedSeNBRelease
  CRITICALITY ignore
}

seNBinitiatedSeNBRelease X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE SeNBReleaseRequired
  SUCCESSFUL OUTCOME SeNBReleaseConfirm
  PROCEDURE CODE id-seNBinitiatedSeNBRelease
  CRITICALITY reject
}

seNBCounterCheck X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE SeNBCounterCheckRequest
  PROCEDURE CODE id-seNBCounterCheck
  CRITICALITY reject
}

x2Removal X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE X2RemovalRequest
  SUCCESSFUL OUTCOME X2RemovalResponse
  UNSUCCESSFUL OUTCOME X2RemovalFailure
  PROCEDURE CODE id-x2Removal
  CRITICALITY reject
}

retrieveUEContext X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE RetrieveUEContextRequest
  SUCCESSFUL OUTCOME RetrieveUEContextResponse
  UNSUCCESSFUL OUTCOME RetrieveUEContextFailure
  PROCEDURE CODE id-retrieveUEContext
  CRITICALITY reject
}

sgNBAdditionPreparation X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE SgNBAdditionRequest
  SUCCESSFUL OUTCOME SgNBAdditionRequestAcknowledge
  UNSUCCESSFUL OUTCOME SgNBAdditionRequestReject
  PROCEDURE CODE id-sgNBAdditionPreparation
  CRITICALITY reject
}

sgNBReconfigurationCompletion X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE  SgNBReconfigurationComplete
PROCEDURE CODE  id-sgNBReconfigurationCompletion
CRITICALITY  ignore
}

meNBinitiatedSgNBModificationPreparation  X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SgNBModificationRequest
    SUCCESSFUL OUTCOME  SgNBModificationRequestAcknowledge
    UNSUCCESSFUL OUTCOME  SgNBModificationRequestReject
    PROCEDURE CODE  id-meNBinitiatedSgNBModificationPreparation
    CRITICALITY  reject
}

sgNBinitiatedSgNBModification  X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SgNBModificationRequired
    SUCCESSFUL OUTCOME  SgNBModificationConfirm
    UNSUCCESSFUL OUTCOME  SgNBModificationRefuse
    PROCEDURE CODE  id-sgNBinitiatedSgNBModification
    CRITICALITY  reject
}

meNBinitiatedSgNBRelease  X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SgNBReleaseRequest
    SUCCESSFUL OUTCOME  SgNBReleaseRequestAcknowledge
    UNSUCCESSFUL OUTCOME  SgNBReleaseRequestReject
    PROCEDURE CODE  id-meNBinitiatedSgNBRelease
    CRITICALITY  ignore
}

sgNBinitiatedSgNBRelease  X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SgNBReleaseRequired
    SUCCESSFUL OUTCOME  SgNBReleaseConfirm
    PROCEDURE CODE  id-sgNBinitiatedSgNBRelease
    CRITICALITY  reject
}

sgNBCounterCheck  X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SgNBCounterCheckRequest
    PROCEDURE CODE  id-sgNBCounterCheck
    CRITICALITY  reject
}

sgNBChange  X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  SgNBChangeRequired
    SUCCESSFUL OUTCOME  SgNBChangeConfirm
    UNSUCCESSFUL OUTCOME  SgNBChangeRefuse
    PROCEDURE CODE  id-sgNBChange
    CRITICALITY  reject
}

rRCTransfer  X2AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE  RRCTransfer
    PROCEDURE CODE  id-rRCTransfer
    CRITICALITY  reject
endcX2Setup X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ENDCX2SetupRequest
  SUCCESSFUL OUTCOME ENDCX2SetupResponse
  UNSUCCESSFUL OUTCOME ENDCX2SetupFailure
  PROCEDURE CODE id-endcX2Setup
  CRITICALITY reject
}

endcConfigurationUpdate X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ENDCConfigurationUpdate
  SUCCESSFUL OUTCOME ENDCConfigurationUpdateAcknowledge
  UNSUCCESSFUL OUTCOME ENDCConfigurationUpdateFailure
  PROCEDURE CODE id-endcConfigurationUpdate
  CRITICALITY reject
}

secondaryRATDataUsageReport X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE SecondaryRATDataUsageReport
  PROCEDURE CODE id-secondaryRATDataUsageReport
  CRITICALITY reject
}

dendcCellActivation X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ENDCCellActivationRequest
  SUCCESSFUL OUTCOME ENDCCellActivationResponse
  UNSUCCESSFUL OUTCOME ENDCCellActivationFailure
  PROCEDURE CODE id-endcCellActivation
  CRITICALITY reject
}

dendcPartialReset X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE ENDCPartialResetRequired
  SUCCESSFUL OUTCOME ENDCPartialResetConfirm
  PROCEDURE CODE id-endcPartialReset
  CRITICALITY reject
}

eUTRANRCellResourceCoordination X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE EUTRANRCellResourceCoordinationRequest
  SUCCESSFUL OUTCOME EUTRANRCellResourceCoordinationResponse
  PROCEDURE CODE id-eUTRANRCellResourceCoordination
  CRITICALITY reject
}

sgNBActivityNotification X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE SgNBActivityNotification
  PROCEDURE CODE id-SgNBActivityNotification
  CRITICALITY reject
}
endcX2Removal X2AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE  ENDCX2RemovalRequest
  SUCCESSFUL OUTCOME  ENDCX2RemovalResponse
  UNSUCCESSFUL OUTCOME ENDCX2RemovalFailure
  PROCEDURE CODE   id-endcX2Removal
  CRITICALITY    reject
}

END

9.3.4 PDU Definitions

-- **********************************************************************
-- PDU definitions for X2AP.
-- **********************************************************************

X2AP-PDU-Contents {
  itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
  eps-Access (21) modules (3) x2ap (2) version1 (1) x2ap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::= 

BEGIN

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

IMPORTS
  ABSInformation,
  ABS-Status,
  AS-SecurityInformation,
  BearerType,
  Cause,
  CompositeAvailableCapacityGroup,
  Correlation-ID,
  COUNTvalue,
  CellReportingIndicator,
  AerialUEsubscriptionInformation,
  CriticalityDiagnostics,
  CRNTI,
  CSGMembershipStatus,
  CSG-Id,
  DeactivationIndication,
  DL-Forwarding,
  DynamicDLTransmissionInformation,
  ECGI,
  E-RAB-ID,
  E-RAB-Level-QoS-Parameters,
E-RAB-List,
EUTRAN-TraceID,
Global-ENB-ID,
GTPtunnelEndpoint,
GU-GroupIDList,
GUMMEI,
HandoverReportType,
HandoverRestrictionList,
Masked-IMEISV,
InvokeIndication,
LocationReportingInformation,
MBR-Configuration,
ManagementBasedMDTAllowed,
MDTPLMNList,
Neighbour-Information,
PCI,
PDCP-SN,
PLMN-Identity,
ReceiveStatusofULPDCPSDUs,
Registration-Request,
RelativeNarrowbandTxPower,
RadioResourceStatus,
RRCConnReestabIndicator,
RRCConnSetupIndicator,
UE-RLF-Report-Container,
UEAppLayerMeasConfig,
RRC-Context,
ServedCell-Information,
ServedCells,
ShortMAC-I,
SRVCCOperationPossible,
SubscriberProfileIDforRFP,
TargetCellInUTRAN,
TargetenBtoSource-eNBTransparentContainer,
TimeToWait,
TraceActivation,
TraceDepth,
TransportLayerAddress,
UEAggregateMaximumBitRate,
UE-HistoryInformation,
UE-HistoryInformationFromTheUE,
UE-S1AP-ID,
UESecurityCapabilities,
UEsToBeResetList,
UE-X2AP-ID,
UL-HighInterferenceIndicationInfo,
UL-InterferenceOverloadIndication,
HWLoadIndicator,
SI-TNLLoadIndicator,
Measurement-ID,
ReportCharacteristics,
MobilityParametersInformation,
MobilityParametersModificationRange,
ReceiveStatusofULPDCPSDUsExtended,
COUNTValueExtended,
SubframeAssignment,
ExtendedULInterferenceOverloadInfo,
ExpectedUEBehaviour,
SeNBSecurityKey,
MeNBtoSeNBContainer,
SeNBtoMeNBContainer,
SCGChangeIndication,
CoMPInformation,
ReportingPeriodicityRSRP_MR,
RSRP_MRRList,
UE-RLF-Report-Container-for-extended-bands,
ProSeAuthorized,
CoverageModificationList,
ReportingPeriodicityCSIR,
CSIReportList,
ReceiveStatusOfULPDCPDSUsPDCP-SN1length18,
COUNTvaluePDCP-SN1length18,
LHN-ID,
UE-ContextKeptIndicator,
UE-X2AP-ID-Extension,
SIPTOBearerDeactivationIndication,
TunnelInformation,
V2XServicesAuthorized,
X2BenefitValue,
ResumeID,
EUTRANCellIdentifier,
MakeBeforeBreakIndicator,
WTID,
WT-UE-X2AP-ID,
UESidelinkAggregateMaximumBitRate,
SgNBSecurityKey,
MeNBtoSgNBContainer,
SgNBtoMeNBContainer,
SplitSRBs,
RRCContainer,
SRBType,
GlobalGNB-ID,
GNB-ID,
SCGConfigurationQuery,
SplitSRB,
UENRMMeasurement,
EN-DC-ResourceConfiguration,
TAC,
NRFreqInfo,
NRCoG,
NRPCI,
NRUESecurityCapabilities,
PDCPChangeIndication,
ULConfiguration,
SgNB-UE-X2AP-ID,
SecondaryRATUsageReportList,
ActivationID,
MeNBResourceCoordinationInformation,
SgNBResourceCoordinationInformation,
NR-TxBW,
BroadcastPLMNs-Item,
RLCMode,
GBR-QosInformation,
DRB-ID,
FiveGS-TAC,
SULInformation,
Packet-LossRate,
ResourceType,
DataTrafficResourceIndication,
SpectrumSharingGroupID,
RRC-Config-Ind,
SgNB-Addition-Trigger-Ind,
UserPlaneTrafficActivityReport,
ERABActivityNotifyItemList

FROM X2AP-IEs

PrivateIE-Container{},
ProtocolExtensionContainer{},
ProtocolIE-Container{},
ProtocolIE-ContainerList{},
ProtocolIE-ContainerPair{},
ProtocolIE-ContainerPairList{},
ProtocolIE-Single-Container{},
X2AP-PRIVATE-IES,
X2AP-PROTOCOL-EXTENSION,
X2AP-PROTOCOL-IES,
X2AP-PROTOCOL-IES-PAIR
FROM X2AP-Containers

id-ABSInformation,
id-ActivatedCellList,
id-BearerType,
id-Cause,
id-CellInformation,
id-CellInformation-Item,
id-CellMeasurementResult,
id-CellMeasurementResult-Item,
id-CellToReport,
id-CellToReport-Item,
id-CompositeAvailableCapacityGroup,
id-AerialUEsubscriptionInformation,
id-CriticalityDiagnostics,
id-DeactivationIndication,
id-DynamicDLTransmissionInformation,
id-E-RABs-Admitted-Item,
id-E-RABs-Admitted-List,
id-E-RABs-NotAdmitted-List,
id-E-RABs-SubjectToStatusTransfer-List,
id-E-RABs-SubjectToStatusTransfer-Item,
id-E-RABs-ToBeSetup-Item,
id-GlobalENB-ID,
id-GUGroupIDList,
id-GUGroupIDToAddList,
id-GUGroupIDToDeleteList,
id-GUMMEI-ID,
id-Masked-IMEISV,
id-InvokeIndication,
id-New-eNB-UE-X2AP-ID,
id-Old-eNB-UE-X2AP-ID,
id-Registration-Request,
id-ReportingPeriodicity,
id-ServedCells,
id-ServedCellsActivate,
id-ServedCellsToAdd,
id-ServedCellsToModify,
id-ServedCellsToDelete,
id-SRVOperationPossible,
id-TargetCell-ID,
id-TargetENBtoSource-eNBTransparentContainer,
id-TimeToWait,
id-TraceActivation,
id-UE-ContextInformation,
id-UE-HistoryInformation,
id-UE-X2AP-ID,
id-Measurement-ID,
id-ReportCharacteristics,
id-ENB1-Measurement-ID,
id-ENB2-Measurement-ID,
id-ENB1-Cell-ID,
id-ENB2-Cell-ID,
id-ENB2-Proposed-Mobility-Parameters,
id-ENB1-Mobility-Parameters,
id-ENB2-Mobility-Parameters-Modification-Range,
id-FailureCellPCI,
id-Re-establishmentCellECGI,
id-FailureCellCRNTI,
id-ShortMAC-1,
id-SourceCellECGI,
id-FailureCellECGI,
id-HandoverReportType,
id-UE-RLF-Report-Container,
id-PartialSuccessIndicator,
id-MeasurementInitiationResult-List,
id-MeasurementInitiationResult-Item,
id-MeasurementFailureCause-Item,
id-CompleteFailureCauseInformation-List,
id-CompleteFailureCauseInformation-Item,
id-CSGMembershipStatus,
id-CSG-Id,
id-MDTConfiguration,
id-ManagementBasedMDTAllowed,
id-ABS-Status,
id-RRCConnSetupIndicator,
id-RRCConnReestabIndicator,
id-TargetCellInUTRAN,
id-MobilityInformation,
id-SourceCellCWNTI,
id-ManagementBasedMDTPLMNList,
id-ReceiveStatusOfULPDCPSDUsExtended,
id-ULCOUNTValueExtended,
id-DLCountValueExtended,
id-IntendedULDLConfiguration,
id-ExtendedULLInterferenceOverloadInfo,
id-RNL-Header,
id-x2APMessage,
id-UE-HistoryInformationFromTheUE,
id-ExpectedUEBehaviour,
id-MeNB-UE-X2AP-ID,
id-SeNB-UE-X2AP-ID,
id-UE-SecurityCapabilities,
id-SeNBSecurityKey,
id-SeNBUEAggregateMaximumBitRate,
id-ServingPLMN,
id-E-RABs-ToBeAdded-List,
id-E-RABs-ToBeAdded-Item,
id-MeNBtoSeNBContainer,
id-E-RABs-Admitted-ToBeAdded-List,
id-E-RABs-Admitted-ToBeAdded-Item,
id-SeNBtoMeNBContainer,
id-ResponseInformationSeNBReconfComp,
id-UE-ContextInformationSeNBModReq,
id-E-RABs-ToBeAdded-ModReqItem,
id-E-RABs-ToBeModified-ModReqItem,
id-E-RABs-ToBeReleased-ModReqItem,
id-E-RABs-Admitted-ToBeAdded-ModAckList,
id-E-RABs-Admitted-ToBeModified-ModAckList,
id-E-RABs-Admitted-ToBeReleased-ModAckList,
id-E-RABs-Admitted-ToBeAdded-ModAckItem,
id-E-RABs-Admitted-ToBeModified-ModAckItem,
id-E-RABs-Admitted-ToBeReleased-ModAckItem,
id-X2SRNClockChangeIndication,
id-E-RABs-ToBeReleased-ModReq,
id-E-RABs-ToBeReleased-ModReqItem,
id-E-RABs-ToBeReleased-List-RelReq,
id-E-RABs-ToBeReleased-List-RelConf,
id-E-RABs-ToBeReleased-RelReqItem,
id-E-RABs-ToBeReleased-RelConfItem,
id-E-RABs-SubjectToCounterCheck-List,
id-E-RABs-SubjectToCounterCheckItem,
id-CoMPInformation,
id-ReportingPeriodicityRSRPMR,
id-RSRPMLList,
id-UE-RLF-Report-Container-for-extended-bands,
id-ProSeAuthorized,
id-CoverageModificationList,
id-ReportingPeriodicityCSIR,
id-CSIRreportList,
id-ReceiveStatusOfULPDCPSDUsPDCP-SNlength18,
id-ULCOUNTValuePDCP-SNlength18,  
id-DLCOUNTValuePDCP-SNlength18,  
id-LHIN-ID,  
id-Correlation-ID,  
id-SIPTO-Correlation-ID,  
id-UE-ContextReferenceAtSeNB,  
id-UE-ContextReferenceAtWT,  
id-UE-ContextKeptIndicator,  
id-UEs-ToBeReset,  
id-UEs-Admitted-ToBeReset,  
id-WT-UE-ContextKeptIndicator,  
id-New-eNB-UE-X2AP-ID-Extension,  
id-Old-eNB-UE-X2AP-ID-Extension,  
id-MeNB-UE-X2AP-ID-Extension,  
id-SeNB-UE-X2AP-ID-Extension,  
id-SIPTO-BearerDeactivationIndication,  
id-Tunnel-Information-for-BBF,  
id-SIPTO-L-GW-TransportLayerAddress,  
id-GW-TransportLayerAddress,  
id-X2RemovalThreshold,  
id-CellReportingIndicator,  
id-V2XServicesAuthorized,  
id-resumeID,  
id-UE-ContextInformationRetrieve,  
id-E-RABs-ToBeSetupRetrieve-Item,  
id-NewEUTRANCellIdentifier,  
id-MakeBeforeBreakIndicator,  
id-UESidelinkAggregateMaximumBitRate,  
id-UL-GTPtunnelEndpoint,  
id-SgNBSecurityKey,  
id-SgNBUEAggregateMaximumBitRate,  
id-E-RABs-ToBeAdded-SgNBAddReqList,  
id-MeNBtoSgNBContainer,  
id-SgNB-UE-X2AP-ID,  
id-RequestedSplitSRBs,  
id-E-RABs-ToBeAdded-SgNBAddReq-Item,  
id-E-RABs-Admitted-ToBeAdded-SgNBAddReqAckList,  
id-SgNBtoMeNBContainer,  
id-AdmittedSplitSRBs,  
id-E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item,  
id-ResponseInformationSgNBReconfComp,  
id-UE-ContextInformation-SgNBModReq,  
id-E-RABs-ToBeAdded-SgNBModReq-Item,  
id-E-RABs-ToBeModified-SgNBModReq-Item,  
id-E-RABs-ToBeReleased-SgNBModReq-Item,  
id-E-RABs-Admitted-ToBeAdded-SgNBModAckList,  
id-E-RABs-Admitted-ToBeModified-SgNBModAckList,  
id-E-RABs-Admitted-ToBeReleased-SgNBModAckList,  
id-E-RABs-Admitted-ToBeAdded-SgNBModAck-Item,  
id-E-RABs-Admitted-ToBeModified-SgNBModAck-Item,  
id-E-RABs-Admitted-ToBeReleased-SgNBModAck-Item,  
id-E-RABs-ToBeReleased-SgNBModReqdList,  
id-E-RABs-ToBeModified-SgNBModReqdList,  
id-E-RABs-ToBeReleased-SgNBModReqd-Item,  
id-E-RABs-ToBeReleased-SgNBModReqd-Item,
id-E-RABs-ToBeModified-SgNBModReqd-Item, id-E-RABs-ToBeReleased-SgNBChaConfList, id-E-RABs-ToBeReleased-SgNBChaConf-Item, id-E-RABs-ToBeReleased-SgNBRel1ReqList, id-E-RABs-ToBeReleased-SgNBRel1Req-Item, id-E-RABs-ToBeReleased-SgNBRel1ConfList, id-E-RABs-ToBeReleased-SgNBRel1Conf-Item, id-E-RABs-SubjectToSgNBCounterCheck-List, id-E-RABs-SubjectToSgNBCounterCheck-Item, id-Target-SgNB-ID, id-RRCContainer, id-SRBBType, id-HandoverRestrictionList, id-SCGConfigurationQuery, id-SplitSRB, id-UEMNMeasurement, id-InitiatingNodeType-EndcX2Setup, id-InitiatingNodeType-EndcConfigUpdate, id-RespondingNodeType-EndcX2Setup, id-RespondingNodeType-EndcConfigUpdate, id-NRUEncapsulationCapabilities, id-PDCPChangeIndication, id-ServedEUTRACellsENDCX2ManagementList, id-ServedEUTRACellsToModifyListENDCConfUpd, id-ServedEUTRACellsToModifyListENDCConfUpd, id-ServedNRCellsToModifyListENDCConfUpd, id-ServedNRCellsToDeleteListENDCConfUpd, id-CellAssistanceInformation, id-Globalen-gNB-ID, id-ServedNRCellsENDCX2ManagementList, id-Old-SgNB-UE-X2AP-ID, id-UE-ContextReferenceAtSgNB, id-SecondaryRATUsageReportList, id-ActivationID, id-ServedNRCellsToActivate, id-ActivatedNRCellList, id-MeNBResourceCoordinationInformation, id-SgNBResourceCoordinationInformation, id-UEAppLayerMeasConfig, id-SelectedPLMN, id-SubscriberProfileIDforRFP, id-InitiatingNodeType-EutranrCellResourceCoordination, id-RespondingNodeType-EutranrCellResourceCoordination, id-DataTrafficResourceIndication, id-SpectrumSharingGroupID, id-ListofEUTRACellsinEUTRACoordinationReq, id-ListofEUTRACellsinEUTRACoordinationResp, id-ListofNRCellsinNRCoordinationReq, id-ListofNRCellsinNRCoordinationResp, id-RCCConfigIndication, id-SGNB-Addition-Trigger-Ind, id-RequestedSplitSRBsrelease, id-AdmittedSplitSRBsrelease, id-RRCConfigIndication, id-SGNB-Addition-Trigger-Ind, id-RequestedSplitSRBsrelease, id-AdmittedSplitSRBsrelease,
id-E-RABs-AdmittedToBeModified-SgNBModConfList,
id-E-RABs-AdmittedToBeModified-SgNBModConf-Item,
id-UEContextLevelUserPlaneActivity,
id-ERABActivityNotifyItemList,
id-MeNBCell-ID,
id-InitiatingNodeType-EndcX2Removal,
id-RespondingNodeType-EndcX2Removal,

maxCellineNB,
maxnooFBearers,
maxnooFPDCP-SN,
maxFailedMeasObjects,
maxnooFCellIDforMDT,
maxnooFTAforMDT,
maxoFNNRNeighbours,
maxCellineNB,
maxnooFCellIDforQMC,
maxnooFTAforQMC,
maxnooFPLMNforQMC,
maxnooFProtectedResourcePatterns,
maxnooNRcellsSpectrumSharingWithE-UTRA,
maxnooFNRCellBands

FROM X2AP-Constants;

-- ***********************************************************************
--  HANDOVER REQUEST
-- ***********************************************************************

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

HandoverRequest-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-Old-eNB-UE-X2AP-ID        CRITICALITY reject TYPE UE-X2AP-ID        PRESENCE mandatory},
    { ID id-Cause        CRITICALITY ignore TYPE Cause         PRESENCE mandatory},
    { ID id-TargetCell-ID      CRITICALITY reject TYPE ECGI         PRESENCE mandatory},
    { ID id-GUMMEI-ID       CRITICALITY reject TYPE GUMMEI         PRESENCE mandatory},
    { ID id-UE-ContextInformation    CRITICALITY reject TYPE UE-ContextInformation     PRESENCE mandatory},
    { ID id-GUMMEI-ID       CRITICALITY reject TYPE GUMMEI         PRESENCE mandatory},
    { ID id-UE-Context-ContextInformation        CRITICALITY reject TYPE UE-Context-ContextInformation     PRESENCE mandatory},
    { ID id-UE-HistoryInformationFromTheUE CRITICALITY ignore TYPE UE-HistoryInformationFromTheUE PRESENCE optional},
    { ID id-ExpectedUEBehaviour     CRITICALITY ignore TYPE ExpectedUEBehaviour     PRESENCE optional},
    ...
}
{ ID id-V2XServicesAuthorized CRITICALITY ignore TYPE V2XServicesAuthorized PRESENCE optional},
{ ID id-UE-ContextReferenceAtWT CRITICALITY ignore TYPE UE-ContextReferenceAtWT PRESENCE optional},
{ ID id-UE-ContextReferenceAtSgNB CRITICALITY ignore TYPE UE-ContextReferenceAtSgNB PRESENCE optional},
{ ID id-AerialUEsubscriptionInformation CRITICALITY ignore TYPE AerialUEsubscriptionInformation PRESENCE optional},
...
}

UE-ContextInformation ::= SEQUENCE {
  mME-UE-S1AP-ID UE-S1AP-ID,
  uESecurityCapabilities UESecurityCapabilities,
  aS-SecurityInformation AS-SecurityInformation,
  uEaggregateMaximumBitRate UEAggregateMaximumBitRate,
  subscriberProfileIDforRFP SubscriberProfileIDforRFP OPTIONAL,
  e-RABs-ToBeSetup-List E-RABs-ToBeSetup-List,
  rRC-Context RRC-Context,
  handoverRestrictionList HandoverRestrictionList OPTIONAL,
  locationReportingInformation LocationReportingInformation OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {UE-ContextInformation-ExtIEs} } OPTIONAL,
  ...
}

UE-ContextInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-ManagementBasedMDTallowed CRITICALITY ignore EXTENSION ManagementBasedMDTallowed PRESENCE optional }
  { ID id-ManagementBasedMDTPLMNList CRITICALITY ignore EXTENSION MDTPLMNList PRESENCE optional }
  { ID id-UESidelinkAggregateMaximumBitRate CRITICALITY ignore EXTENSION UESidelinkAggregateMaximumBitRate PRESENCE optional},
  ...
}

E-RABs-ToBeSetup-List ::= SEQUENCE {SIZE(1..maxnoofBearers)} OF ProtocolIE-Single-Container { {E-RABs-ToBeSetup-ItemIEs} }

E-RABs-ToBeSetup-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeSetup-Item CRITICALITY ignore TYPE E-RABs-ToBeSetup-Item PRESENCE mandatory },
  ...
}

E-RABs-ToBeSetup-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  e-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  dl-Forwarding DL-Forwarding OPTIONAL,
  ul-GTPtunnelEndpoint GTPtunnelEndpoint,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeSetup-ItemExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeSetup-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-BearerType CRITICALITY reject EXTENSION BearerType PRESENCE optional },
  ...
}

MobilityInformation ::= BIT STRING (SIZE(32))

UE-ContextReferenceAtSeNB ::= SEQUENCE {
  source-GlobalSeNB-ID GlobalENB-ID,
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```plaintext
seNB-UE-X2AP-ID  UE-X2AP-ID,
seNB-UE-X2AP-ID-Extension  UE-X2AP-ID-Extension,
iE-Extensions  ProtocolExtensionContainer  { (UE-ContextReferenceAtSeNB-ItemExtIEs)  }  OPTIONAL,
...
}

UE-ContextReferenceAtSeNB-ItemExtIEs  X2AP-PROTOCOL-EXTENSION  ::=  {
...
}

UE-ContextReferenceAtWT  ::=  SEQUENCE  {
  wTID  WTID,
  wt-UE-XwAP-ID  WT-UE-XwAP-ID,
  iE-Extensions  ProtocolExtensionContainer  { (UE-ContextReferenceAtWT-ItemExtIEs)  }  OPTIONAL,
...
}

UE-ContextReferenceAtWT-ItemExtIEs  X2AP-PROTOCOL-EXTENSION  ::=  {
...
}

UE-ContextReferenceAtSgNB  ::=  SEQUENCE  {
  source-GlobalSgNB-ID  GlobalGNB-ID,
  sgNB-UE-X2AP-ID  SgNB-UE-X2AP-ID,
  iE-Extensions  ProtocolExtensionContainer  { (UE-ContextReferenceAtSgNB-ItemExtIEs)  }  OPTIONAL,
...
}

UE-ContextReferenceAtSgNB-ItemExtIEs  X2AP-PROTOCOL-EXTENSION  ::=  {
...
}

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

-- HANDOVER REQUEST ACKNOWLEDGE

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

HandoverRequestAcknowledge  ::=  SEQUENCE  {
  protocolIEs  ProtocolIE-Container  [{HandoverRequestAcknowledge-IEs}]
}

