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Technical Specification Group Radio Access Network;

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(E-UTRAN);

X2 application protocol (X2AP)

(Release 16)

** 

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# Foreword

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

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

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

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

# 1 Scope

The present document specifies the 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".

[2] 3GPP TS 36.401: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture Description".

[3] 3GPP TS 36.420: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 General Aspects and Principles".

[4] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".

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

[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".

[8] 3GPP TS 36.424: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 data transport".

[9] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRAN); Radio Resource Control (RRC) Protocol Specification".

[10] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation".

[11] 3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures ".

[12] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[13] 3GPP TS 23.203: "Policy and charging control architecture".

[14] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System; Stage 3".

[15] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA), Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; stage 2".

[16] 3GPP TS 36.104: "Base Station (BS) radio transmission and reception ".

[17] Void.

[18] 3GPP TS 33.401: "Security architecture".

[19] 3GPP TS 36.414: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 data transport".

[20] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC)".

[21] 3GPP TS 36.422: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 signaling transport".

[22] 3GPP TS 36.314: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Layer 2 - Measurements".

[23] Void.

[24] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling"

[25] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT);Overall description; Stage 2".

[26] 3GPP TS 29.281: "General Packet Radio Service (GPRS); Tunnelling Protocol User Plane (GTPv1-U)".

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

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

[29] 3GPP TS 23.003: "Technical Specification Group Core Network and Terminals; Numbering, addressing and identification".

[30] 3GPP TR 25.921 (version.7.0.0): "Guidelines and principles for protocol description and error handling".

[31] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specification".

[32] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity; Stage 2".

[33] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".

[34] 3GPP TS 38.401: "NG-RAN; Architecture description".

[35] IETF RFC 5905: "Network Time Protocol Version 4: Protocol and Algorithms Specification".

[36] 3GPP TS 26.247: "Transparent end-to-end Packet-switched Streaming Service (PSS); Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".

[37] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".

[38] 3GPP TS 23.501: "System Architecture for the 5G System"

[39] 3GPP TS 38.413: "NG Radio Access Network (NG-RAN); NG Application Protocol (NGAP)".

[40] 3GPP TS 36.322: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Link Control (RLC) protocol specification".

[41] 3GPP TS 23.285: " Technical Specification Group Services and System Aspects; Architecture enhancements for V2X services".

[42] 3GPP TS 38.211: "NR; Physical channels and modulation".

[43] 3GPP TS 38.213: "NR; Physical layer procedures for control".

[44] 3GPP TS 38.473: "NG-RAN; F1 application protocol (F1AP)".

[45] 3GPP TS 38.314: "NR; Layer 2 Measurements".

[46] Void

[47] 3GPP TS 38.300: "NR; Overall description; Stage-2".

[48] 3GPP TS 38.472: "NG-RAN; F1 signalling transport"

[49] 3GPP TS 38.423: "NG-RAN; Xn Application Protocol (XnAP)".

[50] 3GPP TS 33.501: "Security architecture and procedures for 5G System".

# 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].

**ACL functionality:** A functionality controlling the access to network nodes. In case of Access Control Lists (ACL) functionality is applied in a network node the network node may only accept connections from other peer network nodes once the source addresses of the sending network node is already known in the target node.

**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].

**E-UTRAN node**: either an eNB or an en-gNB.

**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].

**Conditional Handover:** As defined in TS 36.300 [15].

**DAPS HO:** As defined in TS 36.300 [15].

**Conditional PSCell Change:** As defined in TS 37.340 [32].

**Immediate Handover:** Used in the context of Conditional Handover, to refer to a handover that is executed immediately after the UE receives the Handover Command.

**IAB-node:** as defined in TS 38.300 [47].

## 3.2 Symbols

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

<symbol> <Explanation>

## 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].

ABS Almost Blank Subframe

ARPI Additional RRM Policy Index

ACL Access Control List

BBF Broadband Forum

BL Bandwidth reduced Low complexity

CCO Cell Change Order

CE Coverage Enhancement

CHO Conditional Handover

CoMP Coordinated Multi Point

DAPS Dual Active Protocol Stacks

DC Dual Connectivity

DL Downlink

EARFCN E-UTRA Absolute Radio Frequency Channel Number

E-CID Enhanced Cell-ID (positioning method)