HandoverRequestAcknowledge-IEs  X2AP-PROTOCOL-IES  ::=  {
  { ID id-Old-eNB-UE-X2AP-ID       CRITICALITY ignore TYPE UE-X2AP-ID  PRESENCE mandatory
  }
  { ID id-New-eNB-UE-X2AP-ID       CRITICALITY ignore TYPE UE-X2AP-ID  PRESENCE mandatory
  }
  { ID id-E-RABs-Admitted-List     CRITICALITY ignore TYPE E-RABs-Admitted-List  PRESENCE mandatory
  }
  { ID id-E-RABs-NotAdmitted-List  CRITICALITY ignore TYPE E-RABs-Admitted-List  PRESENCE optional
  }
  { ID id-Target-eNBtoSource-eNBTransparentContainer CRITICALITY ignore TYPE Target-eNBtoSource-eNBTransparentContainer  PRESENCE mandatory
  }
  { ID id-CriticalityDiagnostics     CRITICALITY ignore TYPE CriticalityDiagnostics  PRESENCE optional
  }
  { ID id-UE-ContextKeptIndicator   CRITICALITY ignore TYPE UE-ContextKeptIndicator  PRESENCE optional
  }
  { ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension  PRESENCE optional
  }
  { ID id-Old-eNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension  PRESENCE optional
  }
  { ID id-New-eNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension  PRESENCE optional
  }
```

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ETSI
E-RABs-Admitted-List ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container {E-RABs-Admitted-ItemIEs}

E-RABs-Admitted-ItemIEs X2AP-PROTOCOL-IES ::= {
   { ID id-E-RABs-Admitted-Item CRITICALITY ignore TYPE E-RABs-Admitted-Item PRESENCE mandatory }
}

E-RABs-Admitted-Item ::= SEQUENCE {
   e-RAB-ID E-RAB-ID,
   uL-GTP-TunnelEndpoint GTPtrunkEndpoint OPTIONAL,
   dL-GTP-TunnelEndpoint GTPtrunkEndpoint OPTIONAL,
   iE-Extensions ProtocolExtensionContainer {E-RABs-Admitted-Item-ExtIEs} OPTIONAL,
   ...
}

E-RABs-Admitted-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
   ...
}

--- ************************************************************
--- HANDOVER PREPARATION FAILURE
--- ************************************************************

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

HandoverPreparationFailure-IEs X2AP-PROTOCOL-IES ::= {
   { ID id-Old-eNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory},
   { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory},
   { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},
   { ID id-Old-eNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
   ...
}

--- ************************************************************
--- Handover Report
--- ************************************************************

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

HandoverReport-IEs X2AP-PROTOCOL-IES ::= {

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{ ID id-HandoverReportType
  CRITICALITY ignore TYPE HandoverReportType
  PRESENCE mandatory}

{ ID id-Cause
  CRITICALITY ignore TYPE Cause
  PRESENCE mandatory}

{ ID id-SourceCellECGI
  CRITICALITY ignore TYPE ECGI
  PRESENCE mandatory}

{ ID id-FailureCellECGI
  CRITICALITY ignore TYPE ECGI
  PRESENCE mandatory}

{ ID id-Re-establishmentCellECGI
  CRITICALITY ignore TYPE ECGI
  PRESENCE conditional} -

- The IE shall be present if the Handover Report Type IE is set to "HO to Wrong Cell" -- |

{ ID id-TargetCellInUTRAN
  CRITICALITY ignore TYPE TargetCellInUTRAN
  PRESENCE conditional} -

- The IE shall be present if the Handover Report Type IE is set to "InterRAT ping-pong" -- |

{ ID id-SourceCellCRNTI
  CRITICALITY ignore TYPE CRNTI
  PRESENCE optional}

{ ID id-MobilityInformation
  CRITICALITY ignore TYPE MobilityInformation
  PRESENCE optional}

{ ID id-UE-RLF-Report-Container
  CRITICALITY ignore TYPE UE-RLF-Report-Container
  PRESENCE optional}

{ ID id-UE-RLF-Report-Container-for-extended-bands
  CRITICALITY ignore TYPE UE-RLF-Report-Container-for-extended-bands
  PRESENCE optional},

...

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

SN Status Transfer

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

SNStatusTransfer-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-Old-eNB-UE-X2AP-ID
  CRITICALITY reject TYPE UE-X2AP-ID
  PRESENCE mandatory}

{ ID id-New-eNB-UE-X2AP-ID
  CRITICALITY reject TYPE UE-X2AP-ID
  PRESENCE mandatory}

{ ID id-E-RABs-SubjectToStatusTransfer-List
  CRITICALITY ignore TYPE E-RABs-SubjectToStatusTransfer-List
  PRESENCE mandatory}

{ ID id-Old-eNB-UE-X2AP-ID-Extension
  CRITICALITY reject TYPE UE-X2AP-ID-Extension
  PRESENCE optional}

{ ID id-New-eNB-UE-X2AP-ID-Extension
  CRITICALITY reject TYPE UE-X2AP-ID-Extension
  PRESENCE optional}

{ ID id-SgNB-UE-X2AP-ID
  CRITICALITY ignore TYPE SgNB-UE-X2AP-ID
  PRESENCE optional},

...

}

E-RABs-SubjectToStatusTransfer-List ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { ( E-RABs-SubjectToStatusTransfer-ItemIEs) }

E-RABs-SubjectToStatusTransfer-ItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-RABs-SubjectToStatusTransfer-Item
  CRITICALITY ignore TYPE E-RABs-SubjectToStatusTransfer-Item
  PRESENCE mandatory}

}

E-RABs-SubjectToStatusTransfer-Item ::= SEQUENCE {

  e-RAB-ID
    E-RAB-ID,

  receiveStatusofULPDCPSDUs
    ReceiveStatusofULPDCPSDUs
    OPTIONAL,

  ul-COUNTvalue
    COUNTvalue,

  dl-COUNTvalue
    COUNTvalue,

  iE-Extensions
    ProtocolExtensionContainer
      { (E-RABs-SubjectToStatusTransfer-ItemExtIEs) } OPTIONAL,

...

}

E-RABs-SubjectToStatusTransfer-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...
{ ID id-ReceiveStatusOfULPDCPSDUsExtended CRITICALITY ignore EXTENSION ReceiveStatusOfULPDCPSDUsExtended PRESENCE optional |
{ ID id-ULCOUNTValueExtended CRITICALITY ignore EXTENSION COUNTValueExtended PRESENCE optional |
{ ID id-DLCOUNTValueExtended CRITICALITY ignore EXTENSION COUNTValueExtended PRESENCE optional |
{ ID id-ReceiveStatusOfULPDCPSDUsPDCP-SNlength18 CRITICALITY ignore EXTENSION ReceiveStatusOfULPDCPSDUsPDCP-SNlength18 PRESENCE optional |
{ ID id-ULCOUNTValuePDCP-SNlength18 CRITICALITY ignore EXTENSION COUNTvaluePDCP-SNlength18 PRESENCE optional |
{ ID id-DLCOUNTValuePDCP-SNlength18 CRITICALITY ignore EXTENSION COUNTvaluePDCP-SNlength18 PRESENCE optional |
} ...

-- **********************************************
-- UE Context Release
-- **********************************************

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

UEContextRelease-IEs X2AP-PROTOCOL-IES ::= {
  ID id-Old-eNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory |
  ID id-New-eNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory |
  ID id-Old-eNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional |
  ID id-New-eNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional |
  ID id-SIPTO-BearerDeactivationIndication CRITICALITY ignore TYPE SIPTOBearerDeactivationIndication PRESENCE optional |
  ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE optional |
} ...

-- **********************************************
-- HANDOVER CANCEL
-- **********************************************

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

HandoverCancel-IEs X2AP-PROTOCOL-IES ::= {
  ID id-Old-eNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory |
  ID id-New-eNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE optional |
  ID id-Old-eNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional |
  ID id-New-eNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional |
  ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory |
} ...

-- **********************************************
-- ERROR INDICATION
-- **********************************************
ErrorIndication ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{ErrorIndication-IEs}},
  ...}

ErrorIndication-IEs X2AP-PROTOCOL-IES ::= {
  ID id-Old-eNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE optional|
  ID id-New-eNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE optional|
  ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE optional|
  ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional|
  ID id-Old-eNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional|
  ID id-New-eNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional|
  ID id-Old-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE optional|
  ...}

-- Reset Request

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

ResetRequest-IEs X2AP-PROTOCOL-IES ::= {
  ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory|
  ...}

-- Reset Response

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

ResetResponse-IEs X2AP-PROTOCOL-IES ::= {
  ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional |
  ...}

-- X2 SETUP REQUEST
X2SetupRequest ::= SEQUENCE {
   protocolIEs ProtocolIE-Container {{X2SetupRequest-IEs}},
   ...
}  

X2SetupRequest-IEs X2AP-PROTOCOL-IES ::= {
   { ID id-GlobalENB-ID CRITICALITY reject TYPE GlobalENB-ID PRESENCE mandatory}|
   { ID id-ServedCells CRITICALITY reject TYPE ServedCells PRESENCE mandatory}|
   { ID id-GUGroupIDList CRITICALITY reject TYPE GUGroupIDList PRESENCE optional}|
   { ID id-LHN-ID CRITICALITY ignore TYPE LHN-ID PRESENCE optional},
   ...
}  

X2SetupResponse ::= SEQUENCE {
   protocolIEs ProtocolIE-Container {{X2SetupResponse-IEs}},
   ...
}  

X2SetupResponse-IEs X2AP-PROTOCOL-IES ::= {
   { ID id-GlobalENB-ID CRITICALITY reject TYPE GlobalENB-ID PRESENCE mandatory}|
   { ID id-ServedCells CRITICALITY reject TYPE ServedCells PRESENCE mandatory}|
   { ID id-GUGroupIDList CRITICALITY reject TYPE GUGroupIDList PRESENCE optional}|
   { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}|
   { ID id-LHN-ID CRITICALITY ignore TYPE LHN-ID PRESENCE optional},
   ...
}  

X2SetupFailure ::= SEQUENCE {
   protocolIEs ProtocolIE-Container {{X2SetupFailure-IEs}},
   ...
}  

X2SetupFailure-IEs X2AP-PROTOCOL-IES ::= {
   { 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 },
...

-- **************************************************************
-- LOAD INFORMATION
-- **************************************************************

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

LoadInformation-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-CellInformation CRITICALITY ignore TYPE CellInformation-List PRESENCE mandatory },
  ...
}

CellInformation-List ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ProtocolIE-Single-Container { {CellInformation-ItemIEs} }

CellInformation-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-CellInformation-Item CRITICALITY ignore TYPE CellInformation-Item PRESENCE mandatory }
}

CellInformation-Item ::= SEQUENCE {
  cell-ID       ECGI,
  ul-InterferenceOverloadIndication  UL-InterferenceOverloadIndication OPTIONAL,
  ul-HighInterferenceIndicationInfo  UL-HighInterferenceIndicationInfo OPTIONAL,
  relativeNarrowbandTxPower  RelativeNarrowbandTxPower OPTIONAL,
  iE-Extensions    ProtocolExtensionContainer { {CellInformation-Item-ExtIEs} } OPTIONAL,
  ...
}

CellInformation-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-ABSInformation CRITICALITY ignore EXTENSION ABSInformation PRESENCE optional },
  { ID id-InvokeIndication CRITICALITY ignore EXTENSION InvokeIndication PRESENCE optional },
  { ID id-IntendedULDLConfiguration CRITICALITY ignore EXTENSION SubframeAssignment PRESENCE optional },
  { ID id-ExtendedULInterferenceOverloadInfo CRITICALITY ignore EXTENSION ExtendedULInterferenceOverloadInfo PRESENCE optional },
  { ID id-CoMPInformation CRITICALITY ignore EXTENSION CoMPInformation PRESENCE optional },
  { ID id-DynamicDLTransmissionInformation CRITICALITY ignore EXTENSION DynamicDLTransmissionInformation PRESENCE optional },
  ...
}

-- **************************************************************
-- ENB CONFIGURATION UPDATE
-- **************************************************************
ENBConfigurationUpdate ::= SEQUENCE {
    protocolIEs ProtocolIE-Container {{ENBConfigurationUpdate-IEs}},
    ...
}

ENBConfigurationUpdate-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-ServedCellsToAdd CRITICALITY reject TYPE ServedCells PRESENCE optional },
    { ID id-ServedCellsToModify CRITICALITY reject TYPE ServedCellsToModify PRESENCE optional },
    { ID id-ServedCellsToDelete CRITICALITY reject TYPE Old-ECGI PRESENCE optional },
    { ID id-GUGroupIDToAddList CRITICALITY reject TYPE GUGroupIDList PRESENCE optional },
    { ID id-GUGroupIDToDeleteList CRITICALITY reject TYPE GUGroupIDList PRESENCE optional },
    { ID id-CoverageModificationList CRITICALITY reject TYPE CoverageModificationList PRESENCE optional },
    ...
}

ServedCellsToModify ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ServedCellsToModify-Item

ServedCellsToModify-Item ::= SEQUENCE {
    old-ecgi ECGI,
    servedCellInfo ServedCell-Information,
    neighbour-Info Neighbour-Information OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { ServedCellsToModify-Item-ExtIEs} } OPTIONAL,
    ...
}

ServedCellsToModify-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    { ID id-DeactivationIndication CRITICALITY ignore EXTENSION DeactivationIndication PRESENCE optional },
    ...
}

Old-ECGIs ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ECGI

-- ********************************************************************************
-- ENB CONFIGURATION UPDATE ACKNOWLEDGE
-- ********************************************************************************

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

ENBConfigurationUpdateAcknowledge-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },
    ...
}

-- ********************************************************************************
-- ENB CONFIGURATION UPDATE FAIURE
-- ********************************************************************************
ENBConfigurationUpdateFailure ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{ENBConfigurationUpdateFailure-IEs}},
  ...,
}

ENBConfigurationUpdateFailure-IEs X2AP-PROTOCOL-IES ::= {
  { 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},
  ...
}

-- ******************************
-- Resource Status Request
-- ******************************

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

ResourceStatusRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ENB1-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory},
  { ID id-ENB2-Measurement-ID CRITICALITY ignore TYPE Measurement-ID PRESENCE conditional},
  { ID id-Registration-Request CRITICALITY reject TYPE Registration-Request PRESENCE mandatory},
  { ID id-ReportCharacteristics CRITICALITY reject TYPE ReportCharacteristics PRESENCE optional},
  { ID id-CellToReport CRITICALITY ignore TYPE CellToReport-List PRESENCE mandatory},
  { ID id-ReportingPeriodicity CRITICALITY ignore TYPE ReportingPeriodicity PRESENCE optional},
  { ID id-PartialSuccessIndicator CRITICALITY ignore TYPE PartialSuccessIndicator PRESENCE optional},
  { ID id-ReportingPeriodicityRSRPMR CRITICALITY ignore TYPE ReportingPeriodicityRSRPMR PRESENCE optional},
  { ID id-ReportingPeriodicityCSIR CRITICALITY ignore TYPE ReportingPeriodicityCSIR PRESENCE optional},
  ...
}

CellToReport-List ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ProtocolIE-Single-Container { {CellToReport-ItemIEs} }

CellToReport-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-CellToReport-Item CRITICALITY ignore TYPE CellToReport-Item PRESENCE mandatory},
}

CellToReport-Item ::= SEQUENCE {
  cell-ID ECGI,
  iE-Extensions ProtocolExtensionContainer { {CellToReport-Item-ExtIEs} } OPTIONAL,
  ...
}

CellToReport-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {


...}

ReportingPeriodicity ::= ENUMERATED {
  one-thousand-ms,
  two-thousand-ms,
  five-thousand-ms,
  ten-thousand-ms,
  ...
}

PartialSuccessIndicator ::= ENUMERATED {
  partial-success-allowed,
  ...
}

-- ************************************************************
--
-- Resource Status Response
--
-- ************************************************************

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

ResourceStatusResponse-IEs X2AP-PROTOCOL-IEs ::= {
  { ID id-ENB1-Measurement-ID     CRITICALITY reject TYPE Measurement-ID       PRESENCE mandatory},
  { ID id-ENB2-Measurement-ID     CRITICALITY reject TYPE Measurement-ID       PRESENCE mandatory},
  { ID id-CriticalityDiagnostics    CRITICALITY ignore TYPE CriticalityDiagnostics     PRESENCE optional},
  ...
}

MeasurementInitiationResult-List ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ProtocolIE-Single-Container { { MeasurementInitiationResult-ItemIEs} }

MeasurementInitiationResult-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeasurementInitiationResult-Item CRITICALITY ignore TYPE MeasurementInitiationResult-Item PRESENCE mandatory}
}

MeasurementInitiationResult-Item ::= SEQUENCE {
  cell-ID           ECGI,
  measurementFailureCause-List     MeasurementFailureCause-List OPTIONAL,
  iE-Extensions         ProtocolExtensionContainer { { MeasurementInitiationResult-Item-ExtIEs} } OPTIONAL,
  ...
}

MeasurementInitiationResult-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
MeasurementFailureCause-List ::= SEQUENCE (SIZE (1..maxFailedMeasObjects)) OF ProtocolIE-Single-Container { { MeasurementFailureCause-ItemIEs} }

MeasurementFailureCause-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeasurementFailureCause-Item CRITICALITY ignore TYPE MeasurementFailureCause-Item PRESENCE mandatory}
}

MeasurementFailureCause-Item ::= SEQUENCE {
  measurementFailedReportCharacteristics   ReportCharacteristics,
  cause           Cause,
  iE-Extensions         ProtocolExtensionContainer { { MeasurementFailureCause-Item-ExtIEs} } OPTIONAL,
  ...
}

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

ResourceStatusFailure-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ENB1-Measurement-ID      CRITICALITY reject TYPE Measurement-ID         PRESENCE mandatory}|
  { ID id-ENB2-Measurement-ID      CRITICALITY reject TYPE Measurement-ID         PRESENCE mandatory}|
  { ID id-Cause         CRITICALITY ignore TYPE Cause           PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics     CRITICALITY ignore TYPE CriticalityDiagnostics      PRESENCE optional}|
  { ID id-CompleteFailureCauseInformation-List CRITICALITY ignore TYPE CompleteFailureCauseInformation-List PRESENCE optional}, ...
}

CompleteFailureCauseInformation-List ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ProtocolIE-Single-Container { {CompleteFailureCauseInformation-ItemIEs} }

CompleteFailureCauseInformation-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-CompleteFailureCauseInformation-Item CRITICALITY ignore TYPE CompleteFailureCauseInformation-Item PRESENCE mandatory}
}

CompleteFailureCauseInformation-Item ::= SEQUENCE {
  cell-ID           ECGI,
  measurementFailureCause-List     MeasurementFailureCause-List,
  iE-Extensions         ProtocolExtensionContainer { { CompleteFailureCauseInformation-Item-ExtIEs} } OPTIONAL,
  ...
}

CompleteFailureCauseInformation-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
ResourceStatusUpdate ::= SEQUENCE {
  protocolIEs  ProtocolIE-Container {{ResourceStatusUpdate-IEs}},
  ...
}

ResourceStatusUpdate-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ENB1-Measurement-ID  CRITICALITY reject TYPE Measurement-ID     PRESENCE mandatory}
  { ID id-ENB2-Measurement-ID  CRITICALITY reject TYPE Measurement-ID     PRESENCE mandatory}
  { ID id-CellMeasurementResult CRITICALITY ignore TYPE CellMeasurementResult-List  PRESENCE mandatory},
  ...
}

CellMeasurementResult-List ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ProtocolIE-Single-Container { {CellMeasurementResult-ItemIEs} }

CellMeasurementResult-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-CellMeasurementResult-Item CRITICALITY ignore TYPE CellMeasurementResult-Item PRESENCE mandatory}
}

CellMeasurementResult-Item ::= SEQUENCE {
  cell-ID      ECGI,
  hWLoadIndicator  HWLoadIndicator OPTIONAL,
  s1TNLLoadIndicator  S1TNLLoadIndicator OPTIONAL,
  radioResourceStatus  RadioResourceStatus OPTIONAL,
  iE-Extensions    ProtocolExtensionContainer { {CellMeasurementResult-Item-ExtIEs} } OPTIONAL,
  ...
}

CellMeasurementResult-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-CompositeAvailableCapacityGroup CRITICALITY ignore EXTENSION CompositeAvailableCapacityGroup PRESENCE optional}
  { ID id-ABS-Status CRITICALITY ignore EXTENSION ABS-Status PRESENCE optional}
  { ID id-RSRPMLList CRITICALITY ignore EXTENSION RSRPMLList PRESENCE optional}
  { ID id-CSIRReportList CRITICALITY ignore EXTENSION CSIRReportList PRESENCE optional}
  { ID id-CellReportingIndicator CRITICALITY ignore EXTENSION CellReportingIndicator PRESENCE optional},
  ...
}

PrivateMessage ::= SEQUENCE {
  privateIEs  PrivateIE-Container {{PrivateMessage-IEs}},
  ...
}
PrivateMessage-IEs X2AP-PRIVATE-IES ::= {
  ...
}
-- *************************************************************************************
--
-- MOBILITY CHANGE REQUEST
-- *************************************************************************************

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

MobilityChangeRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ENB1-Cell-ID      CRITICALITY reject TYPE ECGI           PRESENCE mandatory},
  { ID id-ENB2-Cell-ID      CRITICALITY reject TYPE ECGI           PRESENCE mandatory},
  { ID id-ENB1-Mobility-Parameters   CRITICALITY ignore TYPE MobilityParametersInformation    PRESENCE optional},
  { ID id-ENB2-Proposed-Mobility-Parameters CRITICALITY reject TYPE MobilityParametersInformation    PRESENCE mandatory},
  { ID id-Cause        CRITICALITY reject TYPE Cause           PRESENCE mandatory},
  ...
}
-- *************************************************************************************
--
-- MOBILITY CHANGE ACKNOWLEDGE
-- *************************************************************************************

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

MobilityChangeAcknowledge-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ENB1-Cell-ID   CRITICALITY reject TYPE ECGI       PRESENCE mandatory},
  { ID id-ENB2-Cell-ID   CRITICALITY reject TYPE ECGI       PRESENCE mandatory},
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics   PRESENCE optional},
  ...
}
-- *************************************************************************************
--
-- MOBILITY CHANGE FAILURE
-- *************************************************************************************

MobilityChangeFailure ::= SEQUENCE {
  protocolIEs  ProtocolIE-Container {{MobilityChangeFailure-IEs}},
  ...
}
MobilityChangeFailure-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-ENB1-Cell-ID CRITICALITY ignore TYPE ECGI PRESENCE mandatory},
    { ID id-ENB2-Cell-ID CRITICALITY ignore TYPE ECGI PRESENCE mandatory},
    { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory},
    { ID id-ENB2-Mobility-Parameters-Modification-Range CRITICALITY ignore TYPE MobilityParametersModificationRange PRESENCE optional},
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},
    ...
}

--- Radio Link Failure Indication

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

RLFIndication-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-FailureCellPCI CRITICALITY ignore TYPE PCI PRESENCE mandatory},
    { ID id-Re-establishmentCellECGI CRITICALITY ignore TYPE ECGI PRESENCE mandatory},
    { ID id-FailureCellCRNTI CRITICALITY ignore TYPE CRNTI PRESENCE mandatory},
    { ID id-ShortMAC-I CRITICALITY ignore TYPE ShortMAC-I PRESENCE optional},
    { ID id-UE-RLF-Report-Container CRITICALITY ignore TYPE UE-RLF-Report-Container PRESENCE optional},
    { ID id-RRCConnSetupIndicator CRITICALITY reject TYPE RRCConnSetupIndicator PRESENCE optional},
    { ID id-RRCConnReestabIndicator CRITICALITY ignore TYPE RRCConnReestabIndicator PRESENCE optional},
    { ID id-UE-RLF-Report-Container-for-extended-bands CRITICALITY ignore TYPE UE-RLF-Report-Container-for-extended-bands PRESENCE optional},
    ...
}

--- Cell Activation Request

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

CellActivationRequest-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-ServedCellsToActivate CRITICALITY reject TYPE ServedCellsToActivate PRESENCE mandatory},
    ...
}

ServedCellsToActivate ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ServedCellsToActivate-Item

ServedCellsToActivate-Item ::= SEQUENCE {
    ecgi ECGI,
    ...
iE-Extensions ProtocolExtensionContainer { { ServedCellsToActivate-Item-ExtIEs} } OPTIONAL,
...}

ServedCellsToActivate-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...
}

-- ************************************************************
-- Cell Activation Response
-- ************************************************************

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

CellActivationResponse-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ActivatedCellList CRITICALITY ignore TYPE ActivatedCellList PRESENCE mandatory }|
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },
...
}

ActivatedCellList ::= SEQUENCE { SIZE (1..maxCellineNB)) OF ActivatedCellList-Item

ActivatedCellList-Item ::= SEQUENCE {
  ecgi ECGI,
  iE-Extensions ProtocolExtensionContainer { { ActivatedCellList-Item-ExtIEs} } OPTIONAL,
...
}

ActivatedCellList-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...
}

-- ***********************************************************************************************
-- CELL ACTIVATION FAILURE
-- ***********************************************************************************************

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

CellActivationFailure-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },
...
}
X2Release ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{X2Release-IEs}},
    ...
}

X2Release-IEs X2AP-PROTOCOL-IEs ::= {
    { ID id-GlobalENB-ID   CRITICALITY reject TYPE GlobalENB-ID   PRESENCE mandatory},
    ...
}

X2APMessageTransfer ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{X2APMessageTransfer-IEs}},
    ...
}

X2APMessageTransfer-IEs X2AP-PROTOCOL-IEs ::= {
    { ID id-RNL-Header CRITICALITY reject TYPE RNL-Header    PRESENCE mandatory},
    { ID id-x2APMessage CRITICALITY reject TYPE X2AP-Message   PRESENCE optional},
    ...
}

RNL-Header ::= SEQUENCE {
    source-GlobalENB-ID GlobalENB-ID,
    target-GlobalENB-ID GlobalENB-ID OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { { RNL-Header-Item-ExtIEs} } OPTIONAL,
    ...
}

RNL-Header-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

X2AP-Message ::= OCTET STRING

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

-- ************************************************************
-- -- X2 RELEASE
-- ************************************************************

ETSI
SeNBAdditionRequest-IEs X2AP-PROTOCOL-IEs ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory},
  { ID id-UE-SecurityCapabilities CRITICALITY reject TYPE UE-SecurityCapabilities PRESENCE conditional}|
  -- This IE shall be present if the Bearer Option IE is set to the value "SCG bearer" --
  { ID id-SeNBSecurityKey CRITICALITY reject TYPE SeNBSecurityKey PRESENCE conditional}|
  -- This IE shall be present if the Bearer Option IE is set to the value "SCG bearer" --
  { ID id-SeNBUEAggregateMaximumBitRate CRITICALITY reject TYPE UEAggregateMaximumBitRate PRESENCE mandatory},
  { ID id-ServingPLMN CRITICALITY ignore TYPE PLMN-Identity PRESENCE optional},
  { ID id-E-RABs-ToBeAdded-List CRITICALITY reject TYPE E-RABs-ToBeAdded-List PRESENCE mandatory},
  { ID id-MeNBtoSeNBContainer CRITICALITY reject TYPE MeNBtoSeNBContainer PRESENCE mandatory},
  { ID id-CSGMembershipStatus CRITICALITY reject TYPE CSGMembershipStatus PRESENCE optional},
  { ID id-SeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE optional},
  { ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
  { ID id-ExpectedUEBehaviour CRITICALITY ignore TYPE ExpectedUEBehaviour PRESENCE optional},
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...
}

E-RABs-ToBeAdded-List ::= SEQUENCE {SIZE(1..maxnoofBearers)} OF ProtocolIE-Single-Container {
  { E-RABs-ToBeAdded-ItemIEs }
}

E-RABs-ToBeAdded-ItemIEs X2AP-PROTOCOL-IEs ::= {
  { ID id-E-RABs-ToBeAdded-Item CRITICALITY reject TYPE E-RABs-ToBeAdded-Item PRESENCE mandatory},
  ...
}

E-RABs-ToBeAdded-Item ::= CHOICE {
  scG-Bearer E-RABs-ToBeAdded-Item-SCG-Bearer,
  split-Bearer E-RABs-ToBeAdded-Item-Split-Bearer,
  ...
}

E-RABs-ToBeAdded-Item-SCG-Bearer ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  e-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  dl-Forwarding DL-Forwarding OPTIONAL,
  s1-UL-GTPtunnelEndpoint GTPtunnelEndpoint,
  iE-Extensions ProtocolExtensionContainer {
    { E-RABs-ToBeAdded-Item-SCG-BearerExtIEs }
  } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-Item-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional}|
  { ID id-SIPTO-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional},
  ...
}

E-RABs-ToBeAdded-Item-Split-Bearer ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  e-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  meNB-GTPtunnelEndpoint GTPtunnelEndpoint,
  iE-Extensions ProtocolExtensionContainer {
    { E-RABs-ToBeAdded-Item-Split-BearerExtIEs }
  } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-Item-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional}|
  { ID id-SIPTO-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional},
  ...
}
E-RABs-ToBeAdded-Item-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- ************************************************************
-- SENB ADDITION REQUEST ACKNOWLEDGE
-- ************************************************************

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

SeNBAdditionRequestAcknowledge-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
  { ID id-SeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
  { ID id-E-RABs-Admitted-ToBeAdded-List CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-List PRESENCE mandatory}|
  { ID id-E-RABs-NotAdmitted-List CRITICALITY ignore TYPE E-RABs-NotAdmitted-List PRESENCE optional}|
  { ID id-SeNBtoMeNBContainer CRITICALITY reject TYPE SeNBtoMeNBContainer PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}|
  { ID id-GW-TransportLayerAddress CRITICALITY ignore TYPE TransportLayerAddress PRESENCE optional}|
  { ID id-SIPTO-L-GW-TransportLayerAddress CRITICALITY ignore TYPE TransportLayerAddress PRESENCE optional}|
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE E-RABs-Admitted-ToBeAdded-Item-SCG-BearerExtIEs PRESENCE optional}|
  { ID id-Tunnel-Information-for-BBF CRITICALITY ignore TYPE TunnelInformation PRESENCE optional},
  ...
}

E-RABs-Admitted-ToBeAdded-List ::= SEQUENCE {SIZE (1..maxnoofBearers)} OF ProtocolIE-Single-Container { (E-RABs-Admitted-ToBeAdded-ItemIEs) }

E-RABs-Admitted-ToBeAdded-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-Admitted-ToBeAdded-Item CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-Item PRESENCE mandatory}|
}

E-RABs-Admitted-ToBeAdded-Item ::= CHOICE {
  sCG-Bearer E-RABs-Admitted-ToBeAdded-Item-SCG-Bearer,
  split-Bearer E-RABs-Admitted-ToBeAdded-Item-Split-Bearer,
  ...
}

E-RABs-Admitted-ToBeAdded-Item-SCG-Bearer ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  s1-DL-GTPtunnelEndpoint GTPtunnelEndpoint,
  dl-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  ul-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { (E-RABs-Admitted-ToBeAdded-Item-SCG-BearerExtIEs) } OPTIONAL,
  ...
}
E-RABs-Admitted-ToBeAdded-Item-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...}

E-RABs-Admitted-ToBeAdded-Item-Split-Bearer ::= SEQUENCE {
  e-RAB-ID          E-RAB-ID,
  seNB-GTPtunnelEndpoint     GTPtunnelEndpoint,
  iE-Extensions     ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-Item-Split-BearerExtIEs} } OPTIONAL,
  ...}

E-RABs-Admitted-ToBeAdded-Item-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...}

-- ******************************************************
-- SENB ADDITION REQUEST REJECT
-- ******************************************************

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

SeNBAdditionRequestReject-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID     CRITICALITY reject TYPE UE-X2AP-ID     PRESENCE mandatory}
  { ID id-SeNB-UE-X2AP-ID     CRITICALITY reject TYPE UE-X2AP-ID     PRESENCE mandatory}
  { ID id-Cause       CRITICALITY ignore TYPE Cause      PRESENCE mandatory}
  { ID id-CriticalityDiagnostics   CRITICALITY ignore TYPE CriticalityDiagnostics  PRESENCE optional}
  { ID id-MeNB-UE-X2AP-ID-Extension    CRITICALITY reject TYPE UE-X2AP-ID-Extension      PRESENCE optional},
  ...}

-- ******************************************************
-- SENB RECONFIGURATION COMPLETE
-- ******************************************************

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

SeNBReconfigurationComplete-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID     CRITICALITY reject TYPE UE-X2AP-ID         PRESENCE mandatory}
  { ID id-SeNB-UE-X2AP-ID     CRITICALITY reject TYPE UE-X2AP-ID         PRESENCE mandatory}
  { ID id-MeNB-UE-X2AP-ID-Extension    CRITICALITY reject TYPE UE-X2AP-ID-Extension      PRESENCE optional}
  { ID id-SeNB-UE-X2AP-ID-Extension    CRITICALITY reject TYPE UE-X2AP-ID-Extension      PRESENCE optional},
  ...}
ResponseInformationSeNBReconfComp ::= CHOICE {
  success    ResponseInformationSeNBReconfComp-SuccessItem,
  reject-by-MeNB  ResponseInformationSeNBReconfComp-RejectByMeNBItem,
  ...
}

ResponseInformationSeNBReconfComp-SuccessItem ::= SEQUENCE {
  meNBtoSeNBContainer    MeNBtoSeNBContainer OPTIONAL,
  iE-Extensions     ProtocolExtensionContainer { {ResponseInformationSeNBReconfComp-SuccessItemExtIEs} } OPTIONAL,
  ...
}

ResponseInformationSeNBReconfComp-RejectByMeNBItem ::= SEQUENCE {
  cause       Cause,
  meNBtoSeNBContainer    MeNBtoSeNBContainer OPTIONAL,
  iE-Extensions     ProtocolExtensionContainer { {ResponseInformationSeNBReconfComp-RejectByMeNBItemExtIEs} } OPTIONAL,
  ...
}

ResponseInformationSeNBReconfComp-RejectByMeNBItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- ************************************************************
-- SENB MODIFICATION REQUEST
-- *************************************************************

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

SeNBModificationRequest-IEs X2AP-PROTOCOL-IES ::= {
  ...
}
UE-ContextInformationSeNBModReq ::= SEQUENCE {
  ue-SecurityCapabilities  UESecurityCapabilities           OPTIONAL,
  seNB-SecurityKey        SeNBSecurityKey                   OPTIONAL,
  seNBUEAggregateMaximumBitRate  UEAggregateMaximumBitRate     OPTIONAL,
  e-RABs-ToBeAdded   E-RABs-ToBeAdded-List-ModReq           OPTIONAL,
  e-RABs-ToBeModified  E-RABs-ToBeModified-List-ModReq       OPTIONAL,
  e-RABs-ToBeReleased  E-RABs-ToBeReleased-List-ModReq       OPTIONAL,
  iE-Extensions       ProtocolExtensionContainer { { UE-ContextInformationSeNBModReqExtIEs} } OPTIONAL,
  ...
}

UE-ContextInformationSeNBModReqExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeAdded-List-ModReq ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeAdded-ModReqItemIEs} }

E-RABs-ToBeAdded-ModReqItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeAdded-ModReqItem CRITICALITY ignore TYPE E-RABs-ToBeAdded-ModReqItem PRESENCE mandatory},
  ...
}

E-RABs-ToBeAdded-ModReqItem ::= CHOICE {
  sCG-Bearer   E-RABs-ToBeAdded-ModReqItem-SCG-Bearer,
  split-Bearer E-RABs-ToBeAdded-ModReqItem-Split-Bearer,
  ...
}

E-RABs-ToBeAdded-ModReqItem-SCG-Bearer ::= SEQUENCE {
  e-RAB-ID    E-RAB-ID,
  e-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  dl-Forwarding DL-Forwarding                      OPTIONAL,
  s1-UL-GTPtunnelEndpoint GTPtunnelEndpoint,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-ModReqItem-SCG-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-ModReqItem-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional}|
  { ID id-SIPTO-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional},
  ...
}

E-RABs-ToBeAdded-ModReqItem-Split-Bearer ::= SEQUENCE {
  e-RAB-ID    E-RAB-ID,
  e-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  meNB-GTPtunnelEndpoint GTPtunnelEndpoint,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-ModReqItem-Split-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-ModReqItem-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
E-RABs-ToBeModified-List-ModReq ::= SEQUENCE {SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { (E-RABs-ToBeModified-ModReqItemIEs) } }

E-RABs-ToBeModified-ModReqItemIEs X2AP-PROTOCOL-IES ::= { ID id-E-RABs-ToBeModified-ModReqItem CRITICALITY ignore TYPE E-RABs-ToBeModified-ModReqItem PRESENCE mandatory), ...

E-RABs-ToBeModified-ModReqItem ::= CHOICE {
  sCG-Bearer E-RABs-ToBeModified-ModReqItem-SCG-Bearer,
  split-Bearer E-RABs-ToBeModified-ModReqItem-Split-Bearer,
  ...
}

E-RABs-ToBeModified-ModReqItem-SCG-Bearer ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  e-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
  s1-UL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-ModReqItem-SCG-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeModified-ModReqItem-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeModified-ModReqItem-Split-Bearer ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  e-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
  meNB-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-ModReqItem-Split-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeModified-ModReqItem-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeReleased-List-ModReq ::= SEQUENCE {SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { (E-RABs-ToBeReleased-ModReqItemIEs) } }

E-RABs-ToBeReleased-ModReqItemIEs X2AP-PROTOCOL-IES ::= { ID id-E-RABs-ToBeReleased-ModReqItem CRITICALITY ignore TYPE E-RABs-ToBeReleased-ModReqItem PRESENCE mandatory), ...

E-RABs-ToBeReleased-ModReqItem ::= CHOICE {
  sCG-Bearer E-RABs-ToBeReleased-ModReqItem-SCG-Bearer,
  split-Bearer E-RABs-ToBeReleased-ModReqItem-Split-Bearer,
  ...
}

E-RABs-ToBeReleased-ModReqItem-SCG-Bearer ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  ...
}
dL-Forwarding-GTPtunnelEndpoint  GTPtunnelEndpoint  OPTIONAL,
ul-Forwarding-GTPtunnelEndpoint  GTPtunnelEndpoint  OPTIONAL,
iE-Extensions  ProtocolExtensionContainer { {E-RABs-ToBeReleased-ModReqItem-SCG-BearerExtIEs} } OPTIONAL,
...

E-RABs-ToBeReleased-ModReqItem-SCG-BearerExtIEs  X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeReleased-ModReqItem-Split-Bearer  ::=  SEQUENCE {
  e-RAB-ID  E-RAB-ID,
  dL-Forwarding-GTPtunnelEndpoint  GTPtunnelEndpoint  OPTIONAL,
  iE-Extensions  ProtocolExtensionContainer { {E-RABs-ToBeReleased-ModReqItem-Split-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeReleased-ModReqItem-Split-BearerExtIEs  X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-Admitted-ToBeAdded-ModAckList  ::=  SEQUENCE {
  { ID id-E-RABs-Admitted-ToBeAdded-ModAckList  CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeAdded-ModAckList  PRESENCE optional}|
  { ID id-E-RABs-NotAdmitted-List  CRITICALITY ignore  TYPE E-RAB-List  PRESENCE optional}|
  { ID id-SeNBtoMeNBContainer  CRITICALITY ignore  TYPE SeNBtoMeNBContainer  PRESENCE optional}|
  { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics  PRESENCE optional}|
  { ID id-MeNB-UE-X2AP-ID-Extension  CRITICALITY ignore  TYPE UE-X2AP-ID-Extension  PRESENCE optional},
 ...
}

E-RABs-Admitted-ToBeAdded-ModAckItem  ::=  CHOICE {
  ...
sCG-Bearer  E-RABs-Admitted-ToBeAdded-ModAckItem-SCG-Bearer,
split-Bearer  E-RABs-Admitted-ToBeAdded-ModAckItem-Split-Bearer,
...

E-RABs-Admitted-ToBeAdded-ModAckItem-SCG-Bearer ::= SEQUENCE {
  e-RAB-ID        E-RAB-ID,
  s1-DL-GTPtunnelEndpoint   GTPtunnelEndpoint,
  dL-Forwarding-GTPtunnelEndpoint   GTPtunnelEndpoint   OPTIONAL,
  ul-Forwarding-GTPtunnelEndpoint   GTPtunnelEndpoint   OPTIONAL,
  iE-Extensions     ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-ModAckItem-SCG-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-Admitted-ToBeAdded-ModAckItem-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= { ...

E-RABs-Admitted-ToBeAdded-ModAckItem-Split-Bearer ::= SEQUENCE {
  e-RAB-ID        E-RAB-ID,
  seNB-GTPtunnelEndpoint   GTPtunnelEndpoint,
  iE-Extensions     ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-ModAckItem-Split-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-Admitted-ToBeAdded-ModAckItem-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= { ...

E-RABs-Admitted-ToBeModified-ModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-Admitted-ToBeModified-ModAckItemIEs} }

E-RABs-Admitted-ToBeModified-ModAckItemIEs X2AP-PROTOCOL-IES ::= { ID id-E-RABs-Admitted-ToBeModified-ModAckItem  CRITICALITY ignore TYPE E-RABs-Admitted-ToBeModified-ModAckItemIEs PRESENCE mandatory}

E-RABs-Admitted-ToBeModified-ModAckItem ::= CHOICE {
  sCG-Bearer  E-RABs-Admitted-ToBeModified-ModAckItem-SCG-Bearer,
  split-Bearer E-RABs-Admitted-ToBeModified-ModAckItem-Split-Bearer,
  ...
}

E-RABs-Admitted-ToBeModified-ModAckItem-SCG-Bearer ::= SEQUENCE {
  e-RAB-ID        E-RAB-ID,
  s1-DL-GTPtunnelEndpoint   GTPtunnelEndpoint   OPTIONAL,
  iE-Extensions     ProtocolExtensionContainer { {E-RABs-Admitted-ToBeModified-ModAckItem-SCG-BearerExtIEs} } OPTIONAL,
  ...
}

E-RABs-Admitted-ToBeModified-ModAckItem-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= { ...

E-RABs-Admitted-ToBeModified-ModAckItem-Split-Bearer ::= SEQUENCE {
  e-RAB-ID        E-RAB-ID,
E-RABs-Admitted-ToBeModified-ModAckItem-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
   ... 
}

E-RABs-Admitted-ToBeReleased-ModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-Admitted-ToBeReleased-ModAckItemIEs} }

E-RABs-Admitted-ToBeReleased-ModAckItemIEs X2AP-PROTOCOL-IES ::= {
   { ID id=U-RABs-Admitted-ToBeReleased-ModAckItem CRITICALITY ignore TYPE U-RABs-Admitted-ToReleased-ModAckItem PRESENCE mandatory }
}

E-RABs-Admitted-ToBeReleased-ModAckItem ::= CHOICE {
   sCG-Bearer E-RABs-Admitted-ToBeReleased-ModAckItem-SCG-Bearer,
   split-Bearer E-RABs-Admitted-ToBeReleased-ModAckItem-Split-Bearer,
   ... 
}

E-RABs-Admitted-ToBeReleased-ModAckItem-SCG-Bearer ::= SEQUENCE {
   e-RAB-ID E-RAB-ID,
   iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeReleased-ModAckItem-SCG-BearerExtIEs} } OPTIONAL,
   ... 
}

E-RABs-Admitted-ToBeReleased-ModAckItem-Split-Bearer ::= SEQUENCE {
   e-RAB-ID E-RAB-ID,
   iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeReleased-ModAckItem-Split-BearerExtIEs} } OPTIONAL,
   ... 
}

E-RABs-Admitted-ToBeReleased-ModAckItem-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
   ... 
}

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

SeNBModificationRequestReject-IEs X2AP-PROTOCOL-IES ::= {...}
SeNBModificationRequired ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container  {{SeNBModificationRequired-IEs}},
    ...
}

SeNBModificationRequired-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
    { ID id-SeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
    { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|
    { ID id-SCGChangeIndication CRITICALITY ignore TYPE SCGChangeIndication PRESENCE optional}|
    { ID id-E-RABs-ToBeReleased-ModReqd CRITICALITY ignore TYPE E-RABs-ToBeReleased-ModReqd PRESENCE optional}|
    { ID id-SeNBtoMeNBContainer CRITICALITY ignore TYPE SeNBtoMeNBContainer PRESENCE optional}|
    { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional}|
    { ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
    ...
}

E-RABs-ToBeReleased-ModReqd ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeReleased-ModReqdItemIEs} }

E-RABs-ToBeReleased-ModReqdItemIEs X2AP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeReleased-ModReqdItem CRITICALITY ignore TYPE E-RABs-ToBeReleased-ModReqdItem PRESENCE mandatory },
    ...
}

E-RABs-ToBeReleased-ModReqdItem ::= SEQUENCE {
    e-RAB-ID E-RAB-ID,
    cause Cause,
    iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-ModReqdItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-ToBeReleased-ModReqdItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *******************************************************
-- SENB MODIFICATION CONFIRM
-- *******************************************************

-- *******************************************************
-- SENB MODIFICATION REQUIRED
-- *******************************************************
SeNBModificationConfirm ::= SEQUENCE {
  protocolIEs  ProtocolIE-Container  {{SeNBModificationConfirm-IEs}},
  ...  
}

SeNBModificationConfirm-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID      CRITICALITY ignore TYPE UE-X2AP-ID      PRESENCE mandatory},
  { ID id-SeNB-UE-X2AP-ID      CRITICALITY ignore TYPE UE-X2AP-ID      PRESENCE mandatory},
  { ID id-MeNBtoSeNBContainer    CRITICALITY ignore TYPE MeNBtoSeNBContainer PRESENCE optional},
  { ID id-CriticalityDiagnostics  CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
  { ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...  
}

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

SeNBModificationRefuse-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID      CRITICALITY ignore TYPE UE-X2AP-ID     PRESENCE mandatory},
  { ID id-SeNB-UE-X2AP-ID      CRITICALITY ignore TYPE UE-X2AP-ID     PRESENCE mandatory},
  { ID id-Cause        CRITICALITY ignore TYPE Cause      PRESENCE mandatory},
  { ID id-MeNBtoSeNBContainer    CRITICALITY ignore TYPE MeNBtoSeNBContainer PRESENCE optional},
  { ID id-CriticalityDiagnostics  CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
  { ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...  
}

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

SeNBReleaseRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID      CRITICALITY reject TYPE UE-X2AP-ID         PRESENCE mandatory},
  { ID id-SeNB-UE-X2AP-ID      CRITICALITY reject TYPE UE-X2AP-ID         PRESENCE optional},
  ...  
}
{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE optional },
{ ID id-E-RABs-ToBeReleased-List-RelReq CRITICALITY ignore TYPE E-RABs-ToBeReleased-List-RelReq PRESENCE optional },
{ ID id-UE-ContextKeptIndicator CRITICALITY ignore TYPE UE-ContextKeptIndicator PRESENCE optional },
{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional },
{ ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional },
{ ID id-MakeBeforeBreakIndicator CRITICALITY ignore TYPE MakeBeforeBreakIndicator PRESENCE optional },
...
}

E-RABs-ToBeReleased-List-RelReq ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeReleased-RelReqItemIEs} }

E-RABs-ToBeReleased-RelReqItemIEs X2AP-PROTOCOL-IES ::= {
{ ID id-E-RABs-ToBeReleased-RelReqItem CRITICALITY ignore TYPE E-RABs-ToBeReleased-RelReqItem PRESENCE mandatory },
...
}

E-RABs-ToBeReleased-RelReqItem ::= CHOICE {
scG-Bearer E-RABs-ToBeReleased-RelReqItem-SCG-Bearer,
split-Bearer E-RABs-ToBeReleased-RelReqItem-Split-Bearer,
...
}

E-RABs-ToBeReleased-RelReqItem-SCG-Bearer ::= SEQUENCE {
e-RAB-ID E-RAB-ID,
ul-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
dl-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-RelReqItem-SCG-BearerExtIEs} } OPTIONAL,
...
}

E-RABs-ToBeReleased-RelReqItem-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...
}

E-RABs-ToBeReleased-RelReqItem-Split-Bearer ::= SEQUENCE {
e-RAB-ID E-RAB-ID,
dl-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-RelReqItem-Split-BearerExtIEs} } OPTIONAL,
...
}

E-RABs-ToBeReleased-RelReqItem-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...
}

SeNBReleaseRequired ::= SEQUENCE {
protocolIEs ProtocolIE-Container { {SeNBReleaseRequired-IEs} },
...
SeNBReleaseRequired-IEs X2AP-PROTOCOL-IEs ::= {
    { ID id-SeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory }|
    { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|
    { ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional },
    ...
}

-- ********************************************
-- SENB RELEASE CONFIRM
-- ********************************************

SeNBReleaseConfirm ::= SEQUENCE {
    protocolIEs ProtocolIE-Container {[SeNBReleaseConfirm-IEs]},
    ...
}

SeNBReleaseConfirm-IEs X2AP-PROTOCOL-IEs ::= {
    { ID id-SeNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory }|
    { ID id-E-RABs-ToBeReleased-List-RelConf CRITICALITY ignore TYPE E-RABs-ToBeReleased-List-RelConf PRESENCE optional }|
    { ID id-E-RABs-ToBeReleased-RelConfItemIEs CRITICALITY ignore TYPE E-RABs-ToBeReleased-RelConfItemIEs PRESENCE optional },
    ...
}

E-RABs-ToBeReleased-List-RelConf ::= SEQUENCE {size(1..maxnoofBearers)} OF ProtocolIE-Single-Container {[E-RABs-ToBeReleased-RelConfItemIEs]}

E-RABs-ToBeReleased-RelConfItemIEs X2AP-PROTOCOL-IEs ::= {
    { ID id-E-RABs-ToBeReleased-RelConfItem CRITICALITY ignore TYPE E-RABs-ToBeReleased-RelConfItem PRESENCE mandatory },
    ...
}

E-RABs-ToBeReleased-RelConfItem ::= CHOICE {
    sCG-Bearer E-RABs-ToBeReleased-RelConfItem-SCG-Bearer,
    split-Bearer E-RABs-ToBeReleased-RelConfItem-Split-Bearer,
    ...
}

E-RABs-ToBeReleased-RelConfItem-SCG-Bearer ::= SEQUENCE {
    e-RAB-ID E-RAB-ID,
    ul-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
    dl-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
    iE-Extensions ProtocolExtensionContainer {[E-RABs-ToBeReleased-RelConfItem-SCG-BearerExtIEs]} OPTIONAL,
    ...
}

E-RABs-ToBeReleased-RelConfItem-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

ETSI
E-RABs-ToBeReleased-RelConfItem-Split-Bearer ::= SEQUENCE {
    e-RAB-ID      E-RAB-ID,
    dL-Forwarding-GTPtunnelEndpoint   GTPtunnelEndpoint             OPTIONAL,
    iE-Extensions     ProtocolExtensionContainer [ {E-RABs-ToBeReleased-RelConfItem-Split-BearerExtIEs} ] OPTIONAL,
    ...  
}

E-RABs-ToBeReleased-RelConfItem-Split-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...  
}

-- ****************************************************************************
--
-- SENB COUNTER CHECK REQUEST
--
-- ****************************************************************************

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

SeNBCounterCheckRequest-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-MeNB-UE-X2AP-ID      CRITICALITY ignore TYPE UE-X2AP-ID         PRESENCE mandatory}|
    { ID id-SeNB-UE-X2AP-ID      CRITICALITY ignore TYPE UE-X2AP-ID         PRESENCE mandatory}|
    { ID id-E-RABs-SubjectToCounterCheck-List CRITICALITY ignore TYPE E-RABs-SubjectToCounterCheck-List  PRESENCE mandatory}|
    { ID id-MeNB-UE-X2AP-ID-Extension   CRITICALITY ignore TYPE UE-X2AP-ID-Extension      PRESENCE optional}|
    { ID id-SeNB-UE-X2AP-ID-Extension   CRITICALITY ignore TYPE UE-X2AP-ID-Extension      PRESENCE optional},
    ...
}

E-RABs-SubjectToCounterCheck-List ::= SEQUENCE {SIZE(1..maxnoofBearers)} OF ProtocolIE-Single-Container [ {E-RABs-SubjectToCounterCheckItemIEs} ]

E-RABs-SubjectToCounterCheckItemIEs X2AP-PROTOCOL-IES ::= {
    { ID id-E-RABs-SubjectToCounterCheckItem CRITICALITY ignore TYPE E-RABs-SubjectToCounterCheckItem  PRESENCE mandatory},
    ...
}

E-RABs-SubjectToCounterCheckItem ::= SEQUENCE {
    e-RAB-ID      E-RAB-ID,
    ul-Count      INTEGER (0..4294967295),
    dl-Count      INTEGER (0..4294967295),
    iE-Extensions     ProtocolExtensionContainer [ {E-RABs-SubjectToCounterCheckItemExtIEs} ] OPTIONAL,
    ...
}

E-RABs-SubjectToCounterCheckItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- ****************************************************************************
--
-- X2 REMOVAL REQUEST
--
**X2 Removal Request**