eNB E-UTRAN NodeB

EN-DC E-UTRA-NR Dual Connectivity

EP Elementary Procedure

EPC Evolved Packet Core

E-RAB E-UTRAN Radio Access Bearer

E-UTRAN Evolved UTRAN

GNSS Global Navigation Satellite System

GUMMEI Globally Unique MME Identifier

HFN Hyper Frame Number

IAB Integrated Access and Backhaul

IE Information Element

L-GW Local GateWay

LWA LTE-WLAN Aggregation

MCG Master Cell Group

MDT Minimization of Drive Tests

MeNB Master eNB

MME Mobility Management Entity

MTSI Multimedia Telephony Service for IMS

NAICS Network-Assisted Interference Cancellation and Suppression

NR New Radio

PDCP Packet Data Convergence Protocol

PLMN Public Land Mobile Network

ProSe Proximity Service

QMC QoE Measurement Collection

QoE Quality of Experience

SCG Secondary Cell Group

S-GW Serving Gateway

SeNB Secondary eNB

SgNB Secondary gNB

SIPTO Selected IP Traffic Offload

SIPTO@LN Selected IP Traffic Offload at the Local Network

SN Sequence Number

SSID Service Set Identifier

TAC Tracking Area Code

UE User Equipment

UL Uplink

V2X Vehicle-to-Everything

WLAN Wireless Local Area Network

WT WLAN Termination

# 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 Retrieval. This function allows retrieval of a UE context in case of resumption or re-establishment of an RRC connection.

- 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.

- EN-DC Configuration Transfer. This function supports en-gNB X2 TNL address discovery.

- EN-DC Load Management. This function is used by MeNB/en-gNB to indicate resource status, overload and traffic load to each other.

- UE Radio Capability ID Mapping.

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

| Function | Elementary Procedure(s) |
| --- | --- |
| Mobility Management | a) Handover Preparation b) SN Status Transfer c) UE Context Release  d) Handover Cancel  e) Handover Success  f) Conditional 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  o) gNB Status Indication  p) EN-DC Resource Status Reporting Initiation  q) EN-DC Resource Status Reporting  r) F1-C Traffic Transfer |
| 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 Retrieval | a) Retrieve UE Context  b) Data Forwarding Address Indication |
| Secondary RAT Data Usage Report | Secondary RAT Data Usage Report |
| E-UTRA – NR Spectrum Sharing | E-UTRA - NR Cell Resource Coordination |
| EN-DC Configuration Transfer | EN-DC Configuration Transfer |
| UE Radio Capability ID Mapping | UE Radio Capability ID Mapping |