```plaintext
X2RemovalRequest ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{X2RemovalRequest-IEs}},
    ...
}
X2RemovalRequest-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-GlobalENB-ID    CRITICALITY reject TYPE GlobalENB-ID   PRESENCE mandatory},
    { ID id-X2RemovalThreshold   CRITICALITY reject TYPE X2BenefitValue   PRESENCE optional},
    ...
}
```

**X2 Removal Response**

```plaintext
X2RemovalResponse ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{X2RemovalResponse-IEs}},
    ...
}
X2RemovalResponse-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-GlobalENB-ID    CRITICALITY reject TYPE GlobalENB-ID    PRESENCE mandatory},
    { ID id-CriticalityDiagnostics  CRITICALITY ignore TYPE CriticalityDiagnostics   PRESENCE optional},
    ...
}
```

**X2 Removal Failure**

```plaintext
X2RemovalFailure ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{X2RemovalFailure-IEs}},
    ...
}
X2RemovalFailure-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-Cause      CRITICALITY ignore TYPE Cause       PRESENCE mandatory},
    { ID id-CriticalityDiagnostics  CRITICALITY ignore TYPE CriticalityDiagnostics   PRESENCE optional},
    ...
}
```
RetrieveUEContextRequest ::= SEQUENCE {
  protocolIEs  ProtocolIE-Container {{ RetrieveUEContextRequest-IEs}},
  ...
}

RetrieveUEContextRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-New-eNB-UE-X2AP-ID     CRITICALITY reject TYPE UE-X2AP-ID    PRESENCE mandatory}|
  { ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional}|
  { ID id-ResumeID               CRITICALITY reject TYPE ResumeID    PRESENCE mandatory}|
  { ID id-ShortMAC-I             CRITICALITY reject TYPE ShortMAC-I       PRESENCE mandatory}|
  { ID id-NewEUTRANCellIdentifier CRITICALITY reject TYPE EUTRANCellIdentifier PRESENCE optional}|
  { ID id-FailureCellCRNTI       CRITICALITY reject TYPE CRNTI     PRESENCE optional}|
  { ID id-FailureCellPCI         CRITICALITY reject TYPE PCI    PRESENCE optional},
  ...
}

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

RetrieveUEContextResponse-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-New-eNB-UE-X2AP-ID    CRITICALITY ignore TYPE UE-X2AP-ID       PRESENCE mandatory}|
  { ID id-New-eNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional}|
  { ID id-Old-eNB-UE-X2AP-ID     CRITICALITY ignore TYPE UE-X2AP-ID       PRESENCE mandatory}|
  { ID id-Old-eNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional}|
  { ID id-GUMMEI-ID        CRITICALITY reject TYPE GUMMEI      PRESENCE mandatory}|
  { ID id-UE-ContextInformationRetrieve CRITICALITY reject TYPE UE-ContextInformationRetrieve PRESENCE mandatory}|
  { ID id-TraceActivation     CRITICALITY ignore TYPE TraceActivation     PRESENCE optional}|
  { ID id-SRVCCOperationPossible CRITICALITY ignore TYPE SRVCCOperationPossible PRESENCE optional}|
  { ID id-Masked-IMEISV       CRITICALITY ignore TYPE Masked-IMEISV      PRESENCE optional}|
  { ID id-ExpectedUEBehaviour CRITICALITY ignore TYPE ExpectedUEBehaviour PRESENCE optional}|
  { ID id-ProSeAuthorized     CRITICALITY ignore TYPE ProSeAuthorized     PRESENCE optional}|
  { ID id-CriticalityDiagnoses CRITICALITY ignore TYPE CriticalityDiagnoses PRESENCE optional}|
  { ID id-V2XServicesAuthorized CRITICALITY ignore TYPE V2XServicesAuthorized PRESENCE optional}|
  { ID id-AerialUEsubscriptionInformation CRITICALITY ignore TYPE AerialUEsubscriptionInformation PRESENCE optional},
  ...
}

UE-ContextInformationRetrieve ::= SEQUENCE {
  mM6-UE-S1AP-ID UE-S1AP-ID,
  uESecurityCapabilities         UESecurityCapabilities,
  aS-SecurityInformation         AS-SecurityInformation,
  uEaggregateMaximumBitRate      UEAggregateMaximumBitRate,
  ...}
subscriberProfileIDforRFP  OPTIONAL,
e-RABs-ToBeSetup-ListRetrieve E-RABs-ToBeSetup-ListRetrieve,  OPTIONAL,
rRC-Context  RRC-Context,  OPTIONAL,
handoverRestrictionList  HandoverRestrictionList  OPTIONAL,
locationReportingInformationLocationReportingInformation  OPTIONAL,
managBasedMDTallowedManagementBasedMDTallowed  OPTIONAL,
managBasedMDTPLMNList MDTPLMNList  OPTIONAL,
ie-Extensions ProtocolExtensionContainer { {UE-ContextInformationRetrieve-ExtIEs} } OPTIONAL,

UE-ContextInformationRetrieve-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-UESidelinkAggregateMaximumBitRate  CRITICALITY ignore  EXTENSION UESidelinkAggregateMaximumBitRate  PRESENCE optional},
...
}

E-RABs-ToBeSetup-ListRetrieve ::= SEQUENCE { SIZE(1..maxnoofBearers) } OF ProtocolIE-Single-Container { {E-RABs-ToBeSetupRetrieve-ItemIEs} }

E-RABs-ToBeSetupRetrieve-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeSetupRetrieve-Item  CRITICALITY ignore  TYPE E-RABs-ToBeSetupRetrieve-Item  PRESENCE mandatory},
...
}

E-RABs-ToBeSetupRetrieve-Item ::= SEQUENCE {
  e-RAB-ID  E-RAB-ID,
e-RAB-Level-QoS-Parameters  E-RAB-Level-QoS-Parameters,
  bearerType  BearerType  OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeSetupRetrieve-ItemExtIEs} } OPTIONAL,
...
}

E-RABs-ToBeSetupRetrieve-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-uL-GTPtunnelEndpoint  CRITICALITY reject  EXTENSION GTPtunnelEndpoint  PRESENCE mandatory},
...
}

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

RetrieveUEContextFailure-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-New-eNB-UE-X2AP-ID  CRITICALITY ignore  TYPE UE-X2AP-ID  PRESENCE mandatory}|}
  { ID id-New-eNB-UE-X2AP-ID-Extension  CRITICALITY ignore  TYPE UE-X2AP-ID-Extension  PRESENCE optional}|}
  { ID id-Cause  CRITICALITY ignore  TYPE Cause  PRESENCE mandatory}|}
  { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics  PRESENCE optional},
...
}
SgNBAdditionRequest ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {SgNBAdditionRequest-IEs},
  ...
}

SgNBAdditionRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory},
  { ID id-NRUEncryptingKey CRITICALITY reject TYPE NRUEncryptingKey PRESENCE mandatory},
  { ID id-NRUEncryptionAlgorithm CRITICALITY reject TYPE NRUEncryptionAlgorithm PRESENCE mandatory},
  { ID id-SgNB-UE-ID CRITICALITY reject TYPE SgNB-UE-ID PRESENCE mandatory},
  { ID id-SelectedQoSProfile CRITICALITY ignore TYPE QoSProfile PRESENCE optional},
  { ID id-HandoverRestrictionList CRITICALITY ignore TYPE HandoverRestrictionList PRESENCE optional},
  { ID id-MeNBtoSgNBContainer CRITICALITY reject TYPE MeNBtoSgNBContainer PRESENCE mandatory},
  { ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE optional},
  { ID id-ExpectedUEBehaviour CRITICALITY ignore TYPE ExpectedUEBehaviour PRESENCE optional},
  { ID id-MeNBCell-ID CRITICALITY reject TYPE ECGI PRESENCE mandatory},
  ...
}

E-RABs-ToBeAdded-SgNBAddReqList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container {E-RABs-ToBeAdded-SgNBAddReq-ItemIEs}

E-RABs-ToBeAdded-SgNBAddReq-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-e-RAB-ID CRITICALITY reject TYPE e-RAB-ID PRESENCE mandatory},
  ...
}

E-RABs-ToBeAdded-SgNBAddReq-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  drb-ID DRB-ID,
  en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
  resource-configuration CHOICE {
    sgNBPDCCpresent E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCCpresent,
    sgNBPDCCnotpresent E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCCnotpresent,
    ...
  },
  iE-Extensions ProtocolExtensionContainer {E-RABs-ToBeAdded-SgNBAddReq-ItemExtIEs} OPTIONAL,
  ...
}

E-RABs-ToBeAdded-SgNBAddReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
E-RABs-ToBeAdded-SgNBAddReq-Item-SgNPDCPpresent ::= SEQUENCE {
  full-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  max-MCG-admit-E-RAB-Level-QoS-Parameters GBR-QoSInformation OPTIONAL,
  -- This IE shall be present if MCG resource and SCG resources IEs in the the EN-DC Resource Configuration IE are set to "present" and GBR QoS Information IE is present in Full E-RAB Level QoS Parameters IE --
  dl-Forwarding DL-Forwarding OPTIONAL,
  meNB-DL-GTP-TEIDatMCG GTPtunnelEndpoint OPTIONAL,
  -- This IE shall be present if MCG resource IE in the the EN-DC Resource Configuration IE is set to "present" --
  s1-UL-GTPtunnelEndpoint GTPtunnelEndpoint,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBAddReq-Item-SgNPDCPpresentExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-SgNBAddReq-Item-SgNPDCPnotpresent ::= SEQUENCE {
  requested-SCG-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  meNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint, optional,
  secondary-meNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL,
  rlc-Mode RLCMode,
  ul-Configuration ULConfiguration OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBAddReq-Item-SgNPDCPnotpresentExtIEs} } OPTIONAL,
  ...
}

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

SgNBAdditionRequestAcknowledge-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
  { ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID PRESENCE mandatory}|
  { ID id-E-RABs-Admitted-ToBeAdded-SgNBAddReqAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-SgNBAddReqAckList PRESENCE mandatory}|
  { ID id-E-RABs-NotAdmitted-List CRITICALITY ignore TYPE E-RAB-List PRESENCE optional}|
  { ID id-SgNBtoMeNBContainer CRITICALITY reject TYPE SgNBtoMeNBContainer PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}
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{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional },
{ ID id-AdmittedSplitSRBs CRITICALITY reject TYPE SplitSRBs PRESENCE optional },
{ ID id-SgNBResource CoordinationInformation CRITICALITY ignore TYPE SgNBResource CoordinationInformation PRESENCE optional },
{ ID id-RRCConfigIndication CRITICALITY reject TYPE RRC-Config-Ind PRESENCE optional },
...

E-RABs-Admitted-ToBeAdded-SgNBAddReqAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-ItemIEs} }

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-ItemIEs X2AP-PROTOCOL-IEs ::= {
 { ID id-E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item PRESENCE mandatory },
...

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item ::= SEQUENCE {
 e-RAB-ID E-RAB-ID,
en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
resource-configuration CHOICE {
 sgNBPDCCpresent E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCCpresent,
sgNBPDCCnotpresent E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCCnotpresent,
... },
 iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBAddReqAck-ItemExtIEs} } OPTIONAL,
... }

E-RABs-ToBeAdded-SgNBAddReqAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCCpresent ::= SEQUENCE {
 s1-DL-GTPtunnelEndpoint GTPtunnelEndpoint, sgNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint,
-- This IE shall be present if MCG resource IE in the the EN-DC Resource Configuration IE is set to "present" --
 rlc-Mode RLCMode OPTIONAL,
-- This IE shall be present if MCG resource IE in the the EN-DC Resource Configuration IE is set to "present" --
dl-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint, ul-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint,
mCG-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
-- This IE shall be present if MCG resource and SCG resource IEs in the the EN-DC Resource Configuration IE are set to "present" and the GBR QoS Information IE is present in the Requested MCG E-RAB Level QoS Parameters IE --
ul-Configuration ULConfiguration OPTIONAL,
-- This IE shall be present if MCG resource and SCG resources IEs in the the EN-DC Resource Configuration IE are set to "present" --
iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCCpresentExtIEs} } OPTIONAL,
... }

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCCnotpresent ::= SEQUENCE {
...

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCCnotpresent ::= SEQUENCE {
**SgNB Addition Request Reject**

```plaintext
SgNBAdditionRequestReject ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{SgNBAdditionRequestReject-IEs}},
    ...}

SgNBAdditionRequestReject-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-MeNB-UE-X2AP-ID     CRITICALITY reject TYPE UE-X2AP-ID     PRESENCE mandatory},
    { ID id-SgNB-UE-X2AP-ID     CRITICALITY reject TYPE SgNB-UE-X2AP-ID     PRESENCE mandatory},
    { ID id-Cause       CRITICALITY ignore TYPE Cause      PRESENCE mandatory},
    { ID id-CriticalityDiagnostics   CRITICALITY ignore TYPE CriticalityDiagnostics  PRESENCE optional},
    { ID id-MeNB-UE-X2AP-ID-Extension    CRITICALITY reject TYPE UE-X2AP-ID-Extension        PRESENCE optional},
    ...}
```

**SgNB Reconfiguration Complete**

```plaintext
SgNBReconfigurationComplete ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{SgNBReconfigurationComplete-IEs}},
    ...}

SgNBReconfigurationComplete-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-MeNB-UE-X2AP-ID     CRITICALITY reject TYPE UE-X2AP-ID     PRESENCE mandatory},
    { ID id-SgNB-UE-X2AP-ID     CRITICALITY reject TYPE SgNB-UE-X2AP-ID     PRESENCE mandatory},
    { ID id-ResponseInformationSgNBReconfComp CRITICALITY ignore TYPE ResponseInformationSgNBReconfComp  PRESENCE mandatory},
    { ID id-MeNB-UE-X2AP-ID-Extension    CRITICALITY reject TYPE UE-X2AP-ID-Extension        PRESENCE optional},
    ...}

ResponseInformationSgNBReconfComp ::= CHOICE {
    ...}
```
success-SgNBReconfComp ResponseInformationSgNBReconfComp-SuccessItem,
reject-by-MeNB-SgNBReconfComp ResponseInformationSgNBReconfComp-RejectByMeNBItem,
...
}

ResponseInformationSgNBReconfComp-SuccessItem ::= SEQUENCE {
  meNBtoSgNBContainer MeNBtoSgNBContainer OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {ResponseInformationSgNBReconfComp-SuccessItemExtIEs} } OPTIONAL,
...
}

ResponseInformationSgNBReconfComp-SuccessItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

ResponseInformationSgNBReconfComp-RejectByMeNBItem ::= SEQUENCE {
  cause Cause,
iE-Extensions ProtocolExtensionContainer { {ResponseInformationSgNBReconfComp-RejectByMeNBItemExtIEs} } OPTIONAL,
...
}

ResponseInformationSgNBReconfComp-RejectByMeNBItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *******************************************************
-- SGNB MODIFICATION REQUEST
-- *******************************************************

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

SgNBModificationRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
  { ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID PRESENCE mandatory}|
  { ID id-HandoverRestrictionList CRITICALITY ignore TYPE HandoverRestrictionList PRESENCE optional}|
  { ID id-SCGConfigurationQuery CRITICALITY ignore TYPE SCGConfigurationQuery PRESENCE optional}|
  { ID id-UE-ContextInformation-SgNBModReq CRITICALITY reject TYPE UE-ContextInformation-SgNBModReq PRESENCE optional}|
  { ID id-MeNBtoSgNBContainer CRITICALITY ignore TYPE MeNBtoSgNBContainer PRESENCE optional}|
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional}|
  { ID id-RequestedSplitSRBs CRITICALITY ignore TYPE SplitSRBs PRESENCE optional}|
  { ID id-RequestedSplitSRBsrelease CRITICALITY ignore TYPE SplitSRBs release PRESENCE optional},
  ...
}

UE-ContextInformation-SgNBModReq ::= SEQUENCE {
  ...
}
nRUE-SecurityCapabilities  NRUESecurityCapabilities                 OPTIONAL,
sgNB-SecurityKey          SgNBSecurityKey                        OPTIONAL,
sgNBUEAggregateMaximumBitRate  UEAggregateMaximumBitRate                OPTIONAL,
e-RABs-ToBeAdded     E-RABs-ToBeAdded-SgNBModReq-List              OPTIONAL,
e-RABs-ToBeModified    E-RABs-ToBeModified-SgNBModReq-List              OPTIONAL,
e-RABs-ToBeReleased    E-RABs-ToBeReleased-SgNBModReq-List              OPTIONAL,
iE-Extensions              ProtocolExtensionContainer { {UE-ContextInformationSgNBModReqExtIEs} } OPTIONAL,

UE-ContextInformationSgNBModReqExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-SubscriberProfileIDforRFP     CRITICALITY ignore EXTENSION SubscriberProfileIDforRFP PRESENCE
    optional},
  ...
}

E-RABs-ToBeAdded-SgNBModReq-List := SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeAdded-SgNBModReq-ItemIEs} }

E-RABs-ToBeAdded-SgNBModReq-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeAdded-SgNBModReq-Item  CRITICALITY ignore TYPE E-RABs-ToBeAdded-SgNBModReq-Item PRESENCE mandatory),
    ...
}

E-RABs-ToBeAdded-SgNBModReq-Item ::= SEQUENCE {
  e-RAB-ID        E-RAB-ID,  drb-ID         DRB-ID,  en-DC-ResourceConfiguration    EN-DC-ResourceConfiguration,
  resource-configuration     CHOICE {
    sgNBPDCPpresent      E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPpresent,
    sgNBPDCPnotpresent     E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPnotpresent,
    ... },
  iE-Extensions              ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBModReq-ItemExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-SgNBModReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPpresent ::= SEQUENCE {
  full-E-RAB-Level-QoS-Parameters   E-RAB-Level-QoS-Parameters,
  max-MN-admit-E-RAB-Level-QoS-Parameters GBR-QosInformation OPTIONAL,
  -- This IE shall be present if MCG resource and SCG resources IEs in the the EN-DC Resource Configuration IE are set to "present" and GBR QoS Information IE is present in Full E-RAB Level QoS Parameters IE --
  dL-Forwarding          DL-Forwarding                  OPTIONAL,
  meNB-DL-GTP-TEIDatMCG  GTPtunnelEndpoint             OPTIONAL,
  -- This IE shall be present if MCG resource IE in the the EN-DC Resource Configuration IE is set to "present" --
  s1-UL-GTPtunnelEndpoint GTPtunnelEndpoint,
  iE-Extensions              ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

ETSi
E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPnotpresent ::= SEQUENCE {
  requested-SCG-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters,
  meNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint,
  secondary-meNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL,
  rlc-Mode RLCMode,
  uL-Configuration ULConfiguration OPTIONAL,
  -- This IE shall be present if MCG resource and SCG resources IEs in the the EN-DC Resource Configuration IE are set to "present" --
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeAdded-SgNBModReq-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeModified-SgNBModReq-List ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeModified-SgNBModReq-ItemIEs} }

E-RABs-ToBeModified-SgNBModReq-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeModified-SgNBModReq-Item CRITICALITY ignore TYPE E-RABs-ToBeModified-SgNBModReq-Item PRESENCE mandatory},
  ...
}

E-RABs-ToBeModified-SgNBModReq-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
  resource-configuration CHOICE {
    sgNBPDCPpresent E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPpresent,
    sgNBPDCPnotpresent E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPnotpresent,
    ...}
  },
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-SgNBModReq-ItemExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeModified-SgNBModReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPpresent ::= SEQUENCE {
  full-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
  max-MN-admit-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
  meNB-DL-GTP-TEIDatMCG GTPtunnelEndpoint OPTIONAL,
  sl-UL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPnotpresent ::= SEQUENCE {
  requested-SCG-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
  meNB-UL-GTP-TEIDatPDCP GTPTunnelEndpoint OPTIONAL,
  ul-Configuration ULConfiguration OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeReleased-SgNBModReq-List ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeReleased-SgNBModReq-ItemIEs} }

E-RABs-ToBeReleased-SgNBModReq-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeReleased-SgNBModReq-Item CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBModReq-Item PRESENCE mandatory),
  ...
}

E-RABs-ToBeReleased-SgNBModReq-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
  resource-configuration CHOICE {
    sgNBPDCCpresent E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCCpresent,
    sgNBPDCCnotpresent E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCCnotpresent,
    ...
  },
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModReq-ItemExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeReleased-SgNBModReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCCpresent ::= SEQUENCE {
  dL-GTPtunnelEndpoint GTPTunnelEndpoint OPTIONAL,
  ul-GTPtunnelEndpoint GTPTunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCCpresentExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCCnotpresent ::= SEQUENCE {
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCCnotpresentExtIEs} } OPTIONAL,
  ...
}
E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDPCnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- ******************************************************************************
-- -- SGNB MODIFICATION REQUEST ACKNOWLEDGE
-- -- ******************************************************************************

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

SgNBModificationRequestAcknowledge-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory}|
  { ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE mandatory}|
  { ID id-E-RABs-Admitted-ToBeAdded-SgNBModAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-SgNBModAckList PRESENCE optional}|
  { ID id-E-RABs-Admitted-ToBeModified-SgNBModAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeModified-SgNBModAckList PRESENCE optional}|
  { ID id-E-RABs-NotAdmitted-List CRITICALITY ignore TYPE E-RAB-List PRESENCE optional}|
  { ID id-SgNBtoMeNBContainer CRITICALITY ignore TYPE SgNBtoMeNBContainer PRESENCE optional}|
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}|
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional}|
  { ID id-SgNBResourceCoordinationInformation CRITICALITY ignore TYPE SgNBResourceCoordinationInformation PRESENCE optional}|
  { ID id-AdmittedSplitSRBs CRITICALITY ignore TYPE SplitSRBs PRESENCE optional}|
  { ID id-AdmittedSplitSRBsRelease CRITICALITY ignore TYPE SplitSRBsRelease PRESENCE optional}|
  ...
}

E-RABs-Admitted-ToBeAdded-SgNBModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-Admitted-ToBeAdded-SgNBModAck-ItemIEs} }

E-RABs-Admitted-ToBeAdded-SgNBModAck-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-Admitted-ToBeAdded-SgNBModAck-Item CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-SgNBModAck-Item PRESENCE mandatory}|
  { ID id-E-RAB-Id E-RAB-ID PRESENCE mandatory}|
  { ID id-en-DC-ResourceConfiguration EN-DC-ResourceConfiguration PRESENCE mandatory}|
  { ID id-resource-configuration CHOICE { sgNBPDPCpresent E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDPCpresent, sgNBPDPCnotpresent E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDPCnotpresent, } PRESENCE optional}|
  { ID id-iExtensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-SgNBModAck-ItemExtIEs} } OPTIONAL, }|
  ...
}
E-RABs-Admitted-ToBeAdded-SgNBModAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPCPPresent ::= SEQUENCE {
  s1-DL-GTPtunnelEndpoint GTPtunnelEndpoint,
  sgNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint,
  -- This IE shall be present if MCG resource IE in the the EN-DC Resource Configuration IE are set to "present" --
  rlc-Mode RLCMode OPTIONAL,
  -- This IE shall be present if MCG resource IE in the the EN-DC Resource Configuration IE are set to "present" --
  dl-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  ul-Forwarding-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  mCG-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
  -- This IE shall be present if MCG resource and SCG resource IEs in the the EN-DC Resource Configuration IE are set to "present" and the GBR QoS Information IE is present in the Requested MCG E-RAB Level QoS Parameters IE --
  ul-Configuration ULConfiguration OPTIONAL,
  -- This IE shall be present if MCG resource and SCG resource IEs in the the EN-DC Resource Configuration IE are set to "present" --
  iE-Extensions ProtocolExtensionContainer {{E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPCPPresentExtIEs}} OPTIONAL,
  ...
}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPCPPresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPCPPresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPCPNotPresent ::= SEQUENCE {
  sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint,
  secondary-sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer {{E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPCPNotPresentExtIEs}} OPTIONAL,
  ...
}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPCPNotPresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-Admitted-ToBeModified-SgNBModAckList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container {{E-RABs-Admitted-ToBeModified-SgNBModAck-ItemIEs}}

E-RABs-Admitted-ToBeModified-SgNBModAck-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-Admitted-ToBeModified-SgNBModAck-Item CRITICALITY ignore TYPE E-RABs-Admitted-ToBeModified-SgNBModAck-Item PRESENCE mandatory} }

E-RABs-Admitted-ToBeModified-SgNBModAck-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
  resource-configuration CHOICE {
    sgNBPCPPresent E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPCPPresent,
    sgNBPCPNotPresent E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPCPNotPresent,
  },
  ...


iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBModAck-ItemExtIEs} } OPTIONAL, 

... }

E-RABs-ToBeAdded-SgNBModAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= { 

... }

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDPCpresent ::= SEQUENCE { 

s1-DL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL, 

sgNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL, 

mCG-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL, 

uL-Configuration ULConfiguration OPTIONAL, 

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDPCpresentExtIEs} } OPTIONAL, 

... }

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDPCpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= { 

... }

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDPCnotpresent ::= SEQUENCE { 

sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL, 

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDPCnotpresentExtIEs} } OPTIONAL, 

... }

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDPCnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= { 

... }

E-RABs-Admitted-ToBeReleased-SgNBModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-Admitted-ToBe Released- SgNBModAck-ItemIEs} }

E-RABs-Admitted-ToBeReleased-SgNBModAck-ItemIEs X2AP-PROTOCOL-IES ::= { 

{ ID id-E-RABs-Admitted-ToBeReleased-SgNBModAck-Item CRITICALITY ignore TYPE E-RABs-Admitted-ToBeReleased-SgNBModAck-Item PRESENCE mandatory} 

}

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item ::= SEQUENCE { 

e-RAB-ID E-RAB-ID, 

en-DC-ResourceConfiguration EN-DC-ResourceConfiguration, 

resource-configuration CHOICE { 

sgNBPDPCpresent E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDPCpresent, 

sgNBPDPCnotpresent E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDPCnotpresent, 

... }, 

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModAck-ItemExtIEs} } OPTIONAL, 

... }

E-RABs-ToBeReleased-SgNBModAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= { 

... }

ETS I
E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDChPresent ::= SEQUENCE {
  iE-Extensions ProtocolExtensionContainer {{E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDChPresentExtIEs}} OPTIONAL,
  ... }

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDChPresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... }

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDChNotPresent ::= SEQUENCE {
  iE-Extensions ProtocolExtensionContainer {{E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDChNotPresentExtIEs}} OPTIONAL,
  ... }

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDChNotPresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... }

-- *********************************************************************
-- -- SGNB MODIFICATION REQUEST REJECT
-- -- *********************************************************************
SgNBModificationReject ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{SgNBModificationReject-IEs}},
  ... }

SgNBModificationReject-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory},
  { ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE mandatory},
  { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory},
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ... }

-- *********************************************************************
-- -- SGNB MODIFICATION REQUIRED
-- -- *********************************************************************
SgNBModificationRequired ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{SgNBModificationRequired-IEs}},
  ... }

ETS
SgNBModificationRequired-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory |
  { ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID PRESENCE mandatory |}
  { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory |
  { ID id-PDCPChangeIndication CRITICALITY ignore TYPE PDCPChangeIndication PRESENCE mandatory |
  { ID id-E-RABs-ToBeReleased-SgNBModReqdList CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBModReqdList PRESENCE optional |}
  { ID id-SgNBtoMeNBContainer CRITICALITY ignore TYPE SgNBtoMeNBContainer PRESENCE optional |
  { ID id-E-RABs-ToBeModified-SgNBModReqdList CRITICALITY ignore TYPE E-RABs-ToBeModified-SgNBModReqdList PRESENCE optional |}
  { ID id-SgNBResourceCoordinationInformation CRITICALITY ignore TYPE SgNBResourceCoordinationInformation PRESENCE optional |,
  ...
}

E-RABs-ToBeReleased-SgNBModReqdList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeReleased-SgNBModReqd-ItemIEs} }

E-RABs-ToBeReleased-SgNBModReqd-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeReleased-SgNBModReqd-Item CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBModReqd-Item PRESENCE mandatory },
  ...
}

E-RABs-ToBeReleased-SgNBModReqd-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  cause Cause,
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModReqd-ItemExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeReleased-SgNBModReqd-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeModified-SgNBModReqdList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeModified-SgNBModReqd-ItemIEs} }

E-RABs-ToBeModified-SgNBModReqd-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeModified-SgNBModReqd-Item CRITICALITY ignore TYPE E-RABs-ToBeModified-SgNBModReqd-Item PRESENCE mandatory },
  ...
}

E-RABs-ToBeModified-SgNBModReqd-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
  resource-configuration CHOICE {
    sgNBPDCCpresent E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCCpresent,
    sgNBPDCCnotpresent E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCCnotpresent,
  ...
  },
  iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-SgNBModReqd-ItemExtIEs} } OPTIONAL,
  ...
}

E-RABs-ToBeModified-SgNBModReqd-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
... 

E-RABs-ToBeModified-SgnBModReqd-Item-SgNBPDCCpresent ::= SEQUENCE {
  requested-MCG-E-RAB-Level-QoS-Parameters E-RAB-Level-QoS-Parameters OPTIONAL,
  ul-Configuration ULConfiguration OPTIONAL,
  sgNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL,
  s1-DL-GTP-TEIDatSgNB GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { (E-RABs-ToBeModified-SgnBModReqd-Item-SgNBPDCCpresentExtIEs) } OPTIONAL,
  ...
}

E-RABs-ToBeModified-SgnBModReqd-Item-SgNBPDCCpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeModified-SgnBModReqd-Item-SgNBPDCCnotpresent ::= SEQUENCE {
  sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,
  secondary-sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { (E-RABs-ToBeModified-SgnBModReqd-Item-SgNBPDCCnotpresentExtIEs) } OPTIONAL,
  ...
}

E-RABs-ToBeModified-SgnBModReqd-Item-SgNBPDCCnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *******************************************************************************
--  SGNB MODIFICATION CONFIRM
-- *******************************************************************************

SgNBModificationConfirm ::= SEQUENCE {
  protocolIEs ProtocolIE-Container { (SgNBModificationConfirm-IEs) },
  ...
}

SgNBModificationConfirm-IEs X2AP-PROTOCOL-IES ::= {
  ID id-MeNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory,
  ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE mandatory,
  ID id-E-RABs-AdmittedToBeModified-SgnBModConfList CRITICALITY ignore TYPE E-RABs-AdmittedToBeModified-SgnBModConfList PRESENCE optional,
  ...
}

E-RABs-AdmittedToBeModified-SgnBModConfList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container {
  (E-RABs-AdmittedToBeModified-SgnBModConf-ItemIEs) 
}
E-RABs-AdmittedToBeModified-SgNBModConf-ItemIEs X2AP-PROTOCOL-IES ::= {
  ID id-E-RABs-AdmittedToBeModified-SgNBModConf-Item CRITICALITY ignore TYPE E-RABs-AdmittedToBeModified-SgNBModConf-Item PRESENCE mandatory },
...}

E-RABs-AdmittedToBeModified-SgNBModConf-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
resource-configuration CHOICE {
  sgNBPDPCpresent E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDPCpresent,
  sgNBPDPCnotpresent E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDPCnotpresent,
...},
iE-Extensions ProtocolExtensionContainer { {E-RABs-AdmittedToBeModified-SgNBModConf-ItemExtIEs} } OPTIONAL,
...}

E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDPCpresent ::= SEQUENCE {
  iE-Extensions ProtocolExtensionContainer { {E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDPCpresentExtIEs} } OPTIONAL,
...}

E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDPCnotpresent ::= SEQUENCE {
  secondary-meNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDPCnotpresentExtIEs} } OPTIONAL,
...}

E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDPCnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...}

--- ************************************************************
--- SGNB MODIFICATION REFUSE
--- ************************************************************

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

SgNBModificationRefuse-IEs X2AP-PROTOCOL-IES ::= {
...}
SgNBReleaseRequest ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{SgNBReleaseRequest-IEs}},
  ...
}

SgNBReleaseRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID       CRITICALITY reject TYPE UE-X2AP-ID          PRESENCE mandatory}|
  { ID id-SgNB-UE-X2AP-ID       CRITICALITY reject TYPE SgNB-UE-X2AP-ID         PRESENCE optional}|
  { ID id-Cause         CRITICALITY ignore TYPE Cause           PRESENCE mandatory}|
  { ID id-E-RABs-ToBeReleased-SgNBRelReqList  CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBRelReqList  PRESENCE optional}|  { ID id-UE-ContextKeptIndicator     CRITICALITY ignore TYPE UE-ContextKeptIndicator      PRESENCE optional}|
  { ID id-MeNB-UE-X2AP-ID-Extension    CRITICALITY reject TYPE UE-X2AP-ID-Extension       PRESENCE optional}|  { ID id-MeNBtoSgNBContainer      CRITICALITY reject TYPE MeNBtoSgNBContainer        PRESENCE optional},
  ...
}

E-RABs-ToBeReleased-SgNBRelReqList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeReleased-SgNBRelReq-ItemIEs} }

E-RABs-ToBeReleased-SgNBRelReq-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeReleased-SgNBRelReq-Item  CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBRelReq-Item  PRESENCE mandatory},
  ...
}

E-RABs-ToBeReleased-SgNBRelReq-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,  
en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,  
resource-configuration CHOICE {
  sgNBPDCCpresent   E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCpresent,  
  sgNBPDCCnotpresent E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCnotpresent,  
},
iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelReq-ItemExtIEs} } OPTIONAL,  
...  
}

E-RABs-ToBeReleased-SgNBRelReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCpresent ::= SEQUENCE {
  uL-GTPtunnelEndpoint       GTPtunnelEndpoint OPTIONAL,
  dl-GTPtunnelEndpoint       GTPtunnelEndpoint OPTIONAL,
  iE-Extensions             ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCpresentExtIEs} } OPTIONAL,
  ...}

E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCpresent ::= SEQUENCE {
  iE-Extensions             ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCpresentExtIEs} } OPTIONAL,
  ...}

E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCCpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- ***************************************************************
-- -- SGNB RELEASE REQUEST ACKNOWLEDGE
-- ***************************************************************

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

SgNBReleaseRequestAcknowledge-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
  { ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}|
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...
}

-- ***************************************************************
-- -- SGNB RELEASE REQUEST REJECT
-- ***************************************************************

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

SgNBReleaseRequestReject-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory}|
  ...
}
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ETSI

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{ ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID PRESENCE mandatory} |
{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory} |
{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional} |
{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
...

-- **************************************************************
-- SGNB RELEASE REQUIRED
-- **************************************************************

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

SgNBReleaseRequired-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory} |
  { ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID PRESENCE mandatory} |
  { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory} |
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...
}

-- **************************************************************
-- SGNB RELEASE CONFIRM
-- **************************************************************

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

SgNBReleaseConfirm-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory} |
  { ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE mandatory} |
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional} |
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...
}

E-RABs-ToBeReleased-SgNBRelConfList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeReleased-SgNBRelConf-ItemIEs} }

E-RABs-ToBeReleased-SgNBRelConf-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeReleased-SgNBRelConf-Item CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBRelConf-Item PRESENCE mandatory},
  ...
}
E-RABs-ToBeReleased-SgNBRelConf-Item ::= SEQUENCE {
  e-RAB-ID       E-RAB-ID,
en-DC-ResourceConfiguration       EN-DC-ResourceConfiguration,
resource-configuration           CHOICE {
  sgNBPDPCpresent      E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDPCpresent,
  sgNBPDPCnotpresent     E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDPCnotpresent,
...  },
  iE-Extensions     ProtocolExtensionContainer [ {E-RABs-ToBeReleased-SgNBRelConf-ItemExtIEs} ] OPTIONAL,
...  }
}
E-RABs-ToBeReleased-SgNBRelConf-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...  }
E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDPCpresent ::= SEQUENCE {
uL-GTPtunnelEndpoint   GTPtunnelEndpoint OPTIONAL,
dL-GTPtunnelEndpoint   GTPtunnelEndpoint OPTIONAL,
iE-Extensions     ProtocolExtensionContainer [ {E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDPCpresentExtIEs} ] OPTIONAL,
...  }
E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDPCnotpresent ::= SEQUENCE {
iE-Extensions     ProtocolExtensionContainer [ {E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDPCnotpresentExtIEs} ] OPTIONAL,
...  }
SgNBCounterCheckRequest ::= SEQUENCE {
  protocolIEs       ProtocolIE-Container [ {SgNBCounterCheckRequest-IEs} ],
...  }
SgNBCounterCheckRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID       CRITICALITY ignore TYPE UE-X2AP-ID PRESSENCE mandatory},
  { ID id-SgNB-UE-X2AP-ID        CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE mandatory},
  { ID id-E-RABs-SubjectToSgNBCounterCheck-List CRITICALITY ignore TYPE E-RABs-SubjectToSgNBCounterCheck-List PRESENCE mandatory},
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},
...  }

-- ************************************************************
-- SGNB COUNTER CHECK REQUEST
-- ************************************************************