# 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

| Elementary Procedure | Initiating Message | Successful Outcome | Unsuccessful Outcome | |
| --- | --- | --- | --- | --- |
| Response message | Response message | |
| Handover Preparation | HANDOVER REQUEST | HANDOVER REQUEST ACKNOWLEDGE | HANDOVER PREPARATION FAILURE |
| Reset | RESET REQUEST | RESET RESPONSE |  |
| X2 Setup | X2 SETUP REQUEST | X2 SETUP RESPONSE | X2 SETUP FAILURE |
| eNB Configuration Update | ENB CONFIGURATION UPDATE | ENB CONFIGURATION UPDATE ACKNOWLEDGE | ENB CONFIGURATION UPDATE FAILURE |
| Resource Status Reporting Initiation | RESOURCE STATUS REQUEST | RESOURCE STATUS RESPONSE | RESOURCE STATUS FAILURE |
| Mobility Settings Change | MOBILITY CHANGE REQUEST | MOBILITY CHANGE ACKNOWLEDGE | MOBILITY CHANGE FAILURE |
| Cell Activation | CELL ACTIVATION REQUEST | CELL ACTIVATION RESPONSE | CELL ACTIVATION FAILURE |
| SeNB Addition Preparation | SENB ADDITION REQUEST | SENB ADDITION REQUEST ACKNOWLEDGE | SENB ADDITION REQUEST REJECT |
| MeNB initiated SeNB Modification Preparation | SENB MODIFICATION REQUEST | SENB MODIFICATION REQUEST ACKNOWLEDGE | SENB MODIFICATION REQUEST REJECT |
| SeNB initiated SeNB Modification | SENB MODIFICATION REQUIRED | SENB MODIFICATION CONFIRM | SENB MODIFICATION REFUSE |
| SeNB initiated SeNB Release | SENB RELEASE REQUIRED | SENB RELEASE CONFIRM |  |
| X2 Removal | X2 REMOVAL REQUEST | X2 REMOVAL RESPONSE | X2 REMOVAL FAILURE |
| Retrieve UE Context | RETRIEVE UE CONTEXT REQUEST | RETRIEVE UE CONTEXT RESPONSE | RETRIEVE UE CONTEXT FAILURE |
| SgNB Addition Preparation | SGNB ADDITION REQUEST | SGNB ADDITION REQUEST ACKNOWLEDGE | SGNB ADDITION REQUEST REJECT |
| MeNB initiated SgNB Modification Preparation | SGNB MODIFICATION REQUEST | SGNB MODIFICATION REQUEST ACKNOWLEDGE | SGNB MODIFICATION REQUEST REJECT |
| SgNB initiated SgNB Modification | SGNB MODIFICATION REQUIRED | SGNB MODIFICATION CONFIRM | SGNB MODIFICATION REFUSE |
| SgNB change | SGNB CHANGE REQUIRED | SGNB CHANGE CONFIRM | SGNB CHANGE REFUSE |
| MeNB initiated SgNB Release | SGNB RELEASE REQUEST | SGNB RELEASE REQUEST ACKNOWLEDGE | SGNB RELEASE REQUEST REJECT |
| SgNB initiated SgNB Release | SGNB RELEASE REQUIRED | SGNB RELEASE CONFIRM |  |
| EN-DC X2 Setup | EN-DC X2 SETUP REQUEST | EN-DC X2 SETUP RESPONSE | EN-DC X2 SETUP FAILURE |
| EN-DC Configuration Update | EN-DC CONFIGURATION UPDATE | EN-DC CONFIGURATION UPDATE ACKNOWLEDGE | EN-DC CONFIGURATION UPDATE FAILURE |
| EN-DC Cell Activation | EN-DC CELL ACTIVATION REQUEST | EN-DC CELL ACTIVATION RESPONSE | EN-DC CELL ACTIVATION FAILURE |
| E-UTRA - NR Cell Resource Coordination | E-UTRA - NR CELL RESOURCE COORDINATION REQUEST | E-UTRA - NR CELL RESOURCE COORDINATION RESPONSE |  |
| EN-DC X2 Removal | EN-DC X2 REMOVAL REQUEST | EN-DC X2 REMOVAL RESPONSE | EN-DC X2 REMOVAL FAILURE |
| EN-DC Resource Status Reporting Initiation | EN-DC RESOURCE STATUS REQUEST | EN-DC RESOURCE STATUS RESPONSE | EN-DC RESOURCE STATUS FAILURE |
| UE Radio Capability ID Mapping | UE RADIO CAPABILITY ID MAPPING REQUEST | UE RADIO CAPABILITY ID MAPPING RESPONSE |  |

Table 8.1-2: Class 2 Elementary Procedures

| Elementary Procedure | Initiating Message |
| --- | --- |
| Load Indication | LOAD INFORMATION |
| Handover Cancel | HANDOVER CANCEL |
| SN Status Transfer | SN STATUS TRANSFER |
| UE Context Release | UE CONTEXT RELEASE |
| Resource Status Reporting | RESOURCE STATUS UPDATE |
| Error Indication | ERROR INDICATION |
| Radio Link Failure Indication | RLF INDICATION |
| Handover Report | HANDOVER REPORT |
| X2 Release | X2 RELEASE |
| X2AP Message Transfer | X2AP MESSAGE TRANSFER |
| SeNB Reconfiguration Completion | SENB RECONFIGURATION COMPLETE |
| MeNB initiated SeNB Release | SENB RELEASE REQUEST |
| SeNB Counter Check | SENB COUNTER CHECK REQUEST |
| SgNB Reconfiguration Completion | SGNB RECONFIGURATION COMPLETE |
| SgNB Counter Check | SGNB COUNTER CHECK REQUEST |
| RRC Transfer | RRC TRANSFER |
| Secondary RAT Data Usage Report | SECONDARY RAT DATA USAGE REPORT |
| SgNB Activity Notification | SGNB ACTIVITY NOTIFICATION |
| Data Forwarding Address Indication | DATA FORWARDING ADDRESS INDICATION |
| gNB Status Indication | GNB STATUS INDICATION |
| EN-DC Configuration Transfer | EN-DC CONFIGURATION TRANSFER |
| Trace Start | TRACE START |
| Deactivate Trace | DEACTIVATE TRACE |
| Handover Success | HANDOVER SUCCESS |
| Conditional Handover Cancel | CONDITIONAL HANDOVER CANCEL |
| Early Status Transfer | EARLY STATUS TRANSFER |
| EN-DC Resource Status Reporting | EN-DC RESOURCE STATUS UPDATE |
| Cell Traffic Trace | CELL TRAFFIC TRACE |
| F1-C Traffic Transfer | F1-C TRAFFIC TRANSFER |