E-RABs-SubjectToSgNBCounterCheck-List ::= SEQUENCE {SIZE(1..maxnoofBearers)} OF ProtocolIE-Single-Container { {E-RABs-SubjectToSgNBCounterCheck-ItemIEs} }

E-RABs-SubjectToSgNBCounterCheck-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-SubjectToSgNBCounterCheck-Item CRITICALITY ignore TYPE E-RABs-SubjectToSgNBCounterCheck-Item PRESENCE mandatory},
  ...
}

E-RABs-SubjectToSgNBCounterCheck-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  uL-Count INTEGER (0..4294967295),
  dL-Count INTEGER (0..4294967295),
  ie-Extensions ProtocolExtensionContainer { {E-RABs-SubjectToSgNBCounterCheck-ItemExtIEs} } OPTIONAL,
  ...
}

E-RABs-SubjectToSgNBCounterCheck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- ************************************************************
-- SGNB CHANGE REQUIRED
-- -- ************************************************************

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

SgNBChangeRequired-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory},
  { ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE mandatory},
  { ID id-Target-SgNB-ID CRITICALITY ignore TYPE GNB-ID PRESENCE mandatory},
  { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory},
  { ID id-SgNBtoMeNBContainer CRITICALITY ignore TYPE SgNBtoMeNBContainer PRESENCE optional},
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...
}

-- ************************************************************
-- SGNB CHANGE CONFIRM
-- -- ************************************************************

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

SgNBChangeConfirm-IEs X2AP-PROTOCOL-IES ::= {
  ...
}
E-RABs-ToBeReleased-SgNBChaConfList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container {E-RABs-ToBeReleased-SgNBChaConf-ItemIEs}

E-RABs-ToBeReleased-SgNBChaConf-ItemIEs X2AP-PROTOCOL-IES ::= {
  { ID id-E-RABs-ToBeReleased-SgNBChaConf-Item CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBChaConf-Item PRESENCE mandatory},
  ...
}

E-RABs-ToBeReleased-SgNBChaConf-Item ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,
  resource-configuration CHOICE {
    sgNBPDCPpresent E-RABs-ToBeReleased-SgNBChaConf-Item-SgNBPDCPpresent,
    sgNBPDCPnotpresent E-RABs-ToBeReleased-SgNBChaConf-Item-SgNBPDCPnotpresent,
    ...
  },
  iE-Extensions ProtocolExtensionContainer {E-RABs-ToBeReleased-SgNBChaConf-ItemExtIEs} OPTIONAL,
  ...
}

E-RABs-ToBeReleased-SgNBChaConf-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

E-RABs-ToBeReleased-SgNBChaConf-Item-SgNBPDCPpresent ::= SEQUENCE {
  uL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  dL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,
  iE-Extensions ProtocolExtensionContainer {E-RABs-ToBeReleased-SgNBChaConf-Item-SgNBPDCPpresentExtIEs} OPTIONAL,
  ...
}

E-RABs-ToBeReleased-SgNBChaConf-Item-SgNBPDCPnotpresent ::= SEQUENCE {
  iE-Extensions ProtocolExtensionContainer {E-RABs-ToBeReleased-SgNBChaConf-Item-SgNBPDCPnotpresentExtIEs} OPTIONAL,
  ...
}

E-RABs-ToBeReleased-SgNBChaConf-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

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

RRCTransfer-IEs X2AP-PROTOCOL-IEs ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY reject TYPE UE-X2AP-ID PRESENCE mandatory| |
  { ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID PRESENCE mandatory| |
  { ID id-SplitSRB CRITICALITY reject TYPE SplitSRB PRESENCE optional| |
  { ID id-UENRMeasurement CRITICALITY reject TYPE UENRMeasurement PRESENCE optional},
  ...
}

-- ************************************************************
--
-- SGNB CHANGE REFUSE
--
-- ************************************************************
SgNBChangeRefuse ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{SgNBChangeRefuse-IEs}},
  ...
}

SgNBChangeRefuse-IEs X2AP-PROTOCOL-IEs ::= {
  { ID id-MeNB-UE-X2AP-ID CRITICALITY ignore TYPE UE-X2AP-ID PRESENCE mandatory| |
  { ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE mandatory| |
  { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory| |
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional| |
  { ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},
  ...
}

-- ****************************
--
-- EN-DC X2 SETUP REQUEST
--
-- ****************************
ENDCX2SetupRequest ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{ENDCX2SetupRequest-IEs}},
  ...
}

ENDCX2SetupRequest-IEs X2AP-PROTOCOL-IEs ::= {
  { ID id-InitiatingNodeType-EndcX2Setup CRITICALITY reject TYPE InitiatingNodeType-EndcX2Setup PRESENCE mandatory},
  ...
}
InitiatingNodeType-EndcX2Setup ::= CHOICE {
  init-eNB    ProtocolIE-Container {{ENB-ENDCX2SetupReqIEs}},
  init-en-gNB   ProtocolIE-Container {{En-gNB-ENDCX2SetupReqIEs}},
...}

ENB-ENDCX2SetupReqIEs X2AP-PROTOCOL-IES ::= {
  { ID id-GlobalENB-ID   CRITICALITY reject TYPE GlobalENB-ID PRESENCE mandatory},
  { ID id-ServedEUTRAcellsENDCX2ManagementList CRITICALITY reject TYPE ServedEUTRAcellsENDCX2ManagementList PRESENCE mandatory},
...}

ServedEUTRAcellsENDCX2ManagementList ::= SEQUENCE (SIZE (1.. maxCellineNB)) OF SEQUENCE {
  servedEUTRACellInfo   ServedCell-Information,
  nrNeighbourInfo   NRNeighbour-Information OPTIONAL,
  iE-Extensions   ProtocolExtensionContainer { { ServedEUTRAcellsENDCX2Management-ExtIEs} } OPTIONAL,
...}

ServedEUTRAcellsENDCX2Management-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...}

En-gNB-ENDCX2SetupReqIEs X2AP-PROTOCOL-IES ::= {
  { ID id-Globalen-gNB-ID    CRITICALITY reject TYPE GlobalGNB-ID PRESENCE mandatory},
  { ID id-ServedNRcellsENDCX2ManagementList CRITICALITY reject TYPE ServedNRcellsENDCX2ManagementList PRESENCE mandatory},
...}

ServedNRcellsENDCX2ManagementList ::= SEQUENCE (SIZE (1.. maxCellinengNB)) OF SEQUENCE {
  servedNRCellInfo   ServedNRCell-Information,
  nrNeighbourInfo   NRNeighbour-Information OPTIONAL,
  iE-Extensions   ProtocolExtensionContainer { { En-gNBServedCells-ExtIEs} } OPTIONAL,
...}

En-gNBservedCells-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
...}

ServedNRCell-Information ::= SEQUENCE {
  nrpCI    NRPCI,
  nrCellID   NRCGI,
  fiveGS-TAC    FiveGS-TAC,
  configured-TAC   TAC OPTIONAL,
  broadcastPLMNs   BroadcastPLMNs-Item,
  nrModeInfo   CHOICE {
    fdd    FDD-InfoServedNRCell-Information,
    tdd    TDD-InfoServedNRCell-Information,
...},
  measurementTimingConfiguration   OCTET STRING,
  iE-Extensions   ProtocolExtensionContainer { { ServedNRCell-Information-ExtIEs} } OPTIONAL,
...}
ServedNRCell-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

FDD-InfoServedNRCell-Information ::= SEQUENCE {
    ul-NRFreqInfo    NRFreqInfo,
    dl-NRFreqInfo    NRFreqInfo,
    ul-NR-TxBW      NR-TxBW,
    dl-NR-TxBW      NR-TxBW,
    iE-Extensions   ProtocolExtensionContainer { { FDD-InfoServedNRCell-Information-ExtIEs } }  OPTIONAL,
    ...
}

FDD-InfoServedNRCell-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

FDD-InfoNeighbourServedNRCell-Information ::= SEQUENCE {
    ul-NRFreqInfo    NRFreqInfo,
    dl-NRFreqInfo    NRFreqInfo,
    iE-Extensions   ProtocolExtensionContainer { { FDD-InfoNeighbourServedNRCell-Information-ExtIEs } }  OPTIONAL,
    ...
}

FDD-InfoNeighbourServedNRCell-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

TDD-InfoServedNRCell-Information ::= SEQUENCE {
    nRFreqInfo      NRFreqInfo,
    nR-TxBW         NR-TxBW,
    iE-Extensions   ProtocolExtensionContainer { { TDD-InfoServedNRCell-Information-ExtIEs } }  OPTIONAL,
    ...
}

TDD-InfoServedNRCell-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

TDD-InfoNeighbourServedNRCell-Information ::= SEQUENCE {
    nRFreqInfo      NRFreqInfo,
    iE-Extensions   ProtocolExtensionContainer { { TDD-InfoNeighbourServedNRCell-Information-ExtIEs } }  OPTIONAL,
    ...
}

TDD-InfoNeighbourServedNRCell-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

NRNeighbour-Information ::= SEQUENCE (SIZE (1.. maxofNRNeighbours))OF SEQUENCE {
    nrpCI    NRPCI,
    nrCellID   NRCGI,
nrFreqInfo       NRFreqInfo,
fiveGS-TAC       FiveGS-TAC,
configured-TAC   TAC     OPTIONAL,
measurementTimingConfiguration OCTET STRING,
nRN Beacon Node Info     CHOICE {
fdd   FDD-InfoNeighbourServedNRCell-Information,
tdd   TDD-InfoNeighbourServedNRCell-Information,
...}

iE-Extensions     ProtocolExtensionContainer { { NRNeighbour-Information-ExtIEs} } OPTIONAL,

}

NRNeighbour-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

}

CellAssistanceInformation ::= CHOICE {
  limited-list     Limited-list,  
  full-list        ENUMERATED {allServedNRcells, ...},
...}

Limited-list ::= SEQUENCE (SIZE (1..maxCellinengNB)) OF SEQUENCE {
  nrCellID       NRCGI,  
  iE-Extensions  ProtocolExtensionContainer { {Limited-list-ExtIEs} } OPTIONAL,
...}

Limited-list-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

}

-- *****************************************************
-- EN-DC X2 SETUP RESPONSE
-- *****************************************************

ENDCX2SetupResponse ::= SEQUENCE {
  protocolIEs  ProtocolIE-Container { [ENDCX2SetupResponse-IEs] },
...}

ENDCX2SetupResponse-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-RespondingNodeType-EndcX2Setup  CRITICALITY reject TYPE RespondingNodeType-EndcX2Setup  PRESENCE mandatory},
...}

RespondingNodeType-EndcX2Setup ::= CHOICE {
  respond-eNB ProtocolIE-Container { [ENB-ENDCX2SetupReqAckIEs] },
  respond-en-gNB ProtocolIE-Container { [En-gNB-ENDCX2SetupReqAckIEs] },
...}
ENB-ENDCX2SetupReqAckIEs X2AP-PROTOCOL-IES ::= {
    { ID id-GlobalENB-ID       CRITICALITY reject TYPE GlobalENB-ID          PRESENCE mandatory},
    { ID id-ServedEUTRAcellsENDCX2ManagementList CRITICALITY reject TYPE ServedEUTRAcellsENDCX2ManagementList PRESENCE mandatory},
    ...
}

En-gNB-ENDCX2SetupReqAckIEs X2AP-PROTOCOL-IES ::= {
    { ID id-Globalen-gNB-ID       CRITICALITY reject TYPE GlobalGNB-ID          PRESENCE mandatory},
    { ID id-ServedNRcellsENDCX2ManagementList CRITICALITY reject TYPE ServedNRcellsENDCX2ManagementList PRESENCE mandatory},
    ...
}

-- *****************************************************************************
--  EN-DC X2 SETUP FAILURE
-- *****************************************************************************

ENDCX2SetupFailure ::= SEQUENCE {
    protocolIEs  ProtocolIE-Container {{ENDCX2SetupFailure-IEs}},
    ...
}

ENDCX2SetupFailure-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-Cause     CRITICALITY ignore  TYPE Cause        PRESENCE mandatory },
    { ID id-CriticalityDiagnostics CRITICALITY ignore  TYPE CriticalityDiagnostics    PRESENCE optional },
    ...
}

-- *****************************************************************************
--  EN-DC CONFIGURATION UPDATE
-- *****************************************************************************

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

ENDCConfigurationUpdate-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-InitiatingNodeType-EndcConfigUpdate CRITICALITY reject TYPE InitiatingNodeType-EndcConfigUpdate PRESENCE mandatory},
    ...
}

InitiatingNodeType-EndcConfigUpdate::= CHOICE {
    init-eNB   ProtocolIE-Container {{ENB-ENDCConfigUpdateIEs}},
    init-en-gNB ProtocolIE-Container {{En-gNB-ENDCConfigUpdateIEs}},
    ...
}
ENB-ENBDCfgUpdateIEs X2AP-PROTOCOL-IES ::= {
  { ID id-CellAssistanceInformation  CRITICALITY reject TYPE CellAssistanceInformation       PRESENCE optional },
  { ID id-ServedEUTRAcellsENDCConfigUpd CRITICALITY reject TYPE ServedEUTRAcellsENDCConfigUpd  PRESENCE optional },
  { ID id-ServedEUTRAcellsToModifyListENDCConfUpd CRITICALITY reject TYPE ServedEUTRAcellsToModifyListENDCConfUpd  PRESENCE optional },
  { ID id-ServedEUTRAcellsToDeleteListENDCConfUpd CRITICALITY reject TYPE ServedEUTRAcellsToDeleteListENDCConfUpd  PRESENCE optional },
  ...
}

ServedEUTRAcellsToModifyListENDCConfUpd ::= SEQUENCE (SIZE (1.. maxCellineNB)) OF SEQUENCE {
  old-ECGI        ECGI,
  servedEUTRACellInfo    ServedCell-Information,
  nrNeighbourInfo      NRNeighbour-Information   OPTIONAL,
  iE-Extensions      ProtocolExtensionContainer { { ServedEUTRAcellsToModifyListENDCConfUpd-ExtIEs} } OPTIONAL,
  ...
}

ServedEUTRAcellsToDeleteListENDCConfUpd-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

En-gNB-ENBDCfgUpdateIEs X2AP-PROTOCOL-IES ::= {
  { ID id-ServedNRcellsENDCConfigUpdList  CRITICALITY reject TYPE ServedNRcellsENDCConfigUpdList  PRESENCE optional },
  { ID id-ServedNRcellsToModifyENDCConfUpdList  CRITICALITY reject TYPE ServedNRcellsToModifyENDCConfUpdList  PRESENCE optional },
  { ID id-ServedNRcellsToDeleteENDCConfUpdList  CRITICALITY reject TYPE ServedNRcellsToDeleteENDCConfUpdList  PRESENCE optional },
  ...
}

ServedNRcellsToModifyENDCConfUpdList ::= SEQUENCE (SIZE (1..maxCellinengNB)) OF ServedNRCellsToModify-Item

ServedNRCellsToModify-Item::= SEQUENCE {
  old-nrcgi      NRCGI,
  servedNRCellInformation    ServedNRCell-Information,
  nrNeighbourInformation   NRNeighbour-Information   OPTIONAL,
  nrDeactivationIndication   DeactivationIndication   OPTIONAL,
  iE-Extensions      ProtocolExtensionContainer { { ServedNRCellsToModify-Item-ExtIEs} } OPTIONAL,
  ...
}

ServedNRCellsToModify-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

ServedNRcellsToDeleteENDCConfUpdList ::= SEQUENCE (SIZE (1..maxCellinengNB)) OF NRCGI

-- ************************************************************
-- EN-DC CONFIGURATION UPDATE ACKNOWLEDGE
-- ************************************************************

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

ENDCConfigurationUpdateAcknowledge-IEs X2AP-PROTOCOL-IES ::= {
   { ID id-RespondingNodeType-EndcConfigUpdate CRITICALITY reject TYPE RespondingNodeType-EndcConfigUpdate PRESENCE mandatory},
   ...
}

RespondingNodeType-EndcConfigUpdate ::= CHOICE {
   respond-eNB ProtocolIE-Container {{ENB-ENDCConfigUpdateAckIEs}},
   respond-en-gNB ProtocolIE-Container {{En-gNB-ENDCConfigUpdateAckIEs}},
   ...
}

ENB-ENDCConfigUpdateAckIEs X2AP-PROTOCOL-IES ::= {
   ...
}

En-gNB-ENDCConfigUpdateAckIEs X2AP-PROTOCOL-IES ::= {
   { ID id-ServedNRcellsENDCX2ManagementList CRITICALITY reject TYPE ServedNRcellsENDCX2ManagementList PRESENCE optional},
   ...
}

-- **********************************************
-- EN-DC CONFIGURATION UPDATE FAILURE
-- **********************************************

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

ENDCConfigurationUpdateFailure-IEs X2AP-PROTOCOL-IES ::= {
   { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|
   { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},
   ...
}

-- **********************************************
-- EN-DC CELL ACTIVATION REQUEST
-- **********************************************

ENDCCellActivationRequest ::= SEQUENCE {
   protocolIEs ProtocolIE-Container {{ENDCCellActivationRequest-IEs}},
   ...
}
ENDCCellActivationRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ServedNRCellsToActivate CRITICALITY reject TYPE ServedNRCellsToActivate PRESENCE mandatory},
  { ID id-ActivationID CRITICALITY reject TYPE ActivationID PRESENCE mandatory},
  ...
}

ServedNRCellsToActivate ::= SEQUENCE (SIZE (1.. maxCellinengNB)) OF ServedNRCellsToActivate-Item

ServedNRCellsToActivate-Item ::= SEQUENCE {
  nrCellID NRCSI,
  iE-Extensions ProtocolExtensionContainer ( { ServedNRCellsToActivate-Item-ExtIEs} ) OPTIONAL,
  ...
}

ServedNRCellsToActivate-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *********************************************************************************************
-- EN-DC CELL ACTIVATION RESPONSE
-- *********************************************************************************************

ENDCCellActivationResponse ::= SEQUENCE {
  protocolIEs ProtocolIE-Container ( {ENDCCellActivationResponse-IEs} ),
  ...
}

ENDCCellActivationResponse-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ActivatedNRCellList CRITICALITY ignore TYPE ActivatedNRCellList PRESENCE mandatory},
  { ID id-ActivationID CRITICALITY reject TYPE ActivationID PRESENCE mandatory},
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},
  ...
}

ActivatedNRCellList ::= SEQUENCE (SIZE (1.. maxCellinengNB)) OF ActivatedNRCellList-Item

ActivatedNRCellList-Item ::= SEQUENCE {
  nrCellID NRCSI,
  iE-Extensions ProtocolExtensionContainer ( { ActivatedNRCellList-Item-ExtIEs} ) OPTIONAL,
  ...
}

ActivatedNRCellList-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *********************************************************************************************
-- EN-DC CELL ACTIVATION FAILURE
-- *********************************************************************************************
-- **************************************************************************************

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

ENDCellActivationFailure-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-ActivationID     CRITICALITY reject  TYPE ActivationID     PRESENCE mandatory }|
  { ID id-Cause      CRITICALITY ignore  TYPE Cause      PRESENCE mandatory }|
  { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics  PRESENCE optional },
  ...
}

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

-- SECONDARY RAT DATA USAGE REPORT

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

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

SecondaryRATDataUsageReport-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID      CRITICALITY reject  TYPE UE-X2AP-ID        PRESENCE mandatory }|
  { ID id-SgNB-UE-X2AP-ID      CRITICALITY reject  TYPE SgNB-UE-X2AP-ID       PRESENCE mandatory }|
  { ID id-SecondaryRATUsageReportList   CRITICALITY reject  TYPE SecondaryRATUsageReportList   PRESENCE mandatory },
  ...
}

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

SgNBActivityNotification-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-MeNB-UE-X2AP-ID      CRITICALITY reject  TYPE UE-X2AP-ID        PRESENCE mandatory }|
  { ID id-SgNB-UE-X2AP-ID      CRITICALITY reject  TYPE SgNB-UE-X2AP-ID       PRESENCE mandatory }|
  { ID id-UEContextLevelUserPlaneActivity  CRITICALITY reject  TYPE UserPlaneTrafficActivityReport  PRESENCE mandatory }|
  { ID id-ERABActivityNotifyItemList   CRITICALITY reject  TYPE ERABActivityNotifyItemList   PRESENCE mandatory },
  ...
}

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

-- EN-DC PARTIAL RESET REQUIRED

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

ENDCPartialResetRequired ::= SEQUENCE {


protocolIEs ProtocolIE-Container {{ENDCPartialResetRequired-IEs}},
...

ENDCPartialResetRequired-IEs X2AP-PROTOCOL-IEs ::= {
    { ID id-UEs-ToBeReset CRITICALITY reject TYPE UEsToBeResetList PRESENCE mandatory },
    { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory },
    ...
}

-- ************************************************************
-- EN-DC PARTIAL RESET CONFIRM
-- ************************************************************

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

ENDCPartialResetConfirm-IEs X2AP-PROTOCOL-IEs ::= {
    { ID id-UEs-Admitted-ToBeReset CRITICALITY reject TYPE UEsToBeResetList PRESENCE mandatory },
    ...
}

-- ************************************************************
-- E-UTRA - NR CELL RESOURCE COORDINATION REQUEST
-- ************************************************************

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

EUTRANRCellResourceCoordinationRequest-IEs X2AP-PROTOCOL-IEs ::= {
    { ID id-InitiatingNodeType-EutranrCellResourceCoordination CRITICALITY reject TYPE InitiatingNodeType-EutranrCellResourceCoordination PRESENCE mandatory },
    ...
}

InitiatingNodeType-EutranrCellResourceCoordination ::= CHOICE {
    initiate-eNB ProtocolIE-Container {{ENB-EUTRA-NRCellResourceCoordinationReqIEs}},
    initiate-en-gNB ProtocolIE-Container {{En-gNB-EUTRA-NRCellResourceCoordinationReqIEs}},
    ...
}

ENB-EUTRA-NRCellResourceCoordinationReqIEs X2AP-PROTOCOL-IEs ::= {
    { ID id-DataTrafficResourceIndication CRITICALITY reject TYPE DataTrafficResourceIndication PRESENCE mandatory },
    { ID id-SpectrumSharingGroupID CRITICALITY reject TYPE SpectrumSharingGroupID PRESENCE mandatory },
    { ID id-ListofEUTRACellsinEUTRACoordinationReq CRITICALITY reject TYPE ListofEUTRACellsinEUTRACoordinationReq PRESENCE mandatory },
    ...
}
En-gNB-EUTRA-NRCellResourceCoordinationReqIEs X2AP-PROTOCOL-IES ::= {
    { ID id-DataTrafficResourceIndication CRITICALITY reject TYPE DataTrafficResourceIndication PRESENCE mandatory }|
    { ID id-ListofEUTRACellsinNRCoordinationReq CRITICALITY reject TYPE ListofEUTRACellsinNRCoordinationReq PRESENCE mandatory }|
    { ID id-SpectrumSharingGroupID CRITICALITY reject TYPE SpectrumSharingGroupID PRESENCE mandatory }|
    { ID id-ListofNRCellsinNRCoordinationReq CRITICALITY reject TYPE ListofNRCellsinNRCoordinationReq PRESENCE mandatory },
...

ListofEUTRACellsinEUTRACoordinationReq ::= SEQUENCE (SIZE (0..maxCellineNB)) OF ECGI
ListofEUTRACellsinNRCoordinationReq ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ECGI
ListofNRCellsinNRCoordinationReq ::= SEQUENCE (SIZE (0..maxnoNRcellsSpectrumSharingWithE-UTRA)) OF NRCGI

-- ******************************************************
-- E-UTRA - NR CELL RESOURCE COORDINATION RESPONSE
-- ******************************************************

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

EUTRANRCellResourceCoordinationResponse-IEs X2AP-PROTOCOL-IES ::= {
    { ID id-RespondingNodeType-EutranrCellResourceCoordination CRITICALITY reject TYPE RespondingNodeType-EutranrCellResourceCoordination
      PRESENCE mandatory },
...

RespondingNodeType-EutranrCellResourceCoordination ::= CHOICE {
    respond-eNB ProtocolIE-Container {{ENB-EUTRA-NRCellResourceCoordinationReqAckIEs}},
    respond-en-gNB ProtocolIE-Container {{En-gNB-EUTRA-NRCellResourceCoordinationReqAckIEs}},
...

ENB-EUTRA-NRCellResourceCoordinationReqAckIEs X2AP-PROTOCOL-IES ::= {
    { ID id-DataTrafficResourceIndication CRITICALITY reject TYPE DataTrafficResourceIndication PRESENCE mandatory }|
    { ID id-SpectrumSharingGroupID CRITICALITY reject TYPE SpectrumSharingGroupID PRESENCE mandatory }|
    { ID id-ListofEUTRACellsinEUTRACoordinationResp CRITICALITY reject TYPE ListofEUTRACellsinEUTRACoordinationResp PRESENCE mandatory },
...

En-gNB-EUTRA-NRCellResourceCoordinationReqAckIEs X2AP-PROTOCOL-IES ::= {
    { ID id-DataTrafficResourceIndication CRITICALITY reject TYPE DataTrafficResourceIndication PRESENCE mandatory }|
    { ID id-SpectrumSharingGroupID CRITICALITY reject TYPE SpectrumSharingGroupID PRESENCE mandatory }|
    { ID id-ListofNRCellsinNRCoordinationResp CRITICALITY reject TYPE ListofNRCellsinNRCoordinationResp PRESENCE mandatory },
ListofEUTRACellsinEUTRACoordinationResp ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ECGI
ListofNRCellsinNRCoordinationResp ::= SEQUENCE (SIZE (1..maxnoNRcellsSpectrumSharingWithE-UTRA)) OF NRCGI

-- ************************************************************
-- EN-DC X2 REMOVAL REQUEST
-- ************************************************************

ENDCX2RemovalRequest ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{ENDCX2RemovalRequest-IEs}},
  ...
}

ENDCX2RemovalRequest-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-InitiatingNodeType-EndcX2Removal CRITICALITY reject TYPE InitiatingNodeType-EndcX2Removal PRESENCE mandatory},
  ...
}

InitiatingNodeType-EndcX2Removal ::= CHOICE {
  init-eNB ProtocolIE-Container {{ENB-ENDCX2RemovalReqIEs}},
  init-en-gNB ProtocolIE-Container {{En-gNB-ENDCX2RemovalReqIEs}},
  ...
}

ENB-ENDCX2RemovalReqIEs X2AP-PROTOCOL-IES ::= {
  { ID id-GlobalENB-ID CRITICALITY reject TYPE GlobalENB-ID PRESENCE mandatory},
  ...
}

En-gNB-ENDCX2RemovalReqIEs X2AP-PROTOCOL-IES ::= {
  { ID id-Globalen-gNB-ID CRITICALITY reject TYPE GlobalGNB-ID PRESENCE mandatory},
  ...
}

-- ************************************************************
-- EN-DC X2 REMOVAL RESPONSE
-- ************************************************************

ENDCX2RemovalResponse ::= SEQUENCE {
  protocolIEs ProtocolIE-Container {{ENDCX2RemovalResponse-IEs}},
  ...
}

ENDCX2RemovalResponse-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-RespondingNodeType-EndcX2Removal CRITICALITY reject TYPE RespondingNodeType-EndcX2Removal PRESENCE mandatory},
  ...
}
RespondingNodeType-EndcX2Removal ::= CHOICE {
  respond-eNB  ProtocolIE-Container {{ENB-ENDCX2RemovalReqAckIEs}},
  respond-en-gNB  ProtocolIE-Container {{En-gNB-ENDCX2RemovalReqAckIEs}},
  ...
}

ENB-ENDCX2RemovalReqAckIEs X2AP-PROTOCOL-IES ::= {
  { ID id-GlobalENB-ID        CRITICALITY reject TYPE GlobalENB-ID          PRESENCE mandatory},
  ...
}

En-gNB-ENDCX2RemovalReqAckIEs X2AP-PROTOCOL-IES ::= {
  { ID id-Globalen-gNB-ID       CRITICALITY reject TYPE GlobalGNB-ID          PRESENCE mandatory},
  ...
}

-- **************************************************************
-- EN-DC X2 REMOVAL FAILURE
-- **************************************************************
ENDCX2RemovalFailure ::= SEQUENCE {
  protocolIEs  ProtocolIE-Container {{ENDCX2RemovalFailure-IEs}},
  ...
}
ENDCX2RemovalFailure-IEs X2AP-PROTOCOL-IES ::= {
  { ID id-Cause     CRITICALITY ignore  TYPE Cause        PRESENCE mandatory |}
  { ID id-CriticalityDiagnostics CRITICALITY ignore  TYPE CriticalityDiagnostics    PRESENCE optional },
  ...
}

END

9.3.5 Information Element definitions

-- **************************************************************
-- Information Element Definitions
-- **************************************************************

X2AP-IEs {
  itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
  eps-Access (21) modules (3) x2ap (2) version1 (1) x2ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::= BEGIN
 IMPORTS
id-E-RAB-Item,
id-Number-of-Antennaports,
id-MBSFN-Subframe-Info,
id-FRACH-Configuration,
id-CSG-Id,
id-MDTConfiguration,
id-SignallingBasedMDTPLMNList,
id-MultibandInfoList,
id-FreqBandIndicatorPriority,
id-NeighbourTAC,
id-Time-UE-StayedInCell-EnhancedGranularity,
id-MGMS-Service-Area-List,
id-HO-cause,
id-eARFCNExtension,
id-DL-EARFCNExtension,
id-UL-EARFCNExtension,
id-M3Configuration,
id-M4Configuration,
id-M5Configuration,
id-MDT-Location-Info,
id-NRrestriction,
id-AdditionalSpecialSubframe-Info,
id-UEID,
id-enhancedRNTP,
id-ProSeUEtoNetworkRelaying,
id-M6Configuration,
id-M7Configuration,
id-OffsetOfNbiotChannelNumberToDL-EARFCN,
id-OffsetOfNbiotChannelNumberToUL-EARFCN,
id-AdditionalSpecialSubframeExtension-Info,
id-BandwidthReducedS1,
id-extended-e-RAB-MaximumBitrateDL,
id-extended-e-RAB-MaximumBitrateUL,
id-extended-e-RAB-GuaranteedBitrateDL,
id-extended-e-RAB-GuaranteedBitrateUL,
id-extended-uAggregateMaximumBitRateDownlink,
id-extended-uAggregateMaximumBitRateUplink,
id-E-RABUsageReport-Item,
id-SecondaryRATUsageReport-Item,
id-UEAppLayerMeasConfig,
id-DL-scheduling-PDCCH-CCE-usage,
id-UL-scheduling-PDCCH-CCE-usage,
id-DownlinkPacketLossRate,
id-UplinkPacketLossRate,
id-serviceType,
id-ProtectedEUTRAResourceIndication,
id-NRS-NSSS-PowerOffset,
id-NSSS-NumOccasionDifferentPrecoder,
maxEARFCNPlusOne,
newmaxEARFCN,
maxInterfaces,

maxnoofBands,
maxnoofEPLMNs,
maxnoofCells,
maxnoofEPLMNs,
maxnoofEPLMNPlusOne,
maxnoofForblACs,
maxnoofForbTACs,
maxnoofNeighbours,
maxnoofFPRBs,
maxNrofErrors,
maxPools,
maxnoofMBMSFN,
maxnoofTAforMDT,
maxnoofCellIDforMDT,
maxnoofMBMSServiceAreaIdentities,
maxnoofMBMTPLMNs,
maxnoofCoMPHypothesisSet,
maxnoofCoMPCells,
maxUEReport,
maxCellReport,
maxnoofPFA,
maxCSIProcess,
maxCSIReport,
maxSubband,
maxnooftimeperiods,
maxnoofCellIDforQMC,
maxnoofTAforQMC,
maxnoofPLMNforQMC,
maxUEsinengNBDU,
maxnoofProtectedResourcePatterns,
maxnoNRcellsSpectrumSharingWithE-UTRA,
maxnoofNRcellBands

FROM X2AP-Constants

Criticality,
ProcedureCode,
ProtocolIE-ID,
TriggeringMessage

FROM X2AP-CommonDataTypes

ProtocolExtensionContainer{},
ProtocolIE-Single-Container{},