## 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. If the procedure concerns a conditional handover, parallel transactions are allowed. Possible parallel requests are identified by the target cell ID when the source UE AP IDs are the same.

The procedure uses UE-associated signalling.

#### 8.2.1.2 Successful Operation



Figure 8.2.1.2-1: Handover Preparation, successful operation

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 TRELOCprep.

If the *Conditional Handover Information Request* IE is contained in the HANDOVER REQUEST message, the target eNB shall consider that the request concerns a conditional handover and shall include the *Conditional Handover Information* *Acknowledge* IE in the HANDOVER REQUEST ACKNOWLEDGE message.

If the *New eNB UE X2AP ID* IE is contained in the *Conditional Handover Information Request* IE included in the HANDOVER REQUEST message, then the target eNB shall remove the existing prepared conditional HO identified by the *New eNB UE X2AP ID* IE and the *Target Cell ID* IE. It is up to the implementation of the target eNB when to remove the HO information.

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].

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. The source eNB shall include the DL Forwarding IE if it requests a DAPS handover for that E-RAB. 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 tunnel endpoint, i.e. the information contained in the *Transport Layer address* IE and *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 TRELOCprep and terminate the Handover Preparation procedure. If the procedure was initiated for an immediate handover, the source eNB shall start the timer TX2RELOCoverall. 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 *Trace Activation* IE includes the *Bluetooth Measurement Configuration* IE, within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [31].

- if the *Trace Activation* IE includes the *WLAN Measurement Configuration* IE, within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [31].

- if the *Trace Activation* IE includes the *MDT Configuration NR* IE, store and forward the *MDT Configuration NR* IE to the SgNB, if the target eNB has configured EN-DC for the UE.

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].

If the *Additional RRM Policy Index* IE is contained in the HANDOVER REQUEST message, the target eNB shall, if supported, 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 IP header compression for the concerned E-RAB.

If the *Ethernet Type* IE is included in the HANDOVER REQUEST message and is set to "True", then the target eNB shall, if supported, take this into account to perform header compression appropriately for the concerned E-RAB.

If the *UE Sidelink Aggregate Maximum Bit Rate* IE is contained in theHANDOVER 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].

If the *Subscription Based* *UE Differentiation Information* IE is included in the HANDOVER REQUEST message, the eNB shall, if supported, store this information in the UE context for further use according to TS 23.401 [12].

If the *DAPS Request Information* IE is included for an E-RAB to be setup in the HANDOVER REQUEST message, the target eNB shall consider that the request concerns a DAPS handover for that E-RAB, as described in TS 36.300 [15]. Accordingly, the target eNB shall include the *DAPS Response Information* IE in the HANDOVER REQUEST ACKNOWLEDGE message.

If the *Maximum Number of CHO Preparations* IE is included in *Conditional Handover Information Acknowledge* IE contained in the the HANDOVER REQUEST ACKNOWLEDGE message, then the source eNB should not prepare more candidate target cells for a CHO for the same UE towards the target eNB than the number indicated in the *Maximum Number of CHO Preparations* IE.

If the *Estimated Arrival Probability* IE is contained in the *Conditional Handover Information* *Request* IE included in the HANDOVER REQUEST message, then the target eNB may use the information to allocate necessary resources for the incoming CHO.

If the *EPC Handover Restriction List Container* IE is included in the HANDOVER REQUEST message, the target eNB shall, if supported, store this information in the UE context and shall use it as specified in TS 36.300 [15].

If the *NR* *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 *NR* *UE Sidelink Aggregate Maximum Bit Rate* IE is contained in theHANDOVER REQUEST message, the target eNB shall, if supported, use it for the concerned UE's sidelink communication in network scheduled mode for NR V2X services.