X2AP-PROTOCOL-EXTENSION,
X2AP-PROTOCOL-IES

FROM X2AP-Containers;

-- A
ABSInformation ::= CHOICE {
  fdd      ABSInformationFDD,
  tdd      ABSInformationTDD,
  abs-inactive      NULL,
  ...
}

ABSInformationFDD ::= SEQUENCE {
  abs-pattern-info      BIT STRING (SIZE(40)),
  numberOfCellSpecificAntennaPorts      ENUMERATED {one, two, four, ...},
  measurement-subset      BIT STRING (SIZE(40)),
  iE-Extensions      ProtocolExtensionContainer { { ABSInformationFDD-ExtIEs} } OPTIONAL,
  ...
}

ABSInformationTDD ::= SEQUENCE {
  abs-pattern-info      BIT STRING (SIZE(1..70, ...)),
  numberOfCellSpecificAntennaPorts      ENUMERATED {one, two, four, ...},
  measurement-subset      BIT STRING (SIZE(1..70, ...)),
  iE-Extensions      ProtocolExtensionContainer { { ABSInformationTDD-ExtIEs} } OPTIONAL,
  ...
}

ABS-Status ::= SEQUENCE {
  dL-ABS-status        DL-ABS-status,
  usableABSInformation      UsableABSInformation,
  iE-Extensions      ProtocolExtensionContainer { {ABS-Status-ExtIEs} } OPTIONAL,
  ...
}

ABS-Status-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

ActivationID ::= INTEGER (0..255)

AdditionalSpecialSubframe-Info ::= SEQUENCE {
  additionalSpecialSubframePatterns      AdditionalSpecialSubframePatterns,
  cyclicPrefixDL      CyclicPrefixDL,
  cyclicPrefixUL      CyclicPrefixUL,
  iE-Extensions      ProtocolExtensionContainer { { AdditionalSpecialSubframe-Info-ExtIEs} } OPTIONAL,
  ...
}

AdditionalSpecialSubframe-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
|spp0,|spp1,|spp2,|spp3,|spp4,|spp5,|spp6,|spp7,|spp8,|spp9,|spp10,|

\[\text{AdditionalSpecialSubframePatterns} ::= \text{ENUMERATED} {\text{spp0, spp1, spp2, spp3, spp4, spp5, spp6, spp7, spp8, spp9, spp10, ...}}\]

\[
\text{AdditionalSpecialSubframeExtension-Info} ::= \text{SEQUENCE} {\text{additionalspecialSubframePatternsExtension AdditionalspecialSubframePatternsExtension, cyclicPrefixDL CyclicPrefixDL, cyclicPrefixUL CyclicPrefixUL, iE-Extensions ProtocolExtensionContainer} {\text{AdditionalSpecialSubframeExtension-Info-ExtIEs}} \text{OPTIONAL, ...}}\]

\[
\text{AdditionalSpecialSubframeExtension-Info-ExtIEs X2AP-PROTOCOL-EXTENSION} ::= {\text{...}}\]

\[
\text{AerialUEsubscriptionInformation ::= \text{ENUMERATED} {\text{allowed, not-allowed, ...}}\}
\]

\[
\text{AllocationAndRetentionPriority ::= \text{SEQUENCE} {\text{priorityLevel PriorityLevel, pre-emptionCapability Pre-emptionCapability, pre-emptionVulnerability Pre-emptionVulnerability, iE-Extensions ProtocolExtensionContainer} {\text{AllocationAndRetentionPriority-ExtIEs}} \text{OPTIONAL, ...}}\]

\[
\text{AllocationAndRetentionPriority-ExtIEs X2AP-PROTOCOL-EXTENSION} ::= {\text{...}}\]

\[
\text{AreaScopeOfMDT ::= \text{CHOICE} {\text{cellBased CellBasedMDT, tABased TABasedMDT, ...}}\}
\]
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AreaScopeOfQMC ::= CHOICE {
    cellBased    CellBasedQMC,
    TAIBased     TAIBasedQMC,
    TAIBasedMDT  TAIBasedQMC,
    pLMNAreaBased PLMNAreaBasedQMC,
    ...
}

AS-SecurityInformation ::= SEQUENCE {
    key-eNodeB-star  Key-eNodeB-Star,
    nextHopChainingCount   NextHopChainingCount,
    iE-Extensions      ProtocolExtensionContainer ( { AS-SecurityInformation-ExtIEs} ) OPTIONAL,
    ...
}

AS-SecurityInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- B

BandwidthReducedSI::= ENUMERATED {
    scheduled,
    ...
}

BearerType ::= ENUMERATED {
    non-IP,
    ...
}

BenefitMetric ::= INTEGER (-101..100, ...)

BitRate ::= INTEGER (0..10000000000)

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

-- C

CapacityValue ::= INTEGER (0..100)

Cause ::= CHOICE {
    radioNetwork    CauseRadioNetwork,
    transport      CauseTransport,
    protocol        CauseProtocol,
    misc            CauseMisc,
    ...
}
CauseMisc ::= ENUMERATED {
  control-processing-overload,
  hardware-failure,
  cm-intervention,
  not-enough-user-plane-processing-resources,
  unspecified,
  ...
}

CauseProtocol ::= ENUMERATED {
  transfer-syntax-error,
  abstract-syntax-error-reject,
  abstract-syntax-error-ignore-and-notify,
  message-not-compatible-with-receiver-state,
  semantic-error,
  unspecified,
  abstract-syntax-error-falsely-constructed-message,
  ...
}

CauseRadioNetwork ::= ENUMERATED {
  handover-desirable-for-radio-reasons,
  time-critical-handover,
  resource-optimisation-handover,
  reduce-load-in-serving-cell,
  partial-handover,
  unknown-new-eNB-UE-X2AP-ID,
  unknown-old-eNB-UE-X2AP-ID,
  unknown-pair-of-UE-X2AP-ID,
  ho-target-not-allowed,
  tx2relocoverall-expiry,
  trelocprep-expiry,
  cell-not-available,
  no-radio-resources-available-in-target-cell,
  invalid-MME-GroupID,
  unknown-MME-Code,
  encryption-and-or-integrity-protection-algorithms-not-supported,
  reportCharacteristicsEmpty,
  noReportPeriodicity,
  existingMeasurementID,
  unknown-eNB-Measurement-ID,
  measurement-temporarily-not-available,
  unspecified,
  ...
}

load-balancing,
handover-optimisation,
value-out-of-allowed-range,
multiple-E-RAB-ID-instances,
switch-off-ongoing,
not-supported-QCI-value,
measurement-not-supported-for-the-object,
tDCoverall-expiry,
tDCprep-expiry,
action-desirable-for-radio-reasons,
reduce-load,
resource-optimisation,
time-critical-action,
target-not-allowed,
o-radio-resources-available,
invalid-QoS-combination,
encryption-algorithms-not-supported,
procedure-cancelled,
rrM-purpose,
without-user-bit-rate,
user-inactivity,
radio-connection-with-UE-lost,
failure-in-the-radio-interface-procedure,
bearer-option-not-supported,
mCG-Mobility,
sCG-Mobility,
count-reaches-max-value,
unknown-old-en-gNB-UE-X2AP-ID,
pDCP-Overload
}
CauseTransport ::= ENUMERATED {
  transport-resource-unavailable,
  unspecified,
  ...
}
CellBasedMDT ::= SEQUENCE {
  cellIdListforMDT CellIdListforMDT,
  iE-Extensions  ProtocolExtensionContainer { {CellBasedMDT-ExtIEs} } OPTIONAL,
  ...
}
CellBasedMDT-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
CellBasedQMC ::= SEQUENCE {
  cellIdListforQMC CellIdListforQMC,
  iE-Extensions  ProtocolExtensionContainer { {CellBasedQMC-ExtIEs} } OPTIONAL,
  ...
}
CellBasedQMC-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
CellCapacityClassValue ::= INTEGER {1..100, ...}
CellDeploymentStatusIndicator ::= ENUMERATED {pre-change-notification, ...}
CellIdListforMDT ::= SEQUENCE (SIZE(1..maxnoofCellIDforMDT)) OF ECGI
CellIdListforQMC ::= SEQUENCE (SIZE(1..maxnoofCellIDforQMC)) OF ECGI

CellReplacingInfo ::= SEQUENCE {
  replacingCellsList  ReplacingCellsList,
  iE-Extensions       ProtocolExtensionContainer { { CellReplacingInfo-ExtIEs}} OPTIONAL,
  ...
}

CellReplacingInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CellReportingIndicator ::= ENUMERATED {stop-request, ...}

Cell-Size ::= ENUMERATED {verysmall, small, medium, large, ...}

CellType ::= SEQUENCE {
  cell-Size        Cell-Size,
  iE-Extensions    ProtocolExtensionContainer { { CellType-ExtIEs}} OPTIONAL,
  ...
}

CellType-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CoMPHypothesisSet ::= SEQUENCE (SIZE(1..maxnoofCoMPCells)) OF CoMPHypothesisSetItem

CoMPHypothesisSetItem ::= SEQUENCE {
  coMPCellID       ECGI,
  coMPHypothesis   BIT STRING (SIZE(6..4400, ...)),
  iE-Extensions    ProtocolExtensionContainer { { CoMPHypothesisSetItem-ExtIEs} } OPTIONAL,
  ...
}

CoMPHypothesisSetItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CoMPInformation ::= SEQUENCE {
  coMPInformationItem CoMPInformationItem,
  coMPInformationStartTime CoMPInformationStartTime,
  iE-Extensions ProtocolExtensionContainer { { CoMPInformation-ExtIEs} } OPTIONAL,
  ...
}

CoMPInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CoMPInformationItem ::= SEQUENCE (SIZE(1..maxnoofCoMPHypothesisSet)) OF SEQUENCE {
coMPHypothesisSet
benefitMetric
iE-Extensions
ProtocolExtensionContainer { { CoMPInformationItem-ExtIEs} } OPTIONAL,
...)

CoMPInformationItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CoMPInformationStartTime ::= SEQUENCE (SIZE(0..1)) OF
  SEQUENCE {
    startSFN       INTEGER (0..1023, ...),
    startSubframeNumber     INTEGER (0..9, ...),
    iE-Extensions      ProtocolExtensionContainer { { CoMPInformationStartTime-ExtIEs} } OPTIONAL,
    ...
  }

CoMPInformationStartTime-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CompositeAvailableCapacity ::= SEQUENCE {
  cellCapacityClassValue       CellCapacityClassValue    OPTIONAL,
  capacityValue         CapacityValue,  iE-Extensions         ProtocolExtensionContainer { { CompositeAvailableCapacity-ExtIEs} } OPTIONAL,
  ...
}

CompositeAvailableCapacity-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CompositeAvailableCapacityGroup ::= SEQUENCE {
  dL-CompositeAvailableCapacity     CompositeAvailableCapacity,
  uL-CompositeAvailableCapacity     CompositeAvailableCapacity,
  iE-Extensions         ProtocolExtensionContainer { { CompositeAvailableCapacityGroup-ExtIEs} } OPTIONAL,
  ...
}

CompositeAvailableCapacityGroup-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

Correlation-ID ::= OCTET STRING (SIZE (4))

COUNTvalue ::= SEQUENCE {
  pDCP-SN     PDCP-SN,
  hFN      HFN,
  iE-Extensions         ProtocolExtensionContainer { { COUNTvalue-ExtIEs} } OPTIONAL,
  ...
}

COUNTvalue-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
COUNTValueExtended ::= SEQUENCE {
  pDCP-SNExtended        PDCP-SNExtended,
  hFNModified            HFNModified,
  iE-Extensions          ProtocolExtensionContainer { { COUNTValueExtended-ExtIEs} } OPTIONAL,
  ...
}

COUNTValueExtended-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

COUNTvaluePDCP-SNlength18 ::= SEQUENCE {
  pDCP-SNlength18        PDCP-SNlength18,
  hFNforPDCP-SNlength18   HFNforPDCP-SNlength18,
  iE-Extensions          ProtocolExtensionContainer { { COUNTvaluePDCP-SNlength18-ExtIEs} } OPTIONAL,
  ...
}

COUNTvaluePDCP-SNlength18-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CoverageModificationList ::= SEQUENCE (SIZE (1..maxCellineNB)) OF CoverageModification-Item

CoverageModification-Item ::= SEQUENCE {
  eCGI                  ECGI,
  coverageState         INTEGER (0..15, ...),
  cellDeploymentStatusIndicator CellDeploymentStatusIndicator OPTIONAL,
  cellReplacingInfo      CellReplacingInfo OPTIONAL,
  -- Included in case the Cell Deployment Status Indicator IE is present
  ...
}

CriticalityDiagnostics ::= SEQUENCE {
  procedureCode          ProcedureCode OPTIONAL,
  triggeringMessage      TriggeringMessage OPTIONAL,
  procedureCriticality   Criticality OPTIONAL,
  iEsCriticalityDiagnostics CriticalityDiagnostics-IE-List OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { {CriticalityDiagnostics-ExtIEs} } OPTIONAL,
  ...
}

CriticalityDiagnostics-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1..maxNrOfErrors)) OF SEQUENCE {
  iECriticality         Criticality,
  iE-ID                 ProtocolIE-ID,
  ...
}
typeOfError    TypeOfError,
iE-Extensions   ProtocolExtensionContainer { {CriticalityDiagnostics-IE-List-ExtIEs} } OPTIONAL,
    ...
}

CriticalityDiagnostics-IE-List-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

CRNTI ::= BIT STRING (SIZE (16))

CSGMembershipStatus ::= ENUMERATED {
    member,
    not-member
}

CSG-Id ::= BIT STRING (SIZE (27))

CSIReportList ::= SEQUENCE (SIZE(1..maxUEReport)) OF
    SEQUENCE {
        uEID       UEID,
        cSIReportPerCSIProcess  CSIReportPerCSIProcess,
        iE-Extensions   ProtocolExtensionContainer { { CSIReportList-ExtIEs} } OPTIONAL,
        ...
    }

CSIReportList-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

CSIReportPerCSIProcess ::= SEQUENCE (SIZE(1.. maxCSIProcess)) OF
    SEQUENCE {
        cSIProcessConfigurationIndex INTEGER (1..7, ...),
        cSIReportPerCSIProcessItem  CSIReportPerCSIProcessItem,
        iE-Extensions     ProtocolExtensionContainer { { CSIReportPerCSIProcess-ExtIEs} } OPTIONAL,
        ...
    }

CSIReportPerCSIProcess-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

CSIReportPerCSIProcessItem ::= SEQUENCE (SIZE(1.. maxCSIReport)) OF
    SEQUENCE {
        rI        INTEGER (1..8, ...),
        widebandCQI      WidebandCQI,
        subbandSize      SubbandSize,
        subbandCQIList   SubbandCQIList OPTIONAL,
        iE-Extensions     ProtocolExtensionContainer { { CSIReportPerCSIProcessItem-ExtIEs} } OPTIONAL,
        ...
    }

CSIReportPerCSIProcessItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}
CyclicPrefixDL ::= ENUMERATED {
    normal,
    extended,
    ... 
}

CyclicPrefixUL ::= ENUMERATED {
    normal,
    extended,
    ... 
}

DataTrafficResources ::= BIT STRING (SIZE(12..8800))

DataTrafficResourceIndication ::= SEQUENCE {
    activationSFN INTEGER (0..1023),
    sharedResourceType SharedResourceType,
    reservedSubframePattern ReservedSubframePattern OPTIONAL,
    ... 
}

DeactivationIndication ::= ENUMERATED {
    deactivated,
    ... 
}

DeliveryStatus ::= SEQUENCE {
    highestSuccessDeliveredPDCPSN INTEGER (0..4095),
    iE-Extensions ProtocolExtensionContainer { {DeliveryStatus-ExtIEs} } OPTIONAL,
    ... 
}

DeliveryStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ... 
}

DL-ABS-status ::= INTEGER (0..100)

DL-Forwarding ::= ENUMERATED {
    dl-forwardingProposed,
    ... 
}

DL-GBR-PRB-usage ::= INTEGER (0..100)

DL-non-GBR-PRB-usage ::= INTEGER (0..100)
DLResourceBitmapULandDLSharing ::= DataTrafficResources

DLResourcesULandDLSharing ::= CHOICE {
  unchanged    NULL,
  changed     DLResourceBitmapULandDLSharing,
  ...
}

DL-scheduling-PDCCH-CCE-usage::= INTEGER (0..100)

DL-Total-PRB-usage::= INTEGER (0..100)

DRB-ID ::= INTEGER (1..32)

DynamicDLTransmissionInformation ::= CHOICE {
  naics-active    DynamicNAICSInformation,
  naics-inactive  NULL,
  ...
}

DynamicNAICSInformation ::= SEQUENCE {
  transmissionModes       BIT STRING (SIZE(8)) OPTIONAL,
  pB-information         INTEGER(0..3) OPTIONAL,
  pA-list                SEQUENCE (SIZE(0..maxnoofPA)) OF PA-Values,
  iE-Extensions           ProtocolExtensionContainer { {DynamicNAICSInformation-ExtIEs} } OPTIONAL,
  ...
}

DynamicNAICSInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- E

EARFCN ::= INTEGER (0..maxEARFCN)

EARFCNExtension ::= INTEGER(maxEARFCNPlusOne..newmaxEARFCN, ...)

ECGI ::= SEQUENCE {
  pLMN-Identity     PLMN-Identity,
  eUTRANcellIdentifier  EUTRANCellIdentifier,
  iE-Extensions       ProtocolExtensionContainer { {ECGI-ExtIEs} } OPTIONAL,
  ...
}

ECGI-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

EnhancedRNTP ::= SEQUENCE {
  enhancedRNTPBitmap   BIT STRING (SIZE(12..8800, ...)),
  rNTP-High-Power-Threshold RNTP-Threshold,
  enhancedRNTPStartTime EnhancedRNTPStartTime OPTIONAL,
  iE-Extensions         ProtocolExtensionContainer { { EnhancedRNTP-ExtIEs} } OPTIONAL,
  ...
}
EnhancedRNTP-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

EnhancedRNTPStartTime ::= SEQUENCE {
  startSFN INTEGER (0..1023, ...),
  startSubframeNumber INTEGER (0..9, ...),
  iE-Extensions ProtocolExtensionContainer { { EnhancedRNTPStartTime-ExtIEs} } OPTIONAL,
  ...
}

EnhancedRNTPStartTime-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

ENB-ID ::= CHOICE {
  macro-eNB-ID BIT STRING (SIZE (20)),
  home-eNB-ID BIT STRING (SIZE (28)),
  ...
  short-Macro-eNB-ID BIT STRING (SIZE (18)),
  long-Macro-eNB-ID BIT STRING (SIZE (21))
}

EncryptionAlgorithms ::= BIT STRING (SIZE (16, ...))

EN-DC-ResourceConfiguration ::= SEQUENCE {
  pDCPatsgNB ENUMERATED {present, not-present, ...},
  mCGresources ENUMERATED {present, not-present, ...},
  sCGresources ENUMERATED {present, not-present, ...},
  iE-Extensions ProtocolExtensionContainer { { EN-DC-ResourceConfigurationExtIEs} } OPTIONAL,
  ...
}

EN-DC-ResourceConfigurationExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

EPLMNs ::= SEQUENCE (SIZE (1..maxnoofEPLMNs)) OF PLMN-Identity

ERABActivityNotifyItemList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ERABActivityNotifyItem

ERABActivityNotifyItem ::= SEQUENCE {
  e-RAB-ID E-RAB-ID,
  activityReport UserPlaneTrafficActivityReport,
  iE-Extensions ProtocolExtensionContainer { {ERABActivityNotifyItem-ExtIEs} } OPTIONAL,
  ...
}

ERABActivityNotifyItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
E-RAB-ID ::= INTEGER (0..15, ...)

E-RAB-Level-QoS-Parameters ::= SEQUENCE {
    qCI        QCI,
    allocationAndRetentionPriority AllocationAndRetentionPriority,
    gbrQosInformation GBR-QosInformation OPTIONAL,
    iE-Extensions    ProtocolExtensionContainer { { E-RAB-Level-QoS-Parameters-ExtIEs} } OPTIONAL,
    ...}

E-RAB-Level-QoS-Parameters-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    -- Extended for introduction of downlink and uplink packet loss rate for enhanced Voice performance --
    { ID id-DownlinkPacketLossRate   CRITICALITY ignore EXTENSION Packet-LossRate  PRESENCE optional},
    { ID id-UplinkPacketLossRate   CRITICALITY ignore EXTENSION Packet-LossRate  PRESENCE optional},
    ...}

E-RAB-List ::= SEQUENCE (SIZE(1.. maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RAB-ItemIEs} }

E-RAB-ItemIEs X2AP-PROTOCOL-IES ::= {
    { ID id-E-RAB-Item  CRITICALITY ignore  TYPE E-RAB-Item  PRESENCE mandatory },
    ...}

E-RAB-Item ::= SEQUENCE {
    e-RAB-ID    E-RAB-ID,
    cause      Cause,
    iE-Extensions    ProtocolExtensionContainer { {E-RAB-Item-ExtIEs} } OPTIONAL,
    ...}

E-RAB-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...}

E-RABUsageReportList ::= SEQUENCE (SIZE(1..maxnooftimeperiods)) OF ProtocolIE-Single-Container { {E-RABUsageReport-ItemIEs} }

E-RABUsageReport-ItemIEs X2AP-PROTOCOL-IES ::= {
    { ID id-E-RABUsageReport-Item  CRITICALITY ignore  TYPE E-RABUsageReport-Item  PRESENCE mandatory },
    ...}

E-RABUsageReport-Item ::= SEQUENCE {
    startTimeStamp    OCTET STRING (SIZE(4)),
    endTimeStamp     OCTET STRING (SIZE(4)),
    usageCountUL     INTEGER (0..18446744073709551615),
    usageCountDL     INTEGER (0..18446744073709551615),
    iE-Extensions    ProtocolExtensionContainer { { E-RABUsageReport-Item-ExtIEs} } OPTIONAL,
    ...}

E-RABUsageReport-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...}
EUTRA-Mode-Info ::= CHOICE {
  fDD  FDD-Info,
  tDD  TDD-Info,
  ...}

EUTRANCellIdentifier ::= BIT STRING (SIZE (28))

EUTRANTraceID ::= OCTET STRING (SIZE (8))

EventType ::= ENUMERATED{
  change-of-serving-cell,
  ...}

ExpectedUEBehaviour ::= SEQUENCE {
  expectedActivity ExpectedUEActivityBehaviour OPTIONAL,
  expectedHOInterval ExpectedHOInterval OPTIONAL,
  iE-Extensions ProtocolExtensionContainer {{ ExpectedUEBehaviour-ExtIEs} } OPTIONAL,
  ...}

ExpectedUEBehaviour-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...}

ExpectedUEActivityBehaviour ::= SEQUENCE {
  expectedActivityPeriod ExpectedActivityPeriod OPTIONAL,
  expectedIdlePeriod ExpectedIdlePeriod OPTIONAL,
  sourceOfUEActivityBehaviourInformation SourceOfUEActivityBehaviourInformation OPTIONAL,
  iE-Extensions ProtocolExtensionContainer {{ ExpectedUEActivityBehaviour-ExtIEs} } OPTIONAL,
  ...}

ExpectedUEActivityBehaviour-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...}

ExpectedActivityPeriod ::= INTEGER (1..30|40|50|60|80|100|120|150|180|181,...)

ExpectedIdlePeriod ::= INTEGER (1..30|40|50|60|80|100|120|150|180|181,...)

ExpectedHOInterval ::= ENUMERATED {
  sec15, sec30, sec60, sec90, sec120, sec180, long-time,
  ...}

ExtendedULInterferenceOverloadInfo ::= SEQUENCE {
  associatedSubframes BIT STRING (SIZE (5)),
  extended-ul-InterferenceOverloadIndication UL-InterferenceOverloadIndication,
  iE-Extensions ProtocolExtensionContainer {{ ExtendedULInterferenceOverloadInfo-ExtIEs} } OPTIONAL,
ExtendedULInterferenceOverloadInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... 
}

ExtendedBitRate ::= INTEGER (10000000001..4000000000000,...)

-- F

FDD-Info ::= SEQUENCE {
  uL-EARFCN      EARFCN,
  dL-EARFCN      EARFCN,
  uL-Transmission-Bandwidth  Transmission-Bandwidth,
  dL- Transmission-Bandwidth Transmission-Bandwidth,
  iE-Extensions    ProtocolExtensionContainer { {FDD-Info-ExtIEs} } OPTIONAL,
  ...
}

FDD-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-UL-EARFCNExtension      CRITICALITY reject EXTENSION EARFCNExtension         PRESENCE optional}|
  { ID id-DL-EARFCNExtension      CRITICALITY reject EXTENSION EARFCNExtension         PRESENCE optional}|
  { ID id-OffsetOfNbiotChannelNumberToDL-EARFCN CRITICALITY reject EXTENSION OffsetOfNbiotChannelNumberToEARFCN PRESENCE optional}|
  { ID id-OffsetOfNbiotChannelNumberToUL-EARFCN CRITICALITY reject EXTENSION OffsetOfNbiotChannelNumberToEARFCN PRESENCE optional}|
  { ID id-NRS-NSSS-PowerOffset     CRITICALITY ignore EXTENSION NRS-NSSS-PowerOffset       PRESENCE optional}|
  { ID id-NSSS-NumOccasionDifferentPrecoder  CRITICALITY ignore EXTENSION NSSS-NumOccasionDifferentPrecoder PRESENCE optional},
  ...
}

ForbiddenInterRATs ::= ENUMERATED {
  all,
  geran,
  utran,
  cdma2000,
  ...
  geranandutran,
  cdma2000andutran
}

ForbiddenTAs ::= SEQUENCE (SIZE(1.. maxnoofEPLMN=PlusOne)) OF ForbiddenTAs-Item

ForbiddenTAs-Item ::= SEQUENCE {
  pLMN-Identity       PLMN-Identity,
  forbiddenTACs       ForbiddenTACs,
  iE-Extensions       ProtocolExtensionContainer { {ForbiddenTAs-Item-ExtIEs} } OPTIONAL,
  ...
}

ForbiddenTAs-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
ForbiddenTACs ::= SEQUENCE (SIZE(1..maxnoofForbTACs)) OF TAC

ForbiddenLAs ::= SEQUENCE (SIZE(1..maxnoofEPLMNsWithPlusOne)) OF ForbiddenLAs-Item

ForbiddenLAs-Item ::= SEQUENCE {
  pLMN-Identity  PLMN-Identity,
  forbiddenLACs   ForbiddenLACs,
  iE-Extensions   ProtocolExtensionContainer { {ForbiddenLAs-Item-ExtIEs} } OPTIONAL,
  ...
}

ForbiddenLAs-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

ForbiddenLACs ::= SEQUENCE (SIZE(1..maxnoofForbLACs)) OF LAC

Fourframes ::= BIT STRING (SIZE (24))

FreqBandIndicator ::= INTEGER (1..256, ...)

FreqBandIndicatorPriority ::= ENUMERATED {
  not-broadcasted,
  broadcasted,
  ...
}

FreqBandNrItem ::= SEQUENCE {
  freqBandIndicatorNr  INTEGER (1..1024,...),
  supportedSULBandList SEQUENCE (SIZE(0..maxnoofNrCellBands)) OF SupportedSULFreqBandItem,
  iE-Extensions   ProtocolExtensionContainer { {FreqBandNrItem-ExtIEs} } OPTIONAL,
  ...
}

FreqBandNrItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- 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 X2AP-PROTOCOL-EXTENSION ::= {
  -- Extension for maximum bitrate > 10Gbps --
  { ID id-extended-e-RAB-MaximumBitrateDL  CRITICALITY ignore EXTENSION ExtendedBitRate PRESENCE optional}|
  { ID id-extended-e-RAB-MaximumBitrateUL  CRITICALITY ignore EXTENSION ExtendedBitRate PRESENCE optional}|

GlobalENB-ID ::= SEQUENCE {
  plMN-Identity PLMN-Identity,
  eNB-ID ENB-ID,
  iE-Extensions ProtocolExtensionContainer { {GlobalENB-ID-ExtIEs} } OPTIONAL,
  ...
}

GlobalENB-ID-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

GlobalGNB-ID ::= SEQUENCE {
  plMN-Identity PLMN-Identity,
  gNB-ID GNB-ID,
  iE-Extensions ProtocolExtensionContainer { {GlobalGNB-ID-ExtIEs} } OPTIONAL,
  ...
}

GlobalGNB-ID-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

GTPtunnelEndpoint ::= SEQUENCE {
  transportLayerAddress TransportLayerAddress,
  gTP-TEI GTP-TEI,
  iE-Extensions ProtocolExtensionContainer { {GTPtunnelEndpoint-ExtIEs} } OPTIONAL,
  ...
}

GTPtunnelEndpoint-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

GTP-TEI ::= OCTET STRING (SIZE (4))

GUGroupIDList ::= SEQUENCE (SIZE (1..maxPools)) OF GU-Group-ID

GU-Group-ID ::= SEQUENCE {
  plMN-Identity PLMN-Identity,
  mME-Group-ID MME-Group-ID,
  iE-Extensions ProtocolExtensionContainer { {GU-Group-ID-ExtIEs} } OPTIONAL,
  ...
}

GU-Group-ID-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
GUMMEI ::= SEQUENCE {
    gU-Group-ID    GU-Group-ID,
    mME-Code    MME-Code,
    iE-Extensions    ProtocolExtensionContainer { {GUMMEI-ExtIEs} } OPTIONAL,
    ...
}

GUMMEI-ExtIES X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-ID ::= CHOICE {
    gNB-ID    BIT STRING (SIZE (22..32)),
    ...
}

-- H

HandoverReportType ::= ENUMERATED {
    hoTooEarly,
    hoToWrongCell,
    ...
    interRATpingpong
}

HandoverRestrictionList ::= SEQUENCE {
    servingPLMN    PLMN-Identity,
    equivalentPLMNs    EPLMNs    OPTIONAL,
    forbiddenTAs    ForbiddenTAs    OPTIONAL,
    forbiddenLAs    ForbiddenLAs    OPTIONAL,
    forbiddenInterRATs    ForbiddenInterRATs    OPTIONAL,
    iE-Extensions    ProtocolExtensionContainer { {HandoverRestrictionList-ExtIEs} } OPTIONAL,
    ...
}

HandoverRestrictionList-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    { ID id-NRrestriction CRITICALITY ignore EXTENSION NRrestriction PRESENCE optional},
    ...
}

HFN ::= INTEGER (0..1048575)

HFNModified ::= INTEGER (0..131071)

HFNforPDCP-SNlength18 ::= INTEGER (0..16383)

HWLoadIndicator ::= SEQUENCE {
    dLHWLoadIndicator    LoadIndicator,
    uLHWLoadIndicator    LoadIndicator,
    iE-Extensions    ProtocolExtensionContainer { { HWLoadIndicator-ExtIEs} } OPTIONAL,
    ...
}
HWLoadIndicator-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- I

IntegrityProtectionAlgorithms ::= BIT STRING (SIZE (16, ...))

InterfacesToTrace ::= BIT STRING (SIZE (8))

InvokeIndication ::= ENUMERATED{
  abs-information,
  ...
}

-- J

InterfacesToTrace ::= BIT STRING (SIZE (8))

InvokeIndication ::= ENUMERATED{
  abs-information,
  ...
}

-- K

Key-eNodeB-Star ::= BIT STRING (SIZE(256))

-- L

LAC ::= OCTET STRING (SIZE (2)) --(EXCEPT ('0000'H|'FFFE'H))

LastVisitedCell-Item ::= CHOICE {
  e-UTRAN-Cell LastVisitedEUTRANCellInformation,
  uTRAN-Cell LastVisitedUTRANCellInformation,
  gERAN-Cell LastVisitedGERANCellInformation,
  ...
}

LastVisitedEUTRANCellInformation ::= SEQUENCE {
  global-Cell-ID ECGI,
  cellType CellType,
  time-UE-StayedInCell Time-UE-StayedInCell,
  iE-Extensions ProtocolExtensionContainer { { LastVisitedEUTRANCellInformation-ExtIEs} } OPTIONAL,
  ...
}

LastVisitedEUTRANCellInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  -- Extension for Rel-11 to support enhanced granularity for time UE stayed in cell --
  { ID id-Time-UE-StayedInCell-EnhancedGranularity CRITICALITY ignore EXTENSION Time-UE-StayedInCell-EnhancedGranularity PRESENCE optional},
  { ID id-HO-cause CRITICALITY ignore EXTENSION Cause PRESENCE optional},
  ...
}

LastVisitedGERANCellInformation ::= CHOICE {
  undefined NULL,
  ...
}
LastVisitedUTRANCellInformation ::= OCTET STRING
LHN-ID ::= OCTET STRING(SIZE (32..256))
Links-to-log ::= ENUMERATED {uplink, downlink, both-uplink-and-downlink, ...}
LoadIndicator ::= ENUMERATED {
  lowLoad,
  mediumLoad,
  highLoad,
  overLoad,
  ...
}
LocationReportingInformation ::= SEQUENCE {
  eventType EventType,
  reportArea  ReportArea,
  iE-Extensions ProtocolExtensionContainer { {LocationReportingInformation-ExtIEs} } OPTIONAL,
  ...
}
LocationReportingInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
-- M
M1PeriodicReporting ::= SEQUENCE {
  reportInterval ReportIntervalMDT,
  reportAmount ReportAmountMDT,
  iE-Extensions ProtocolExtensionContainer { {M1PeriodicReporting-ExtIEs} } OPTIONAL,
  ...
}
M1PeriodicReporting-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
M1ReportingTrigger::= ENUMERATED{
  periodic,
  a2eventtriggered,
  ...
}
M1ThresholdEventA2 ::= SEQUENCE {
  measurementThreshold MeasurementThresholdA2,
  iE-Extensions ProtocolExtensionContainer { {M1ThresholdEventA2-ExtIEs} } OPTIONAL,
  ...
}
M1ThresholdEventA2-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
M3Configuration ::= SEQUENCE {
  m3period   M3period,
  iE-Extensions  ProtocolExtensionContainer :: { M3Configuration-ExtIEs} } OPTIONAL,
...
}

M3Configuration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { ... }

M3period ::= ENUMERATED {ms100, ms1000, ms10000, ... }

M4Configuration ::= SEQUENCE {
  m4period   M4period,
  m4-links-to-log  Links-to-log,
  iE-Extensions  ProtocolExtensionContainer :: { M4Configuration-ExtIEs} } OPTIONAL,
...
}

M4Configuration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { ... }

M4period ::= ENUMERATED {ms1024, ms2048, ms5120, ms10240, min1, ... }

M5Configuration ::= SEQUENCE {
  m5period   M5period,
  m5-links-to-log  Links-to-log,
  iE-Extensions  ProtocolExtensionContainer :: { M5Configuration-ExtIEs} } OPTIONAL,
...
}

M5Configuration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { ... }

M5period ::= ENUMERATED {ms1024, ms2048, ms5120, ms10240, min1, ... }

M6Configuration ::= SEQUENCE {
  m6report-interval M6report-interval,
  m6delay-threshold M6delay-threshold OPTIONAL,
-- This IE shall be present if the M6 Links to log IE is set to "uplink" or to "both-uplink-and-downlink" --
  m6-links-to-log  Links-to-log,
  iE-Extensions  ProtocolExtensionContainer :: { M6Configuration-ExtIEs} } OPTIONAL,
...
}

M6Configuration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { ... }

M6report-interval ::= ENUMERATED { ms1024, ms2048, ms5120, ms10240, ... }

M6delay-threshold ::= ENUMERATED { ms30, ms40, ms50, ms60, ms70, ms80, ms90, ms100, ms150, ms300, ms500, ms750, ... }

M7Configuration ::= SEQUENCE {
  m7period   M7period,
  m7-links-to-log Links-to-log,
  iE-Extensions ProtocolExtensionContainer { { M7Configuration-ExtIEs} } OPTIONAL,
  ... 
}

M7Configuration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... 
}

M7period ::= INTEGER(1..60, ...)

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

ManagementBasedMDTAllowed ::= ENUMERATED {allowed, ...}

Masked-IMEISV ::= BIT STRING (SIZE (64))

MDT-Activation ::= ENUMERATED {
  immediate-MDT-only,
  immediate-MDT-and-Trace,
  ... 
}

MDT-Configuration ::= SEQUENCE {
  mdt-Activation    MDT-Activation,
  areaScopeOfMDT AreaScopeOfMDT,
  measurementsToActivate MeasurementsToActivate,
  m1reportingTrigger MIReportingTrigger,
  m1thresholdEventA2 MIThresholdEventA2 OPTIONAL,
  -- Included in case of event-triggered, or event-triggered periodic reporting for measurement M1
  m1periodicReporting M1PeriodicReporting OPTIONAL,
  -- Included in case of periodic, or event-triggered periodic reporting for measurement M1
  iE-Extensions ProtocolExtensionContainer { { MDT-Configuration-ExtIEs} } OPTIONAL,
  ... 
}

MDT-Configuration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  {ID id-M3Configuration    CRITICALITY ignore EXTENSION M3Configuration  PRESENCE conditional}|
  {ID id-M4Configuration    CRITICALITY ignore EXTENSION M4Configuration  PRESENCE conditional}|
  {ID id-M5Configuration    CRITICALITY ignore EXTENSION M5Configuration  PRESENCE conditional}|
  {ID id-MDT-Location-Info  CRITICALITY ignore EXTENSION MDT-Location-Info  PRESENCE optional}|
  {ID id-SignallingBasedMDTPLMNList CRITICALITY ignore EXTENSION MDTPLMNList  PRESENCE optional}|
  {ID id-M6Configuration    CRITICALITY ignore EXTENSION M6Configuration  PRESENCE conditional}|
  {ID id-M7Configuration    CRITICALITY ignore EXTENSION M7Configuration  PRESENCE conditional},
  ...
}

MDTPLMNList ::= SEQUENCE (SIZE(1..maxnoofMDTPLMNs)) OF PLMN-Identity
MDT-Location-Info ::= BIT STRING (SIZE (8))
Measurement-ID ::= INTEGER (1..4095, ...)
MeasurementsToActivate ::= BIT STRING (SIZE (8))
MeasurementThresholdA2 ::= CHOICE {
  threshold-RSRP    Threshold-RSRP,
  threshold-RSRQ    Threshold-RSRQ,
  ... }
MeNBResourceCoordinationInformation ::= SEQUENCE {
  eUTRA-Cell-ID     ECGI,
  uLCoordinationInformation  BIT STRING (SIZE(6..4400, ...)),
  dLCoordinationInformation  BIT STRING (SIZE(6..4400, ...))  OPTIONAL,
  iE-Extensions     ProtocolExtensionContainer { { MeNBResourceCoordinationInformationExtIEs} }   OPTIONAL,
  ... }
MeNBResourceCoordinationInformationExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... }
MeNBtoSeNBContainer ::= OCTET STRING
MME-Group-ID ::= OCTET STRING (SIZE (2))
MME-Code ::= OCTET STRING (SIZE (1))
MBMS-Service-Area-Identity-List ::= SEQUENCE (SIZE(1.. maxnoofMBMSServiceAreaIdentities)) OF MBMS-Service-Area-Identity
MBMS-Service-Area-Identity ::= OCTET STRING (SIZE (2))
MBSFN-Subframe-Infolist ::= SEQUENCE (SIZE(1.. maxnoofMBSFN)) OF MBSFN-Subframe-Info
MBSFN-Subframe-Info ::= SEQUENCE {
  radioframeAllocationPeriod    RadioframeAllocationPeriod,
  subframeAllocation    SubframeAllocation,
  iE-Extensions     ProtocolExtensionContainer { { MBSFN-Subframe-Info-ExtIEs } }  OPTIONAL,
  ... }
MBSFN-Subframe-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... }
MobilityParametersModificationRange ::= SEQUENCE {
  handoverTriggerChangeLowerLimit INTEGER (-20..20),
  handoverTriggerChangeUpperLimit INTEGER (-20..20),
  ... }
MobilityParametersInformation ::= SEQUENCE {
    handoverTriggerChange   INTEGER {-20..20},
    ...}

MultibandInfoList ::= SEQUENCE (SIZE(1..maxnoofBands)) OF BandInfo

BandInfo ::= SEQUENCE {
    freqBandIndicator FreqBandIndicator,  
    iE-Extensions ProtocolExtensionContainer { { BandInfo-ExtIEs } } OPTIONAL, 
    ...}

BandInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

MeNBtoSgNBContainer ::= OCTET STRING

SplitSRBs ::= ENUMERATED (srbl, srb2, srb1and2, ...)

SplitSRB ::= SEQUENCE {
    rrcContainer RRCCContainer OPTIONAL,  
    srbType SRBType,  
    deliveryStatus DeliveryStatus OPTIONAL,  
    iE-Extensions ProtocolExtensionContainer { {SplitSRB-ExtIEs} } OPTIONAL, 
    ...}

SplitSRB-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

UENRMeasurement ::= SEQUENCE {
    uENRMeasurements RRCCcontainer, 
    iE-Extensions ProtocolExtensionContainer { {UENRMeasurement-ExtIEs} } OPTIONAL, 
    ...}

UENRMeasurement-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

Neighbour-Information ::= SEQUENCE (SIZE (0..maxnoofNeighbours)) OF SEQUENCE {
    eCGI ECGI, 
    pCI PCI, 
    eARFCN EARFCN, 
    iE-Extensions ProtocolExtensionContainer { {Neighbour-Information-ExtIEs} } OPTIONAL, 
    ...}

-- N
Neighbour-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-NeighbourTAC CRITICALITY ignore EXTENSION TAC PRESENCE optional}|
  { ID id-eARFCNExtension CRITICALITY reject EXTENSION EARFCNExtension PRESENCE optional},
  ...
}
NextHopChainingCount ::= INTEGER (0..7)
Number-of-Antennaports ::= ENUMERATED {
an1,
an2,
an4,
...}
NRFreqInfo ::= SEQUENCE{
  nRARFCN INTEGER (0..3279165),
nRARFCN-SUL INTEGER (0..3279165) OPTIONAL,
  freqBandListNr SEQUENCE (SIZE (1..maxnoofNrCellBands)) OF FreqBandNrItem,
sULInformation SULInformation OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {NRFreqInfo-ExtIEs} } OPTIONAL,
  ...
}
NRFreqInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...}
NRCellIdentifier ::= BIT STRING (SIZE (36))
NRCGI ::= SEQUENCE {
  pLMN-Identity PLMN-Identity,
nRcellIdentifier NRCellIdentifier,
iE-Extensions ProtocolExtensionContainer { {NRCGI-ExtIEs} } OPTIONAL,
  ...
}
NRCGI-ExtIEs X2AP-PROCOTOL-EXTENSION ::= {
  ...
}
NRPCI ::= INTEGER (0..1007)
NRrestriction ::= ENUMERATED {
  nRrestricted,
  ...
}
NRencryptionAlgorithms ::= BIT STRING (SIZE (16,...))
NRintegrityProtectionAlgorithms ::= BIT STRING (SIZE (16,...))
NR-TxBW ::= SEQUENCE {

nRSCS  NRSCS,
nNRNB  NNRNB,
iE-Extensions  ProtocolExtensionContainer  {  (  NR-TxBW-ExtIEs) }  OPTIONAL,

NR-TxBW-ExtIEs  X2AP-PROTOCOL-EXTENSION  ::=  {
  ...
}

NRNRB  ::=  ENUMERATED  {  nrb11,  nrb18,  nrb24,  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,  ...}  

NRSCS  ::=  ENUMERATED  {  scs15,  scs30,  scs60,  scs120,  ...}

NRS-NSSS-PowerOffset  ::=  ENUMERATED  {  minusThree,  zero,  three,  ...}  

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

NRUESecurityCapabilities  ::=  SEQUENCE  {
  nRencryptionAlgorithms  NRencryptionAlgorithms,
  nRintegrityProtectionAlgorithms  NRintegrityProtectionAlgorithms,
  iE-Extensions  ProtocolExtensionContainer  {  (  NRUESecurityCapabilities-ExtIEs) }  OPTIONAL,
  ...
}

NRUESecurityCapabilities-ExtIEs  X2AP-PROTOCOL-EXTENSION  ::=  {
  ...
}

NSSS-NumOccasionDifferentPrecoder  ::=  ENUMERATED  {  two,  four,  eight,  ...}  

-- 0

OffsetOfNbiotChannelNumberToEARFCN  ::=  ENUMERATED  {
  minusTen,
  minusNine,
  minusEight,
  minusSeven,
  minusSix,
  minusFive,
  minusFour,
  minusThree,
  minusTwo,
  minusOne,
  minusZeroDotFive,
  zero,
  one,
  two,
  three,
  four,
  five,
  six,
  seven,
eight,
nine,
...

Oneframe ::= BIT STRING (SIZE (6))

-- P

Packet-LossRate ::= INTEGER(0..1000)

PA-Values ::= ENUMERATED {
  dB-6,
  dB-4.77,
  dB-3,
  dB-1.77,
  dB-0,
  dB-1,
  dB-2,
  dB-3,
  ...
}

PDCPChangeIndication ::= ENUMERATED {s-KgNB-update-required, pDCP-data-recovery-required,...}

PDCP-SN ::= INTEGER (0..4095)

PDCP-SNExtended ::= INTEGER (0..32767)

PDCP-SNlength18 ::= INTEGER (0..262143)

PCI ::= INTEGER (0..503, ...)

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

Port-Number ::= OCTET STRING (SIZE (2))

PRACH-Configuration ::= SEQUENCE {
  rootSequenceIndex INTEGER (0..837),
  zeroCorrelationIndex INTEGER (0..15),
  highSpeedFlag BOOLEAN,
  prach-FreqOffset INTEGER (0..94),
  prach-ConfigIndex INTEGER (0..63) OPTIONAL, -- present for TDD --
  iE-Extensions ProtocolExtensionContainer { {PRACH-Configuration-ExtIEs} } OPTIONAL,
  ...
}

PLMNAreaBasedQMC ::= SEQUENCE {
  plmnListforQMC PLMNListforQMC,
  iE-Extensions ProtocolExtensionContainer { {PLMNAreaBasedQMC-ExtIEs} } OPTIONAL,
  ...
}

PLMNAreaBasedQMC-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

}
PLMNListforQMC ::= SEQUENCE (SIZE(1..maxnoofPLMNforQMC)) OF PLMN-Identity

PRACH-Configuration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

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)

ProSeAuthorized ::= SEQUENCE {
    proSeDirectDiscovery ProSeDirectDiscovery OPTIONAL,
    proSeDirectCommunication ProSeDirectCommunication OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { {ProSeAuthorized-ExtIEs} } OPTIONAL,
    ...
}

ProSeAuthorized-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    { ID id-ProSeUEtoNetworkRelaying CRITICALITY ignore EXTENSION ProSeUEtoNetworkRelaying PRESENCE optional},
    ...
}

ProSeDirectDiscovery ::= ENUMERATED {
    authorized,
    not-authorized,
    ...
}

ProSeDirectCommunication ::= ENUMERATED {
    authorized,
    not-authorized,
    ...
}

ProSeUEtoNetworkRelaying ::= ENUMERATED {
    authorized,
    not-authorized,
    ...
}

ProtectedEUTRAResourceIndication ::= SEQUENCE {
    activationSFN INTEGER (0..1023),
ProtectedResourceList ::= SEQUENCE (SIZE(1.. maxnoofProtectedResourcePatterns)) OF ProtectedResourceList-Item

ProtectedResourceList-Item ::= SEQUENCE {
  protectedFootprintStartTime      INTEGER (1..20, ...),
  protectedFootprintFrequencyPattern   BIT STRING (SIZE(6..110, ...)),
  protectedFootprintTimePattern   ProtectedFootprintTimePattern,
  ... }

QCI ::= INTEGER (0..255)

RadioframeAllocationOffset ::= INTEGER (0..7, ...)

RadioframeAllocationPeriod ::= ENUMERATED{
  n1,
  n2,
  n4,
  n8,
  n16,
  n32,
  ... }

RadioResourceStatus ::= SEQUENCE {
  dL-GBR-PRB-usage       DL-GBR-PRB-usage,
  uL-GBR-PRB-usage       UL-GBR-PRB-usage,
  dL-non-GBR-PRB-usage     DL-non-GBR-PRB-usage,
  uL-non-GBR-PRB-usage     UL-non-GBR-PRB-usage,
  dL-Total-PRB-usage      DL-Total-PRB-usage,
  uL-Total-PRB-usage      UL-Total-PRB-usage,
  ... }

RadioResourceStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { [END]
{ID id-DL-scheduling-PDCCH-CCE-usage CRITICALITY ignore EXTENSION DL-scheduling-PDCCH-CCE-usage PRESENCE optional},
...
}

ReceiveStatusofULPDCPSDUs ::= BIT STRING (SIZE(4096))

ReceiveStatusofULPDCPSDUsExtended ::= BIT STRING (SIZE(1..16384))

ReceiveStatusofULPDCPSDUsPDCPSNlength18 ::= BIT STRING (SIZE(1..131072))

Registration-Request ::= ENUMERATED {
  start,
  stop,
  ...,
  partial-stop,
  add
}

RelativeNarrowbandTxPower ::= SEQUENCE {
  rNTP-PerPRB BIT STRING (SIZE(6..110, ...)),
  rNTP-Threshold RNTP-Threshold,
  numberOfCellSpecificAntennaPorts ENUMERATED {one, two, four, ...},
  p-B INTEGER (0..3,...),
  pDCCH-InterferenceImpact INTEGER (0..4,...),
  iE-Extensions ProtocolExtensionContainer { { RelativeNarrowbandTxPower-ExtIEs} } OPTIONAL,
  ...
}

RelativeNarrowbandTxPower-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-enhancedRNTP CRITICALITY ignore EXTENSION EnhancedRNTP PRESENCE optional },
  ...
}

ReplacingCellsList ::= SEQUENCE (SIZE(0.. maxCellineNB)) OF ReplacingCellsList-Item

ReplacingCellsList-Item ::= SEQUENCE {
  eCGI ECGI,
  ...
}

ReportAmountMDT ::= ENUMERATED{r1, r2, r4, r8, r16, r32, r64, rinfinity}

ReportArea ::= ENUMERATED{
  ecgi,
  ...
}

ReportCharacteristics ::= BIT STRING (SIZE (32))

ReportingPeriodicityCSIR ::= ENUMERATED {
  ms5,
ReportingPeriodicityRSRPMR ::= ENUMERATED {
  one-hundred-20-ms,
  two-hundred-40-ms,
  four-hundred-80-ms,
  six-hundred-40-ms,
  ...
}

ReportIntervalMDT ::= ENUMERATED {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, min1, min6, min12, min30, min60}

ReservedSubframePattern ::= SEQUENCE{
  subframeType SubframeType,
  reservedSubframePattern BIT STRING (SIZE(10..40)),
  mBSFNControlRegionLength INTEGER (0..3),
  ...
}

ResourceType ::= ENUMERATED {
  downlinknonCRS, cRS, uplink, ...
}

ResumeID ::= CHOICE {
  non-truncated BIT STRING(SIZE(40)),
  truncated BIT STRING(SIZE(24)),
  ...
}

RLCMode ::= ENUMERATED {
  rlc-am, rlc-um
}

RNTP-Threshold ::= ENUMERATED {
  minusInfinity, minusEleven, minusTen, minusNine, minusEight, minusSeven, minusSix, minusFive, minusFour, minusThree, minusTwo,
minusOne,
zero,
one,
two,
three,
...
}

RRC-Config-Ind ::= ENUMERATED {
  full-config,
delta-config,
...  
}

RRC-Context ::= OCTET STRING

RRCConnReestabIndicator ::= ENUMERATED {
  reconfigurationFailure, handoverFailure, otherFailure, ...
}
-- The values correspond to the values of ReestablishmentCause reported from the UE in the RRCConnectionReestablishmentRequest, as defined in TS 36.331 [9]

RRCConnSetupIndicator ::= ENUMERATED {
  rrcConnSetup,
... 
}

RSRPMeasurementResult ::= SEQUENCE (SIZE(1..maxCellReport)) OF
  SEQUENCE {
    rSRPCellID ECGI, 
    rSRPMeasured INTEGER (0..97, ...),
    iE-Extensions ProtocolExtensionContainer { { RSRPMeasurementResult-ExtIEs} } OPTIONAL, 
    ...
  }

RSRPMeasurementResult-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

RSRPMRList ::= SEQUENCE (SIZE(1..maxUEReport)) OF
  SEQUENCE {
    rSRPMeasurementResult RSRPMeasurementResult, 
    iE-Extensions ProtocolExtensionContainer { { RSRPMRList-ExtIEs} } OPTIONAL, 
    ...
  }

RSRPMRList-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-UEID CRITICALITY ignore EXTENSION UEID PRESENCE optional},
  ...
}

RRCContainer ::= OCTET STRING
-- $
S1TNLLoadIndicator ::= SEQUENCE {  
dLS1TNLLoadIndicator LoadIndicator,  
uLS1TNLLoadIndicator LoadIndicator,  
iE-Extensions ProtocolExtensionContainer { { S1TNLLoadIndicator-ExtIEs} } OPTIONAL,  
...  
}  
S1TNLLoadIndicator-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {  
...  
}  
SCGChangeIndication ::= ENUMERATED {pDCPCountWrapAround, pSCellChange, other, ...}  
SecondaryRATUsageReportList ::= SEQUENCE (SIZE(1..maxnofBearers)) OF ProtocolIE-Single-Container {{SecondaryRATUsageReport-ItemIEs}}  
SecondaryRATUsageReport-ItemIEs X2AP-PROTOCOL-IES ::= {  
{ ID id-SecondaryRATUsageReport-Item CRITICALITY reject TYPE SecondaryRATUsageReport-Item PRESENCE mandatory},  
...  
}  
SecondaryRATUsageReport-Item ::= SEQUENCE {  
e-RAB-ID E-RAB-ID,  
secondaryRATType ENUMERATED {nr, ...},  
e-RABUsageReportList E-RABUsageReportList,  
iE-Extensions ProtocolExtensionContainer { { SecondaryRATUsageReport-Item-ExtIEs} } OPTIONAL,  
...  
}  
SecondaryRATUsageReport-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {  
...  
}  
SeNBSecurityKey ::= BIT STRING (SIZE(256))  
SeNBtoMeNBContainer ::= OCTET STRING  
ServedCells ::= SEQUENCE (SIZE (1.. maxCellineNB)) OF SEQUENCE {  
servedCellInfo ServedCell-Information,  
neighbour-Info Neighbour-Information OPTIONAL,  
iE-Extensions ProtocolExtensionContainer { {ServedCell-ExtIEs} } OPTIONAL,  
...  
}  
ServedCell-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {  
...  
}  
ServedCell-Information ::= SEQUENCE {  
pCI PCI,  
cellId ECGI,  
tAC TAC,  
broadcastPLMNs BroadcastPLMNs-Item,  
...  
}
ServedCell-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-Number-of-Antennaports CRITICALITY ignore EXTENSION Number-of-Antennaports PRESENCE optional } | 
  { ID id-PRACH-Configuration CRITICALITY ignore EXTENSION PRACH-Configuration PRESENCE optional } | 
  { ID id-MBSFN-Subframe-Info CRITICALITY ignore EXTENSION MBSFN-Subframe-InfoList PRESENCE optional } | 
  { ID id-CSG-IId CRITICALITY ignore EXTENSION CSG-IId PRESENCE optional } | 
  { ID id-MBMS-Service-Area-List CRITICALITY ignore EXTENSION MBMS-Service-Area-Identity-List PRESENCE optional } | 
  { ID id-MultibandinfoList CRITICALITY ignore EXTENSION MultibandInfoList PRESENCE optional } | 
  { ID id-FreqBandIndicatorPriority CRITICALITY ignore EXTENSION FreqBandIndicatorPriority PRESENCE optional } | 
  { ID id-BandwidthReducedSI CRITICALITY ignore EXTENSION BandwidthReducedSI PRESENCE optional } | 
  { ID id-ProtectedEUTRAResourceIndication CRITICALITY ignore EXTENSION ProtectedEUTRAResourceIndication PRESENCE optional }, ... 
}

ServiceType ::= ENUMERATED{
  qMC-for-streaming-service,
  qMC-for-MTSI-service,
  ...
}

SgNBResourceCoordinationInformation ::= SEQUENCE { 
  nR-CGI NRCGI,
  uLCoordinationInformation BIT STRING (SIZE(6..4400), ...),
  dLCoordinationInformation BIT STRING (SIZE(6..4400), ...) OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { SgNBResourceCoordinationInformationExtIEs} } OPTIONAL,
  ...
}

SgNBResourceCoordinationInformationExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

SgNB-UE-X2AP-ID ::= INTEGER (0..4294967295)

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

SharedResourceType ::= CHOICE{
  uLOnlySharing ULOnlySharing,
  uLAndDLSharing ULandDLSharing,
  ...
}

ShortMAC-I ::= BIT STRING (SIZE(16))

SGNB-Addition-Trigger-Ind ::= ENUMERATED { 
  sn-change,
SourceOfUEActivityBehaviourInformation ::= ENUMERATED {
  subscription-information,
  statistics,
  ...
}

SpecialSubframe-Info ::= SEQUENCE {
  specialSubframePatterns  SpecialSubframePatterns,
  cyclicPrefixDL    CyclicPrefixDL,
  cyclicPrefixUL    CyclicPrefixUL,
  iE-Extensions    ProtocolExtensionContainer { { SpecialSubframe-Info-ExtIEs} } OPTIONAL,
  ...
}

SpecialSubframe-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

SpecialSubframePatterns ::= ENUMERATED {
  ssp0,
  ssp1,
  ssp2,
  ssp3,
  ssp4,
  ssp5,
  ssp6,
  ssp7,
  ssp8,
  ...
}

SpectrumSharingGroupID ::= INTEGER (1..maxCellineNB)

SubbandCQI ::= SEQUENCE {
  subbandCQICodeword0  SubbandCQICodeword0,
  subbandCQICodeword1  SubbandCQICodeword1  OPTIONAL,
  iE-Extensions    ProtocolExtensionContainer { { SubbandCQI-ExtIEs} } OPTIONAL,
  ...
}

SRVCCOperationPossible ::= ENUMERATED {
  possible,
  ...
}

SubbandCQI-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}
SubbandCQICodeword0 ::= CHOICE {
  four-bitCQI      INTEGER (0..15, ...),
  two-bitSubbandDifferentialCQI INTEGER (0..3, ...),
  two-bitDifferentialCQI   INTEGER (0..3, ...),
  ...
}

SubbandCQICodeword1 ::= CHOICE {
  four-bitCQI       INTEGER (0..15, ...),
  three-bitSpatialDifferentialCQI  INTEGER (0..7, ...),
  two-bitSubbandDifferentialCQI  INTEGER (0..3, ...),
  two-bitDifferentialCQI    INTEGER (0..3, ...),
  ...
}

SubbandCQIList ::= SEQUENCE (SIZE(1.. maxSubband)) OF SubbandCQIItem

SubbandCQIItem ::= SEQUENCE {
  subbandCQI   SubbandCQI,
  subbandIndex  INTEGER (0..27,...),
  iE-Extensions ProtocolExtensionContainer { { SubbandCQIItem-ExtIEs} } OPTIONAL,
  ...
}

SubbandCQIItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

SubbandSize ::= ENUMERATED {
  size2,
  size3,
  size4,
  size6,
  size8,
  ...
}

SubscriberProfileIDforRFP ::= INTEGER (1..256)

SubframeAllocation ::= CHOICE {
  oneframe      Oneframe,
  fourframes      Fourframes,
  ...
}

SubframeAssignment ::= ENUMERATED {
  sa0,
  sa1,
  sa2,
  sa3,
  sa4,
  sa5,
  sa6,
  ...
}
SubframeType ::= ENUMERATED{mbbsfn,nonmbbsfn,...}
SgNBSecurityKey ::= BIT STRING (SIZE(256))
SgNBtoMeNBContainer ::= OCTET STRING
SRBType ::= ENUMERATED {srb1, srb2, ...}
SCGConfigurationQuery ::= ENUMERATED {true,...}
SULInformation ::= SEQUENCE { 
    sUL-ARFCN INTEGER (0.. 3279165), 
    sUL-TxBW NR-TxBW, 
    iE-Extensions ProtocolExtensionContainer { { SULInformation-ExtIEs } } OPTIONAL, 
    ... 
}
SupportedSULFreqBandItem ::= SEQUENCE { 
    freqBandIndicatorNr INTEGER {1..1024,...}, 
    ... 
}
SupportedSULFreqBandItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { 
    ... 
}
SULInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { 
    ... 
}
-- T
TABasedMDT ::= SEQUENCE { 
    tAListforMDT TAIListforMDT, 
    iE-Extensions ProtocolExtensionContainer { {TABasedMDT-ExtIEs} } OPTIONAL, 
    ... 
}
TABasedMDT-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { 
    ... 
}
TAC ::= OCTET STRING (SIZE (2))
TAIBasedMDT ::= SEQUENCE { 
    tAListforMDT TAIListforMDT, 
    iE-Extensions ProtocolExtensionContainer { {TAIBasedMDT-ExtIEs} } OPTIONAL, 
    ... 
}
TAIBasedMDT-ExtIEs X2AP-PROTOCOL-EXTENSION ::= { 
    ... 
}
TAIListforMDT ::= SEQUENCE (SIZE(1..maxnoofTAforMDT)) OF TAI-Item

TAI-Item ::= SEQUENCE {
    tAC TAC,
    pLMN-Identity PLMN-Identity,
    iE-Extensions ProtocolExtensionContainer { { TAI-Item-ExtIEs} } OPTIONAL,
    ...
}

TAI-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

TAIListforMDT ::= SEQUENCE (SIZE(1..maxnoofTAforMDT)) OF TAC

TABasedQMC ::= SEQUENCE {
    tAListforQMC TAIListforQMC,
    iE-Extensions ProtocolExtensionContainer { {TABasedQMCExtenIEs} } OPTIONAL,
    ...
}

TABasedQMCExtenIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

TAListforQMC ::= SEQUENCE (SIZE(1..maxnoofTAforQMC)) OF TAC

TAIBasedQMC ::= SEQUENCE {
    tAListforQMC TAIListforQMC,
    iE-Extensions ProtocolExtensionContainer { {TAIBasedQMCExtenIEs} } OPTIONAL,
    ...
}

TAIBasedQMCExtenIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

TAListforQMC ::= SEQUENCE (SIZE(1..maxnoofTAforQMC)) OF TAI-Item

TargetCellInUTRAN ::= OCTET STRING -- This IE is to be encoded according to the UTRAN Cell ID in the Last Visited UTRAN Cell Information IE in TS 25.413 [24]

TargetENBtoSource-eNBTransparentContainer ::= OCTET STRING

TDD-Info ::= SEQUENCE {
    eARFCN EArFCN,
    transmission-Bandwidth Transmission-Bandwidth,
    subframeAssignment SubframeAssignment,
    specialSubframe-Info SpecialSubframe-Info,
    iE-Extensions ProtocolExtensionContainer { {TDD-Info-ExtIEs} } OPTIONAL,
    ...
}

TDD-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

Threshold-RSRP ::= INTEGER(0..97)
Threshold-RSRQ ::= INTEGER(0..34)

TimeToWait ::= ENUMERATED {
  v1s,
  v2s,
  v5s,
  v10s,
  v20s,
  v60s,
  ...
}

Time-UE-StayedInCell ::= INTEGER (0..4095)

Transmission-Bandwidth ::= ENUMERATED {
  bw6,
  bw15,
TransportLayerAddress ::= BIT STRING (SIZE(1..160, ...))

TunnelInformation ::= SEQUENCE {
  transportLayerAddress TransportLayerAddress,
  uDP-Port-Number   Port-Number   OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { {Tunnel-Information-ExtIEs} } OPTIONAL,
  ...
}

Tunnel-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

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

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UEAggregateMaximumBitRate ::= SEQUENCE {
  uEaggregateMaximumBitRateDownlink BitRate,
  uEaggregateMaximumBitRateUplink BitRate,
  iE-Extensions ProtocolExtensionContainer { {UEAggregate-MaximumBitrate-ExtIEs} } OPTIONAL,
  ...
}

UEAggregate-MaximumBitrate-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-extended-uEaggregateMaximumBitRateDownlink CRITICALITY ignore EXTENSION ExtendedBitRate PRESENCE optional } |
  { ID id-extended-uEaggregateMaximumBitRateUplink CRITICALITY ignore EXTENSION ExtendedBitRate PRESENCE optional },
  ...
}

UEAppLayerMeasConfig ::= SEQUENCE {
  containerForAppLayerMeasConfig OCTET STRING (SIZE(1..1000)),
  areaScopeOfQM C AreaScopeOfQM,
  iE-Extensions ProtocolExtensionContainer { {UEAppLayerMeasConfig-ExtIEs} } OPTIONAL,
  ...
}

UEAppLayerMeasConfig-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  { ID id-serviceType CRITICALITY ignore EXTENSION ServiceType PRESENCE optional },
  ...
}
UE-ContextKeptIndicator ::= ENUMERATED {
    true,
    ...
}

UEID ::= BIT STRING (SIZE (16))

UE-HistoryInformation ::= SEQUENCE (SIZE(1..maxnoofCells)) OF LastVisitedCell-Item

UE-HistoryInformationFromTheUE ::= OCTET STRING
    -- This IE is a transparent container and shall be encoded as the VisitedCellInfoList field contained in the UEInformationResponse message as defined in TS 36.331 [9]

UE-S1AP-ID ::= INTEGER (0..4294967295)

UE-X2AP-ID ::= INTEGER (0..4095)

UE-X2AP-ID-Extension ::= INTEGER (0..4095, ...)

UE-RLF-Report-Container::= OCTET STRING
    -- This IE is a transparent container and shall be encoded as the RLF-Report-r9 field contained in the UEInformationResponse message as defined in TS 36.331 [9]

UE-RLF-Report-Container-for-extended-bands ::= OCTET STRING
    -- This IE is a transparent container and shall be encoded as the RLF-Report-v9e0 field contained in the UEInformationResponse message as defined in TS 36.331 [9]

UESecurityCapabilities ::= SEQUENCE {
    encryptionAlgorithms EncryptionAlgorithms,
    integrityProtectionAlgorithms IntegrityProtectionAlgorithms,
    iE-Extensions ProtocolExtensionContainer { { UESecurityCapabilities-ExtIEs} } OPTIONAL,
    ...
}

UESecurityCapabilities-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

    ...
}

UESidelinkAggregateMaximumBitRate ::= SEQUENCE {
    uESidelinkAggregateMaximumBitRate BitRate,
    iE-Extensions ProtocolExtensionContainer { {UE-Sidelink-Aggregate-MaximumBitRate-ExtIEs} } OPTIONAL,
    ...
}

UE-Sidelink-Aggregate-MaximumBitRate-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

    ...
}

UEsToBeResetList ::= SEQUENCE (SIZE (1..maxUEsinengNBDU)) OF UEsToBeResetList-Item

UEsToBeResetList-Item::= SEQUENCE {
    meNB-ID UE-X2AP-ID,
    meNB-ID-ext UE-X2AP-ID-Extension OPTIONAL,
ULandDLSharing ::= SEQUENCE {
  ulResourcesULandDLSharing ULResourcesULandDLSharing,
  dlResourcesULandDLSharing DLResourcesULandDLSharing,
  ...
}

ULConfiguration ::= SEQUENCE {
  ul-PDCP UL-UE-Configuration,
  iE-Extensions ProtocolExtensionContainer { { ULConfiguration-ExtIEs} } OPTIONAL,
  ...
}

ULConfiguration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

UL-UE-Configuration ::= ENUMERATED { no-data, shared, only, ... }

UL-GBR-PRB-usage ::= INTEGER (0..100)

UL-HighInterferenceIndicationInfo ::= SEQUENCE (SIZE(1..maxCellineNB)) OF UL-HighInterferenceIndicationInfo-Item

UL-HighInterferenceIndicationInfo-Item ::= SEQUENCE {
  target-Cell-ID ECGI,
  ul-interferenceindication UL-HighInterferenceIndication,
  iE-Extensions ProtocolExtensionContainer { { UL-HighInterferenceIndicationInfo-Item-ExtIEs} } OPTIONAL,
  ...
}

UL-HighInterferenceIndicationInfo-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ...
}

UL-HighInterferenceIndication ::= BIT STRING (SIZE(1..110, ...))

UL-InterferenceOverloadIndication ::= SEQUENCE (SIZE(1..maxnoofPRBs)) OF UL-InterferenceOverloadIndication-Item

UL-InterferenceOverloadIndication-Item ::= ENUMERATED {
  high-interference,
  medium-interference,
  low-interference,
  ...
}

UL-non-GBR-PRB-usage ::= INTEGER (0..100)
ULOnlySharing ::= SEQUENCE{
    ulResourceBitmapULOnlySharing  DataTrafficResources,
    ...
}

ULResourceBitmapULandDLSharing ::=  DataTrafficResources

ULResourcesULandDLSharing ::= CHOICE {
    unchanged   NULL,
    changed    ULResourceBitmapULandDLSharing,
    ...
}

UL-scheduling-PDCCH-CCE-usage::= INTEGER (0..100)

UL-Total-PRB-usage::= INTEGER (0..100)

UsableABSInformation ::= CHOICE {
    fdd    UsableABSInformationFDD,
    tdd    UsableABSInformationTDD,
    ...
}

UsableABSInformationFDD ::= SEQUENCE {