If the *PC5 QoS Parameters* IE is contained in theHANDOVER REQUEST message, the target eNB shall, if supported, use it for the concerned UE’s NR sidelink communication as specified in TS 23.285 [41].

If the *UE Radio Capability ID* IE is contained in the HANDOVER REQUEST message, the target eNB shall, if supported, store this information in the UE context and use it as specified in TS 23.401 [12].

If the *IAB Node Indication* IE is contained in the HANDOVER REQUEST message, the target eNB shall, if supported, consider that the request is for an IAB node.

If the *IMS Voice EPS Fallback from 5G* IE is contained in the HANDOVER REQUEST message, the target eNB shall, if supported, store this information in the UE context and consider that the UE was previously handed over from NG-RAN to E-UTRAN due to an IMS voice fallback.

If the target eNB receives a HANDOVER REQUEST message containing the *Source DL Forwarding IP Address* IE as part of the *E-RABs To Be Setup Item* IE, the target eNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

**Interaction with SN Status Transfer procedure:**

If the *UE Context Kept Indicator* IE set to "True" and the *E-RABs transferred to MeNB* IE are included in the HANDOVER REQUEST ACKNOWLEDGE message, then the source eNB shall, if supported, include the uplink/downlink PDCP SN and HFN status received from the SgNB in the SN Status Transfer procedure towards the target eNB, as specified in TS 37.340 [32].

#### 8.2.1.3 Unsuccessful Operation



Figure 8.2.1.3-1: Handover Preparation, unsuccessful operation

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.

If the *Conditional Handover Information Request* IE is contained in the HANDOVER REQUEST message and the target eNB rejects the handover or a failure occurs during the Handover Preparation, the target eNB shall include the *Requested Target Cell ID* IE in the HANDOVER PREPARATION FAILURE message.

**Interactions with Handover Cancel procedure:**

If there is no response from the target eNB to the HANDOVER REQUEST message before timer TRELOCprep 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.

If the *CHO trigger* IE is set to "CHO-replace" in the HANDOVER REQUEST message, but there is no CHO prepared for the included *New eNB UE X2AP ID* IE, or the candidate cell in the *Target Cell ID* IE was not prepared using the same UE-associated signaling connection, 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 MeNB and en-gNB involved in EN-DC, for each respective E-RAB for which PDCP SN and HFN status preservation applies.

In case that the X2 handover is a DAPS handover, the SN Status Transfer procedure may also be used to transfer the uplink PDCP SN and HFN receiver status, or the downlink PDCP SN and HFN transmitter status for an E-RAB associated with RLC-UM and configured with DAPS as described in TS 36.300 [15].

If the SN Status Transfer procedure is applied in the course of dual connectivity, LWA, RRC connection re-establishment 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, RRC connection re-establishment 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, RRC connection re-establishment to which data is forwarded, is specified by the behaviour of the "target eNB".

- in case of EN-DC, the behaviour of the node from which the E-RAB context is transferred, i.e., either the en-gNB or the MeNB from which data is forwarded, is specified by the behaviour of the "source eNB",

- in case of EN-DC, the behaviour of the node to which the E-RAB context is transferred, i.e., either the en-gNB or the MeNB to which data is forwarded, is specified by the behaviour of the "target eNB".

The procedure uses UE-associated signalling.

#### 8.2.2.2 Successful Operation



Figure 8.2.2.2-1: SN Status Transfer, successful operation



Figure 8.2.2.2-2: MeNB initiated SN Status Transfer for EN-DC, successful operation



Figure 8.2.2.2-3: en-gNB initiated SN Status Transfer for EN-DC, successful operation

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] or for the EN-DC operations as per TS 37.340 [32] shall ignore the information received in this message. In case of EN-DC, if the target eNB performs PDCP version change or PDCP SN length change or RLC mode change for an E-RAB as specified in TS 37.340 [32], it shall ignore the information received for that E-RAB in this message.

In case that the X2 handover is a DAPS handover, the source eNB may continue assigning PDCP SNs to downlink SDUs and delivering uplink SDUs toward the EPC when initiating this procedure for E-RABs not configured with DAPS as in TS 36.300 [15].