    usable-abs-pattern-info    BIT STRING (SIZE(40)),
    iE-Extensions      ProtocolExtensionContainer { [ UsableABSInformationFDD-ExtIEs] } OPTIONAL,
    ...
}

UsableABSInformationFDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

UsableABSInformationTDD ::= SEQUENCE {
    usableable-abs-pattern-info   BIT STRING (SIZE(1..70, ...)),
    iE-Extensions      ProtocolExtensionContainer { [ UsableABSInformationTDD-ExtIEs] } OPTIONAL,
    ...
}

UsableABSInformationTDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
    ...
}

UserPlaneTrafficActivityReport ::= ENUMERATED {inactive, re-activated, ...}

-- V

V2XServicesAuthorized ::= SEQUENCE {
    vehicleUE          VehicleUE OPTIONAL,
    pedestrianUE      PedestrianUE OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { [V2XServicesAuthorized-ExtIEs] } OPTIONAL,
V2XServicesAuthorized-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... 
}

VehicleUE ::= ENumerated {
  authorized,
  not-authorized,
  ... 
}

PedestrianUE ::= ENumerated {
  authorized,
  not-authorized,
  ... 
}

-- W

WidebandCQI ::= SEQUENCE {
  widebandCQICodeword0 INTEGER (0..15, ...),
  widebandCQICodeword1 WidebandCQICodeword1 OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { WidebandCQI-ExtIEs } OPTIONAL,
  ... 
}

WidebandCQI-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {
  ... 
}

WidebandCQICodeword1 ::= CHOICE {
  four-bitCQI INTEGER (0..15, ...),
  three-bitSpatialDifferentialCQI INTEGER (0..7, ...),
  ... 
}

WTID ::= CHOICE {
  wTID-Type1 WTID-Type1, 
  wTID-Type2 WTID-Long-Type2, 
  ... 
}

WTID-Type1 ::= SEQUENCE {
  pLMN-Identity PLMN-Identity,
  shortWTID BIT STRING (SIZE(24)),
  ... 
}

WTID-Long-Type2 ::= BIT STRING (SIZE(48))

WT-UE-XwAP-ID ::= OCTET STRING (SIZE (3))
9.3.6 Common definitions

X2BenefitValue ::= INTEGER (1..8, ...)

X2AP-CommonDataTypes {
  itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) eps-Access (21) modules (3) x2ap (2) version1 (1) x2ap-CommonDataTypes (3) }

DEFINITIONS AUTOMATIC TAGS ::= BEGIN

Criticality ::= ENUMERATED { reject, ignore, notify }
Presence ::= ENUMERATED { optional, conditional, mandatory }
PrivateIE-ID ::= CHOICE {
  local INTEGER (0..maxPrivateIEs),
  global OBJECT IDENTIFIER
}
ProcedureCode ::= INTEGER (0..255)

END
9.3.7 Constant definitions

X2AP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) x2ap (2) version1 (1) x2ap-Constants (4)
}
DEFINITIONS AUTOMATIC TAGS ::= BEGIN
IMPORTS
   ProcedureCode,
   ProtocolIE-ID
FROM X2AP-CommonDataTypes;

-- Elementary Procedures

id-handoverPreparation ProcedureCode ::= 0
id-handoverCancel ProcedureCode ::= 1
id-loadIndication ProcedureCode ::= 2
id-errorIndication ProcedureCode ::= 3
id-snStatusTransfer ProcedureCode ::= 4
id-uEContextRelease ProcedureCode ::= 5
id-x2Setup ProcedureCode ::= 6
id-reset ProcedureCode ::= 7
id-eNBConfigurationUpdate ProcedureCode ::= 8
id-resourceStatusReportingInitiation ProcedureCode ::= 9
id-resourceStatusReporting ProcedureCode ::= 10
id-privateMessage ProcedureCode ::= 11
id-mobilitySettingsChange ProcedureCode ::= 12
id-rLFIndication ProcedureCode ::= 13
id-handoverReport ProcedureCode ::= 14
id-cellActivation ProcedureCode ::= 15
id-x2Release ProcedureCode ::= 16
id-x2APMessageTransfer ProcedureCode ::= 17
id-x2Removal ProcedureCode ::= 18
id-seNBAdditionPreparation          ProcedureCode ::= 19
id-seNBReconfigurationCompletion    ProcedureCode ::= 20
id-menNBinitiatedSeNBModificationPreparation ProcedureCode ::= 21
id-seNBinitiatedSeNBModification    ProcedureCode ::= 22
id-menNBinitiatedSeNBRelease        ProcedureCode ::= 23
id-seNBinitiatedSeNBRelease         ProcedureCode ::= 24
id-seNBCounterCheck                 ProcedureCode ::= 25
id-retrieveUEContext                ProcedureCode ::= 26
id-sgNBAdditionPreparation          ProcedureCode ::= 27
id-sgNBReconfigurationCompletion    ProcedureCode ::= 28
id-menNBinitiatedSgNBModificationPreparation ProcedureCode ::= 29
id-sgNBinitiatedSgNBModification    ProcedureCode ::= 30
id-menNBinitiatedSgNBRelease        ProcedureCode ::= 31
id-sgNBinitiatedSgNBRelease         ProcedureCode ::= 32
id-sgNBCounterCheck                 ProcedureCode ::= 33
id-sgNBChange                       ProcedureCode ::= 34
id-rRECTransfer                     ProcedureCode ::= 35
id-endcX2Setup                      ProcedureCode ::= 36
id-endcConfigurationUpdate          ProcedureCode ::= 37
id-secondaryRATDataUsageReport      ProcedureCode ::= 38
id-endcCellActivation               ProcedureCode ::= 39
id-endcPartialReset                 ProcedureCode ::= 40
id-eUTRANRCellResourceCoordination  ProcedureCode ::= 41
id-SgNBActivityNotification         ProcedureCode ::= 42
id-endcX2Removal                    ProcedureCode ::= 43

-- ************************************************************
-- Lists
-- ************************************************************

maxEARFCN INTEGER ::= 65535
maxEARFCNPlusOne INTEGER ::= 65536
newmaxEARFCN INTEGER ::= 262143
maxInterfaces INTEGER ::= 16
maxCellineNB INTEGER ::= 256
maxnoofBands INTEGER ::= 16
maxnoofBearers INTEGER ::= 256
maxNoOfErrors INTEGER ::= 256
maxnoofPDCH-SP INTEGER ::= 16
maxnoofEPLMNs INTEGER ::= 15
maxnoofEPLMNsPlusOne INTEGER ::= 16
maxnoofForbLACs INTEGER ::= 4096
maxnoofForbTACs INTEGER ::= 4096
maxnoofEPLMNs INTEGER ::= 6
maxnoofNeighbours INTEGER ::= 512
maxnoofPRBs INTEGER ::= 110
maxPools INTEGER ::= 16
maxnoofCells INTEGER ::= 16
maxnoofMBSFN INTEGER ::= 8
maxFailedMeasObjects INTEGER ::= 32
maxnoofCell1IDforMDT INTEGER ::= 32
maxnoofTAforMDT INTEGER ::= 8
maxnoofMBMSServiceAreaIdentities INTEGER ::= 256
maxnoofMDTPLMN INTEGER ::= 16
maxnoofCoMPHypothesisSet INTEGER ::= 256
maxnoofCoMPCells INTEGER ::= 32
maxUEReport INTEGER ::= 128
maxCellReport INTEGER ::= 9
maxnofPA INTEGER ::= 3
maxCSIProcess INTEGER ::= 4
maxCSIReport INTEGER ::= 2
maxSubband INTEGER ::= 14
maxoENRNeighbours INTEGER ::= 1024
maxCellinengNB INTEGER ::= 16384
--  maxnoofNRCarriers INTEGER ::= 32
maxnooftimeperiods INTEGER ::= 2
maxnoofCellIDforQMC INTEGER ::= 32
maxnoofTforQMC INTEGER ::= 8
maxnoofPLMNforQMC INTEGER ::= 16
maxUEinengNB INTEGER ::= 8192
maxnoofNRcellsSpectrumSharingWithE-UTRA INTEGER ::= 64
maxnoofNRcellsSpectrumSharingWithE-UTRA INTEGER ::= 64
maxnoofProtectedResourcePatterns INTEGER ::= 16
maxnoofNRcellBands INTEGER ::= 32

-- **********************************************
-- IEs
-- **********************************************

id-E-RABs-Admitted-Item ProtocolIE-ID ::= 0
id-E-RABs-Admitted-List ProtocolIE-ID ::= 1
id-E-RAB-Item ProtocolIE-ID ::= 2
id-E-RABs-NotAdmitted-List ProtocolIE-ID ::= 3
id-E-RABs-ToBeSetup-Item ProtocolIE-ID ::= 4
id-Cause ProtocolIE-ID ::= 5
id-CellInformation ProtocolIE-ID ::= 6
id-CellInformation-Item ProtocolIE-ID ::= 7
id-New-eNB-UE-X2AP-ID ProtocolIE-ID ::= 9
id-Old-eNB-UE-X2AP-ID ProtocolIE-ID ::= 10
id-TargetCell-ID ProtocolIE-ID ::= 11
id-TargeteNBtoSource-eNBTransparentContainer ProtocolIE-ID ::= 12
id-TraceActivation ProtocolIE-ID ::= 13
id-UE-ContextInformation ProtocolIE-ID ::= 14
id-UE-HistoryInformation ProtocolIE-ID ::= 15
id-UE-X2AP-ID ProtocolIE-ID ::= 16
id-CriticalityDiagnostics ProtocolIE-ID ::= 17
id-E-RABs-SubjectToStatusTransfer-List ProtocolIE-ID ::= 18
id-E-RABs-SubjectToStatusTransfer-Item ProtocolIE-ID ::= 19
id-ServedCells ProtocolIE-ID ::= 20
id-GlobalENB-ID ProtocolIE-ID ::= 21
id-TimeToWait ProtocolIE-ID ::= 22
id-GUMMEI-ID ProtocolIE-ID ::= 23
id-GUGroupIDList ProtocolIE-ID ::= 24
id-ServedCellsToAdd ProtocolIE-ID ::= 25
id-ServedCellsToModify ProtocolIE-ID ::= 26
id-ServedCellsToDelete ProtocolIE-ID ::= 27
id-Registration-Request ProtocolIE-ID ::= 28
id-CellToReport ProtocolIE-ID ::= 29
id-ReportingPeriodicity ProtocolIE-ID ::= 30
id-CellToReport-Item ProtocolIE-ID ::= 31
id-CellMeasurementResult ProtocolIE-ID ::= 32
id-CellMeasurementResult-Item ProtocolIE-ID ::= 33
id-GUGroupIDToAddList ProtocolIE-ID ::= 34
id-GUGroupIDToDeleteList ProtocolIE-ID ::= 35
id-SRVCCOperationPossible ProtocolIE-ID ::= 36
id-Measurement-ID ProtocolIE-ID ::= 37
id-ReportCharacteristics ProtocolIE-ID ::= 38
id-ENB1-Measurement-ID ProtocolIE-ID ::= 39
id-ENB2-Measurement-ID ProtocolIE-ID ::= 40
id-Number-of-Antennaports ProtocolIE-ID ::= 41
id-CompositeAvailableCapacityGroup ProtocolIE-ID ::= 42
id-ENB1-Cell-ID ProtocolIE-ID ::= 43
id-ENB2-Cell-ID ProtocolIE-ID ::= 44
id-ENB2-Proposed-Mobility-Parameters ProtocolIE-ID ::= 45
id-ENB1-Mobility-Parameters ProtocolIE-ID ::= 46
id-ENB2-Mobility-Parameters-Modification-Range ProtocolIE-ID ::= 47
id-FailureCellPCI ProtocolIE-ID ::= 48
id-Re-establishmentCellECGI ProtocolIE-ID ::= 49
id-FailureCellCRNTI ProtocolIE-ID ::= 50
id-ShortMAC-I ProtocolIE-ID ::= 51
id-SourceCellECGI ProtocolIE-ID ::= 52
id-FailureCellECGI ProtocolIE-ID ::= 53
id-HandoverReportType ProtocolIE-ID ::= 54
id-PRACH-Configuration ProtocolIE-ID ::= 55
id-MBSFN-Subframe-Info ProtocolIE-ID ::= 56
id-ServedCellsToActivate ProtocolIE-ID ::= 57
id-ActivatedCellList ProtocolIE-ID ::= 58
id-DeactivationIndication ProtocolIE-ID ::= 59
id-UE-RLF-Report-Container ProtocolIE-ID ::= 60
id-ABSInformation ProtocolIE-ID ::= 61
id-InvokeIndication ProtocolIE-ID ::= 62
id-ABS-Status ProtocolIE-ID ::= 63
id-PartialSuccessIndicator ProtocolIE-ID ::= 64
id-MeasurementInitiationResult-List ProtocolIE-ID ::= 65
id-MeasurementInitiationResult-Item ProtocolIE-ID ::= 66
id-MeasurementFailureCause-Item ProtocolIE-ID ::= 67
id-CompleteFailureCauseInformation-List ProtocolIE-ID ::= 68
id-CompleteFailureCauseInformation-Item ProtocolIE-ID ::= 69
id-CSG-Id ProtocolIE-ID ::= 70
id-CSGMembershipStatus ProtocolIE-ID ::= 71
id-MDTConfiguration ProtocolIE-ID ::= 72
id-ManagementBasedMDTAllowed ProtocolIE-ID ::= 73
id-RRCConnSetupIndicator ProtocolIE-ID ::= 74
id-RRCConnReestabIndicator ProtocolIE-ID ::= 75
id-NeighbourTAC ProtocolIE-ID ::= 76
id-Time-UE-StayedInCell-EnhancedGranularity ProtocolIE-ID ::= 77
id-RRCConnReestabIndicator ProtocolIE-ID ::= 78
id-MBMS-Service-Area-List ProtocolIE-ID ::= 79
id-HO-cause ProtocolIE-ID ::= 80
id-TargetCellInUTRAN ProtocolIE-ID ::= 81
id-MobilityInformation
id-SourceCellCRNTI
id-MultibandInfoList
id-M3Configuration
id-M4Configuration
id-M5Configuration
id-MDT-Location-Info
id-ManagementBasedMDTPLMNList
id-SignallingBasedMDTPLMNList
id-ReceiveStatusOfULDCPSDUsExtended
id-ULCOUNTValueExtended
id-DLCOUNTValueExtended
id-eARFCNExtension
id-UL-EARFCNExtension
id-DL-EARFCNExtension
id-AdditionalSpecialSubframe-Info
id-Masked-IMISV
id-ExtendedULDLConfiguration
id-ExtendedULInterferenceOverloadInfo
id-RNL-Header
id-x2APMessage
id-ProSeAuthorized
id-ExpectedUEBehaviour
id-UE-HistoryInformationFromTheUE
id-DynamicDLTransmissionInformation
id-UE-RLF-Report-Container-for-extended-bands
id-CompInformation
id-ReportingPeriodicityRSRPmR
id-RSRPmRList
id-MeNB-UE-X2AP-ID
id-SeNB-UE-X2AP-ID
id-UE-SecurityCapabilities
id-SeNBSecurityKey
id-SeNBUEAggregateMaximumBitRate
id-ServingPLMN
id-E-RABs-ToBeAdded-List
id-E-RABs-ToBeAdded-Item
id-MeNBtoSeNBContainer
id-E-RABs-Admitted-ToBeAdded-List
id-E-RABs-Admitted-ToBeAdded-Item
id-SeNBtoMeNBContainer
id-ResponseInformationSeNBReconfComp
id-UE-ContextInformationSeNBModReq
id-E-RABs-ToBeAdded-ModReqItem
id-E-RABs-ToBeModified-ModReqItem
id-E-RABs-ToBeReleased-ModReqItem
id-E-RABs-Admitted-ToBeAdded-ModAckList
id-E-RABs-Admitted-ToBeModified-ModAckList
id-E-RABs-Admitted-ToBeReleased-ModAckList
id-E-RABs-Admitted-ToBeReleased-ModAckItem
id-E-RABs-Admitted-ToBeReleased-ModReqd
id-E-RABs-ToBeReleased-ModReqdItem
id-SCGChangeIndication  ProtocolIE-ID ::= 136
id-E-RABs-ToBeReleased-List-RelReq  ProtocolIE-ID ::= 137
id-E-RABs-ToBeReleased-RelReqItem  ProtocolIE-ID ::= 138
id-E-RABs-ToBeReleased-List-RelConf  ProtocolIE-ID ::= 139
id-E-RABs-ToBeReleased-RelConfItem  ProtocolIE-ID ::= 140
id-E-RABs-SubjectToCounterCheck-List  ProtocolIE-ID ::= 141
id-E-RABs-SubjectToCounterCheckItem  ProtocolIE-ID ::= 142
id-CoverageModificationList  ProtocolIE-ID ::= 143
id-ReportingPeriodicityCSIR  ProtocolIE-ID ::= 145
id-CSIReportList  ProtocolIE-ID ::= 146
id-UEID  ProtocolIE-ID ::= 147
id-enhancedRNTP  ProtocolIE-ID ::= 148
id-ProSeUEtoNetworkRelaying  ProtocolIE-ID ::= 149
id-ReceiveStatusOfULPDCPDU-PDCP-SNlength18  ProtocolIE-ID ::= 150
id-DLQCountValuePDCP-SNlength18  ProtocolIE-ID ::= 151
id-UE-ContextReferenceAtSeNB  ProtocolIE-ID ::= 152
id-UE-ContextKeptIndicator  ProtocolIE-ID ::= 153
id-New-eNB-UE-X2AP-ID-Extension  ProtocolIE-ID ::= 154
id-Old-eNB-UE-X2AP-ID-Extension  ProtocolIE-ID ::= 155
id-MeNB-UE-X2AP-ID-Extension  ProtocolIE-ID ::= 156
id-SeNB-UE-X2AP-ID-Extension  ProtocolIE-ID ::= 157
id-LHN-ID  ProtocolIE-ID ::= 158
id-FreqBandIndicatorPriority  ProtocolIE-ID ::= 159
id-M6Configuration  ProtocolIE-ID ::= 160
id-M7Configuration  ProtocolIE-ID ::= 161
id-Tunnel-Information-for-BBF  ProtocolIE-ID ::= 162
id-SIPTO-BearerDeactivationIndication  ProtocolIE-ID ::= 163
id-GW-TransportLayerAddress  ProtocolIE-ID ::= 164
id-Correlation-ID  ProtocolIE-ID ::= 165
id-SIPTO-Correlation-ID  ProtocolIE-ID ::= 166
id-SIPTO-L-GW-TransportLayerAddress  ProtocolIE-ID ::= 167
id-X2RemovalThreshold  ProtocolIE-ID ::= 168
id-CellReportingIndicator  ProtocolIE-ID ::= 169
id-BearerType  ProtocolIE-ID ::= 170
id-resumeID  ProtocolIE-ID ::= 171
id-UE-ContextInformationRetrieve  ProtocolIE-ID ::= 172
id-E-RABs-ToBeSetupRetrieve-Item  ProtocolIE-ID ::= 173
id-NewEUTRANCellIdentifier  ProtocolIE-ID ::= 174
id-V2XServicesAuthorized  ProtocolIE-ID ::= 175
id-OffsetOfNbiotChannelNumberToUL-EARFCN  ProtocolIE-ID ::= 176
id-AdditionalSpecialSubframeExtension-Info  ProtocolIE-ID ::= 177
id-BandwidthReducedSI  ProtocolIE-ID ::= 178
id-MakeBeforeBreakIndicator  ProtocolIE-ID ::= 179
id-UE-ContextReferenceAtWT  ProtocolIE-ID ::= 180
id-WT-UE-ContextKeptIndicator  ProtocolIE-ID ::= 181
id-UESidelinkAggregateMaximumBitRate  ProtocolIE-ID ::= 182
id-uL-GTPtunnelEndpoint  ProtocolIE-ID ::= 183
id-DL-scheduling-PDCCH-CCE-usage  ProtocolIE-ID ::= 184
id-UL-scheduling-PDCCH-CCE-usage  ProtocolIE-ID ::= 185
id-UEAppLayerMeasConfig  ProtocolIE-ID ::= 186
id-E-RAB-MaximumBitrateDL  ProtocolIE-ID ::= 187
id-E-RAB-MaximumBitrateUL  ProtocolIE-ID ::= 188
id-extended-e-RAB-MaximumBitrateDL  ProtocolIE-ID ::= 189
id-extended-e-RAB-MaximumBitrateUL  ProtocolIE-ID ::= 190
id-extended-e-RAB-GuaranteedBitrateDL          ProtocolIE-ID ::= 198
id-extended-e-RAB-GuaranteedBitrateUL          ProtocolIE-ID ::= 199
id-extended-uEaggregateMaximumBitRateDownlink        ProtocolIE-ID ::= 200
id-extended-uEaggregateMaximumBitRateUplink         ProtocolIE-ID ::= 201
id-NRrestriction                ProtocolIE-ID ::= 202
id-SgNBSecurityKey               ProtocolIE-ID ::= 203
id-SgNBUEAggregateMaximumBitRate            ProtocolIE-ID ::= 204
id-E-RABs-ToBeAdded-SgNBAddReqList          ProtocolIE-ID ::= 205
id-MeNBtoSgNBContainer              ProtocolIE-ID ::= 206
id-SgNB-UE-X2AP-ID          ProtocolIE-ID ::= 207
id-RequestedSplitSRBs               ProtocolIE-ID ::= 208
id-E-RABs-ToBeAdded-SgNBAddReq-Item       ProtocolIE-ID ::= 209
id-E-RABs-ToBeAdded-SgNBAddReqAckList       ProtocolIE-ID ::= 210
id-SgNBtoMeNBContainer              ProtocolIE-ID ::= 211
id-AdmittedSplitSRBs               ProtocolIE-ID ::= 212
id-E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item ProtocolIE-ID ::= 213
id-ResponseInformationSgNBReconfComp          ProtocolIE-ID ::= 214
id-Ue-ContextInformation-SgNBModReq            ProtocolIE-ID ::= 215
id-E-RABs-ToBeAdded-SgNBModReq-Item          ProtocolIE-ID ::= 216
id-E-RABs-ToBeModified-SgNBModReq-Item        ProtocolIE-ID ::= 217
id-E-RABs-ToBeReleased-SgNBModReq-Item        ProtocolIE-ID ::= 218
id-E-RABs-Admitted-ToBeAdded-SgNBModAckList       ProtocolIE-ID ::= 219
id-E-RABs-Admitted-ToBeReleased-SgNBModAckList       ProtocolIE-ID ::= 220
id-E-RABs-Admitted-ToBeModified-SgNBModAck-Item ProtocolIE-ID ::= 221
id-E-RABs-Admitted-ToBeReleased-SgNBModAck-Item ProtocolIE-ID ::= 222
id-E-RABs-Admitted-ToBeModified-SgNBModAck-Item ProtocolIE-ID ::= 223
id-E-RABs-Admitted-ToBeReleased-SgNBModAck-Item ProtocolIE-ID ::= 224
id-E-RABs-ToBeReleased-SgNBModReqList           ProtocolIE-ID ::= 225
id-E-RABs-ToBeModified-SgNBModReqList           ProtocolIE-ID ::= 226
id-E-RABs-ToBeReleased-SgNBModReqdList          ProtocolIE-ID ::= 227
id-E-RABs-ToBeModified-SgNBModReqdList          ProtocolIE-ID ::= 228
id-E-RABs-ToBeReleased-SgNBModReqdList          ProtocolIE-ID ::= 229
id-UENRMeasurement               ProtocolIE-ID ::= 230
id-InitiatingNodeType-EndcConfigUpdate          ProtocolIE-ID ::= 231
id-RespondingNodeType-EndcConfigUpdate          ProtocolIE-ID ::= 232
id-NRUESecurityCapabilities             ProtocolIE-ID ::= 233
id-PDCPChangeIndication              ProtocolIE-ID ::= 234
id-ServedEUTRACellsEndcX2ManagementList        ProtocolIE-ID ::= 235
id-CellAssistanceInformation          ProtocolIE-ID ::= 236
id-RACContainer                    ProtocolIE-ID ::= 237
id-SRBType                        ProtocolIE-ID ::= 238
id-HandoverRestrictionList           ProtocolIE-ID ::= 239
id-SCGConfigurationQuery             ProtocolIE-ID ::= 240
id-InitiatingNodeType-EndcX2Setup       ProtocolIE-ID ::= 241
id-RespondingNodeType-EndcX2Setup       ProtocolIE-ID ::= 242
id-NRUESecurityCapabilities             ProtocolIE-ID ::= 243
id-PDCPChangeIndication              ProtocolIE-ID ::= 244
id-CellAssistanceInformation          ProtocolIE-ID ::= 245
id=Globalen-gNB-ID           ProtocolIE-ID ::= 252
id-ServedNRcellsENDCX2ManagementList           ProtocolIE-ID ::= 253
id-UE-ContextReferenceAtSgNB               ProtocolIE-ID ::= 254
id-SecondaryRATUsageReport                           ProtocolIE-ID ::= 255
id-ActivationID                                    ProtocolIE-ID ::= 256
id-MeNBResourceCoordinationInformation                     ProtocolIE-ID ::= 257
id-SgNBResourceCoordinationInformation                  ProtocolIE-ID ::= 258
id-ServedEUTRAcellsToModifyListENDCConfUpd             ProtocolIE-ID ::= 259
id-ServedNRcellsToModifyListENDCConfUpd                ProtocolIE-ID ::= 260
id-ServedNRcellsToDeleteListENDCConfUpd                 ProtocolIE-ID ::= 261
id-ServedNRcellsToDeleteListENDCConfUpd                 ProtocolIE-ID ::= 262
id-E-RABUsageReport-Item                           ProtocolIE-ID ::= 263
id-Old-SgNB-UE-X2AP-ID                              ProtocolIE-ID ::= 264
id-SecondaryRATUsageReportList                       ProtocolIE-ID ::= 265
id-SecondaryRATUsageReport-Item                       ProtocolIE-ID ::= 266
id-ServedNRCellsToActivate                          ProtocolIE-ID ::= 267
id-ActivatedNRCellList                              ProtocolIE-ID ::= 268
id-ServedEUTRAcellsToModifyListENDCConfUpd             ProtocolIE-ID ::= 269
id-ServedEUTRAcellsToDeleteListENDCConfUpd             ProtocolIE-ID ::= 270
id-ServedNRcellsToModifyListENDCConfUpd                ProtocolIE-ID ::= 271
id-ServedNRcellsToDeleteListENDCConfUpd                ProtocolIE-ID ::= 272
id-DownlinkPacketLossRate                           ProtocolIE-ID ::= 273
id-UplinkPacketLossRate                              ProtocolIE-ID ::= 274
id-SubscriberProfileIDforRFP                         ProtocolIE-ID ::= 275
id-serviceType                                      ProtocolIE-ID ::= 276
id-AerialUEsubscriptionInformation                   ProtocolIE-ID ::= 277
id-SGNB-Addition-Trigger-Ind                        ProtocolIE-ID ::= 278
id-MeNBCell-ID                                      ProtocolIE-ID ::= 279
id-RequestedSplitSRBsrelease                        ProtocolIE-ID ::= 280
id-AdmittedSplitSRBsrelease                          ProtocolIE-ID ::= 281
id-NAS-NSSS-PowerOffset                              ProtocolIE-ID ::= 282
id-NSSS-NumOccasionDifferentPrecoder                 ProtocolIE-ID ::= 283
id-ProtectedEUTRAresourceIndication                  ProtocolIE-ID ::= 284
id-InitiatingNodeType-EutranrCellResourceCoordination ProtocolIE-ID ::= 285
id-RespondingNodeType-EutranrCellResourceCoordination ProtocolIE-ID ::= 286
id-DataTrafficResourceIndication                     ProtocolIE-ID ::= 287
id-SpectrumSharingGroupID                           ProtocolIE-ID ::= 288
id-ListofEUTRACellsinEUTRACoordinationReq            ProtocolIE-ID ::= 289
id-ListofEUTRACellsinEUTRACoordinationResp            ProtocolIE-ID ::= 290
id-ListofNRCellsinNRCoordinationReq                  ProtocolIE-ID ::= 291
id-ListofNRCellsinNRCoordinationResp                  ProtocolIE-ID ::= 292
id-E-RABs-AdmittedToBeModified-SgNBModConfList        ProtocolIE-ID ::= 293
id-E-RABs-AdmittedToBeModified-SgNBModConf-Item       ProtocolIE-ID ::= 294
id-UEContextLevel1UserPlaneActivity                  ProtocolIE-ID ::= 295
id-ERABActivityNotifyItemList                        ProtocolIE-ID ::= 296
id-InitiatingNodeType-EndcX2Removal                   ProtocolIE-ID ::= 297
id-RespondingNodeType-EndcX2Removal                   ProtocolIE-ID ::= 298
9.3.8 Container definitions

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

X2AP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) x2ap (2) version1 (1) x2ap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::= BEGIN

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

IMPORTS
maxPrivateIEs,
maxProtocolExtensions,
maxProtocolIEs,
Criticality,
Presence,
PrivateIE-ID,
ProtocolIE-ID
FROM X2AP-CommonDataTypes;

-- ******************************************************************************************
--
-- Class Definition for Protocol IEs
--
-- ******************************************************************************************

X2AP-PROTOCOL-IES ::= CLASS {
&id    ProtocolIE-ID    UNIQUE,
&criticality Criticality,
&Value,
&presence  Presence
}

WITH SYNTAX {
ID    &id
CRITICALITY  &criticality
TYPE    &Value
PRESENCE  &presence
}

-- ******************************************************************************************
--
X2AP-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
}

X2AP-PROTOCOL-EXTENSION ::= CLASS {
  &id ProtocolIE-ID UNIQUE,
  &criticality Criticality,
  &Extension,
  &presence Presence
}
WITH SYNTAX {
  ID &id
  CRITICALITY &criticality
  EXTENSION &Extension
  PRESENCE &presence
}

X2AP-PRIVATE-IES ::= CLASS {
  &id PrivateIE-ID,
  &criticality Criticality,
  &Value,
  &presence Presence
}
WITH SYNTAX {
  ID &id
-- Container for Protocol IEs

ProtocolIE-Container (X2AP-PROTOCOL-IES : IEsSetParam) ::= SEQUENCE (SIZE (0..maxProtocolIEs)) OF ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Single-Container (X2AP-PROTOCOL-IES : IEsSetParam) ::= ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field (X2AP-PROTOCOL-IES : IEsSetParam) ::= SEQUENCE {
  id X2AP-PROTOCOL-IES.&id ({IEsSetParam}),
  criticality X2AP-PROTOCOL-IES.&criticality ({IEsSetParam}@id),
  value X2AP-PROTOCOL-IES.&Value ({IEsSetParam}@id)
}

-- Container for Protocol IE Pairs

ProtocolIE-FieldPair (X2AP-PROTOCOL-IES-PAIR : IEsSetParam) ::= SEQUENCE {
  id X2AP-PROTOCOL-IES-PAIR.&id ({IEsSetParam}),
  firstCriticality X2AP-PROTOCOL-IES-PAIR.&firstCriticality ({IEsSetParam}@id),
  firstValue X2AP-PROTOCOL-IES-PAIR.&firstValue ({IEsSetParam}@id),
  secondCriticality X2AP-PROTOCOL-IES-PAIR.&secondCriticality ({IEsSetParam}@id),
  secondValue X2AP-PROTOCOL-IES-PAIR.&SecondValue ({IEsSetParam}@id)
}

-- Container Lists for Protocol IE Containers

ProtocolIE-ContainerList (INTEGER : lowerBound, INTEGER : upperBound, X2AP-PROTOCOL-IES : IEsSetParam) ::= SEQUENCE (SIZE (lowerBound..upperBound)) OF ProtocolIE-Container {{IEsSetParam}}

ProtocolIE-ContainerPairList (INTEGER : lowerBound, INTEGER : upperBound, X2AP-PROTOCOL-IES-PAIR : IEsSetParam) ::= SEQUENCE (SIZE (lowerBound..upperBound)) OF
ProtocolIE-ContainerPair {{IEsSetParam}}

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

-- Container for Protocol Extensions

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

ProtocolExtensionContainer {X2AP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
 ProtocolExtensionField {{ExtensionSetParam}}
}

ProtocolExtensionField {X2AP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
 id X2AP-PROTOCOL-EXTENSION.&id ({ExtensionSetParam}),
 criticality X2AP-PROTOCOL-EXTENSION.&criticality ({ExtensionSetParam}{@id}),
 extensionValue X2AP-PROTOCOL-EXTENSION.&Extension ({ExtensionSetParam}{@id})
}

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

-- Container for Private IEs

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

PrivateIE-Container {X2AP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
 PrivateIE-Field {{IEsSetParam}}
}

PrivateIE-Field {X2AP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
 id X2AP-PRIVATE-IES.&id (IEsSetParam),
 criticality X2AP-PRIVATE-IES.&criticality (IEsSetParam){@id},
 value X2AP-PRIVATE-IES.&Value (IEsSetParam){@id}
}

END
9.4 Message transfer syntax

X2AP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Rec. X.691 [5].

9.5 Timers

\( T_{\text{RELOCprep}} \)
- Specifies the maximum time for the Handover Preparation procedure in the source eNB.

\( T_{\text{TX2RELOCoverall}} \)
- Specifies the maximum time for the protection of the overall handover procedure in the source eNB.

\( T_{\text{DCprep}} \)
- Specifies the maximum time for the SeNB Addition Preparation, MeNB initiated SeNB Modification Preparation, SgNB Addition Preparation, or MeNB initiated SgNB Modification Preparation procedure in the MeNB.

\( T_{\text{DCoverall}} \)
- Specifies the maximum time in the SeNB for either the SeNB initiated SeNB Modification procedure or the protection of the E-UTRAN actions necessary to configure UE resources at SeNB Addition or MeNB initiated SeNB Modification. Or specifies the maximum time in the SgNB for either the SgNB initiated SgNB Modification procedure or the protection of the E-UTRAN actions necessary to configure UE resources at SgNB Addition or MeNB initiated SgNB Modification.

10 Handling of unknown, unforeseen and erroneous protocol data

Section 10 of TS 36.413 [4] is applicable for the purposes of the present document.
Annex A (informative):
Change history
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<th>TSG #</th>
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<th>CR</th>
<th>Rev</th>
<th>Subject/Comment</th>
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<td>Introduction of signalling support for Composite Available Capacity with relative units</td>
<td>9.1.0</td>
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**03/2012**

Rel-11 version created based on v. 10.5.0

11.0.0
Corrections for Dual Connectivity
ASN.1 Corrections for X2AP
Introduction of Cause values for Dual Connectivity
Correction on DC stage3
Corrections of Dual Connectivity in general
ProSe authorized indication
ASN.1 correction to make it compilable
History table corrected
X2 Removal Signaling
Setting of Re-establishment Cell ID in RLF Indication message
Correction on RLF Report Container
X2AP Rapporteur Update
X2 support for Network Assisted Interference Cancellation
Introduction of inter-eNB CoMP signalling
Introduction of Dual Connectivity
Introduction of an indication of the expected UE behaviour
Introduction of the UE history reported from the UE
Clarification of DL ABS status
Correction of SN STATUS TRANSFER
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Correction to tabular of Served Cell Information IE
Handling SIPTO@LN during UE Context Release procedure
Correction for Load Balancing Related IE
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Correction on Handover Report procedure
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| RP-162337 | 1007 | Clarification on V2X Services Authorized IE | 14.0.0 |
| RP-162340 | 1011 | Correction to Served Cell Information for NB-IoT | 14.1.0 |
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