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. In case that the X2 handover is a DAPS handover, this IE may contain the E-RAB ID(s) corresponding to the E-RAB(s) associated with RLC-UM.

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 *SgNB UE X2AP ID* IE shall be included in the SN STATUS TRANSFER message, while the *New eNB UE X2AP ID* IE is ignored. The *SgNB UE X2AP ID* IE is used as the new UE ID.

#### 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.

### 8.2.3 UE Context Release

#### 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.

#### 8.2.3.2 Successful Operation



Figure 8.2.3.2-1: UE Context Release, successful operation for handover



Figure 8.2.3.2-2: UE Context Release, successful operation for dual connectivity



Figure 8.2.3.2-3: UE Context Release, successful operation for EN-DC

**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



Figure 8.2.4.2-1: Handover Cancel, successful operation

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.

If the *Candidate Cells To Be Cancelled List* IE is included in the HANDOVER CANCEL message, the target eNB shall consider that the source eNB is cancelling only the handover associated to the candidate cells identified by the included ECGI and associated to the UE-associated signaling connection identified by the *Old eNB UE X2AP ID* IE (or the *Old eNB UE X2AP ID Extension* IE if included) and, if included , also by the *New eNB UE X2AP ID* IE (or the *New eNB UE X2AP ID Extension* IE if included).

#### 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.

If the *Candidate Cells To Be Cancelled List* IE is included in the HANDOVER CANCEL message and the handover is not associated to a conditional handover, the target eNB shall ignore the *Candidate Cells To Be Cancelled List* IE.

If one or more candidate cells in the *Candidate Cells To Be Cancelled List* IE included in the HANDOVER CANCEL message were not prepared using the same UE-associated signaling connection, the target eNB shall ignore those non-associated candidate cells.

### 8.2.5 Handover Success

#### 8.2.5.1 General

The Handover Success procedure is used during a conditional handover or a DAPS handover to enable a target eNB to inform the source eNB that the UE has successfully accessed the target eNB.

The procedure uses UE-associated signalling.

#### 8.2.5.2 Successful Operation



Figure 8.2.5.2-1: Handover Success, successful operation

The target eNB initiates the procedure by sending the HANDOVER SUCCESS message to the source eNB.

If late data forwarding was configured for this UE, the source eNB shall start data forwarding using the tunnel information related to the global target cell ID provided in the HANDOVER SUCCESS message.

When the source eNB receives the HANDOVER SUCCESS message, it shall consider all other CHO preparations accepted for this UE under the same UE-associated signalling connection in the target eNB as cancelled.

**Interactions with other procedures**

If a CONDITIONAL HANDOVER CANCEL message was received for this UE prior the reception of the HANDOVER SUCCESS message, the source eNB node shall consider that the UE successfully executed the handover. The source eNB may initiate Handover Cancel procedure towards the other signaling connections or other candidate target eNBs for this UE, if any.

#### 8.2.5.3 Unsuccessful Operation

Not applicable.

#### 8.2.5.4 Abnormal Conditions

If the HANDOVER SUCCESS message refers to a context that does not exist, the source eNB shall ignore the message.

### 8.2.6 Conditional Handover Cancel

#### 8.2.6.1 General

The Conditional Handover Cancel procedure is used to enable a target eNB to cancel an already prepared conditional handover.

The procedure uses UE-associated signalling.

#### 8.2.6.2 Successful Operation



Figure 8.2.6.2-1: Conditional Handover Cancel, successful operation

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

The *New* *eNB UE X2AP ID* IE and, if available, the *New eNB UE X2AP ID Extension* IE shall be included.

At the reception of the CONDITIONAL HANDOVER CANCEL message, the source eNB shall consider that the target eNB is about to remove any reference to, and release any resources previously reserved for candidate cells associated to the UE-associated signalling identified by the *Old eNB UE X2AP ID* IE (or the *Old eNB UE X2AP ID Extension* IE if included) and the *New eNB UE X2AP ID* IE (or the *New eNB UE X2AP ID Extension* IE if included).

If the *Candidate Cells To Be Cancelled List* IE is also included, the source eNB shall consider that only the resources reserved for the cells identified by the included ECGI are about to be released.

#### 8.2.6.3 Unsuccessful Operation

Not applicable.

#### 8.2.6.4 Abnormal Conditions

Should the CONDITIONAL HANDOVER CANCEL message refer to a context that does not exist, the source eNB shall ignore the message.

If one or more candidate cells in the *Candidate Cells To Be Cancelled List* IE included in the CONDITIONAL HANDOVER CANCEL message were not prepared using the same UE-associated signaling connection, the source eNB shall ignore those non-associated candidate cells.

### 8.2.7 Early Status Transfer

#### 8.2.7.1 General

The purpose of the Early Status Transfer procedure is to transfer the COUNT of the first downlink SDU that the source eNB forwards to the target eNB or the COUNT for discarding already forwarded downlink SDUs for respective E-RAB during DAPS Handover or Conditional Handover.

For Dual Connectivity or EN-DC, the Early Status Transfer procedure is also used, during a Conditional Handover, from the SeNB to the MeNB as specified in TS 36.300 [15], or from the en-gNB to the MeNB as specified in TS 37.340 [32].

The procedure uses UE-associated signalling.

#### 8.2.7.2 Successful Operation



Figure 8.2.7.2-1: Early Status Transfer during DAPS Handover or Conditional Handover, successful operation



Figure 8.2.7.2-2: Early Status Transfer during Conditional Handover in dual connectivity or EN-DC operation, successful operation

**From source eNB to target eNB**

The *E-RABs Subject To Early Status Transfer List* IE included in the EARLY STATUS TRANSFER message contains the E-RAB ID(s) corresponding to the E-RAB(s) subject to be simultaneously served by the source and the target eNBs during DAPS Handover or the E-RAB(s) transferred during Conditional Handover.

For each E-RAB for which the *FIRST DL COUNT Value* IE is received in the EARLY STATUS TRANSFER message, the target eNB shall use it as the COUNT of the first downlink SDU that the source eNB forwards to the target eNB. If the *FIRST DL COUNT Value Extended* IE or *FIRST DL COUNT Value for PDCP SN Length 18* IE is included in the *E-RABs Subject To Early Status Transfer Item* IE, the target eNB shall, if supported, use this value instead of the value contained in the *FIRST DL COUNT Value* IE.

For each E-RAB for which the *DISCARD DL COUNT Value* IE is received in the EARLY STATUS TRANSFER message, the target eNB does not transmit forwarded downlink SDUs to the UE whose COUNT is less than the provided and discards them if transmission has not been attempted. If the *DISCARD DL COUNT Value Extended* IE or *DISCARD DL COUNT Value for PDCP SN Length 18* IE is included in the *E-RABs Subject To Early Status Transfer Item* IE, the target eNB shall, if supported, use this value instead of the value contained in the *DISCARD DL COUNT Value* IE.

**From SeNB (respectively, en-gNB) to MeNB, the source eNB for Conditional Handover**

The *E-RABs Subject To Early Status Transfer List* IE included in the EARLY STATUS TRANSFER message contains the E-RAB ID(s) corresponding to the E-RAB(s) transferred during Conditional Handover.

For each E-RAB in the *E-RABs Subject To Early Status Transfer List* IE, the source eNB shall forward to the target, the value of the received *FIRST DL COUNT Value* IE or *DISCARD DL COUNT Value* IE. If the *FIRST DL COUNT Value Extended* IE or *FIRST DL COUNT Value for PDCP SN Length 18* IE is included, if supported, this value is forwarded instead of the value contained in the *FIRST DL COUNT Value* IE. If the *DISCARD DL COUNT Value Extended* IE or *DISCARD DL COUNT Value for PDCP SN Length 18* IE is included, if supported, this value is forwarded instead of the value contained in the *DISCARD DL COUNT Value* IE.

If the en-gNB sends the message to the MeNB, then the *SgNB UE X2AP ID* IE shall be included in the EARLY 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.

#### 8.2.7.3 Abnormal Conditions

If the target eNB receives this message for a UE for which no prepared DAPS Handover or Conditional Handover exists at the target eNB, 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



Figure 8.3.1.2-1: Load Indication, 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



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.

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.

In case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], if the Error Indication procedure is triggered by non UE-associated signalling, the ERROR INDICATION message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 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.

NOTE: Exchange of application level configuration data also applies between two eNBs in case the SN (i.e. the en-gNB) does not broadcast system information other than for radio frame timing and SFN, as specified in the TS 37.340 [32]. How to use this information when this option is used is not explicitly specified.

The procedure uses non UE-associated signalling.

#### 8.3.3.2 Successful Operation



Figure 8.3.3.2-1: X2 Setup, 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 *NR Neighbour Information* IE in the X2 SETUP REQUEST message. The candidate eNB2 may also include the *NR Neighbour Information* IE in the X2 SETUP RESPONSE message. The *NR Neighbour Information* IE shall only include NR cells capable of performing EN-DC with the corresponding served E-UTRA cell. The eNB receiving the *NR Neighbour Information* 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.

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

**Interaction with the EN-DC Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *NR Neighbour Information* IE in the X2 SETUP REQUEST message or in the X2 SETUP RESPONSE message to neighbouring en-gNBs by triggering the EN-DC Configuration Update procedure.

**Interaction with the eNB Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *NR Neighbour Information* IE in the X2 SETUP REQUEST message or in the X2 SETUP RESPONSE message to neighbouring eNBs by triggering the eNB Configuration Update procedure.

#### 8.3.3.3 Unsuccessful Operation



Figure 8.3.3.3-1: X2 Setup, unsuccessful operation

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



Figure 8.3.4.2-1: Reset, successful operation

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.



Figure 8.3.4.2-2: Reset, successful operation for EN-DC.

The procedure is initiated with a RESET REQUEST message sent from the eNB1/en-gNB1 to en-gNB2/eNB2. Upon receipt of this message, eNB2/en-gNB2 shall abort any other ongoing procedures over X2 between both nodes. eNB2/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, eNB2/en-gNB2 shall respond with a RESET RESPONSE message.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the RESET REQUEST and the RESET RESPONSE messages shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 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.

NOTE: Update of application level configuration data also applies between two eNBs in case the SN (i.e. the en-gNB) does not broadcast system information other than for radio frame timing and SFN, as specified in the TS 37.340 [32]. How to use this information when this option is used is not explicitly specified.

The procedure uses non UE-associated signalling.

#### 8.3.5.2 Successful Operation



Figure 8.3.5.2-1: eNB Configuration Update, 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.

- If the *NPRACH 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 optimization.

**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].

If the *NR 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. The *NR Neighbour Information* IE shall only include NR cells capable of performing EN-DC with the corresponding served E-UTRA cell. The eNB receiving the *NR Neighbour Information* IE may use it according to 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 eNB2 receives an ENB CONFIGURATION UPDATE without any IE except for *Message Typ*eIE 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.

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *NR Neighbour Information* IE in the ENB CONFIGURATION UPDATE message to neighbouring eNBs by triggering the eNB Configuration Update procedure.

**Interaction with the EN-DC Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *NR Neighbour Information* IE in the ENB CONFIGURATION UPDATE message to neighbouring en-gNBs by triggering the EN-DC Configuration Update procedure.

#### 8.3.5.3 Unsuccessful Operation



Figure 8.3.5.3-1: eNB Configuration Update, 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



Figure 8.3.6.2-1: Resource Status Reporting Initiation, 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



Figure 8.3.6.3-1: Resource Status Reporting Initiation, 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

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



Figure 8.3.8.2-1: Mobility Settings Change, 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



Figure 8.3.8.3-1: Mobility Settings Change, 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

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.

eNB2 may include the *NB-IoT RLF Report Container* IE in the RLF INDICATION message, which may be used by the eNB1 to determine the nature of the failure. If the *NB-IoT 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.

#### 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



Figure 8.3.10.2-1: Handover Report, successful operation

An eNB initiates the procedure by sending an HANDOVER REPORT message to another eNB. By sending the message eNB1 indicates to eNB2 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 eNB1 indicates to eNB2 that, following a successful handover from a cell of eNB2 to a cell of eNB1, a radio link failure occurred and the UE attempted RRC Re-establishment either at the original cell of eNB2 (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 eNB1, the eNB1 should include in HANDOVER REPORT message:

- the *Mobility Information* IE, if the *Mobility Information* IE was sent for this handover from eNB2;

- the *Source cell C-RNTI* IE.

If received, the eNB2 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 eNB1 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 eNB1 indicates to eNB2 that a completed handover from a cell of eNB2 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 eNB1 (indicated with the *Failure cell ECGI* IE).

If the *Handover Report Type* IE is set to "Inter-system ping-pong", then the eNB1 indicates to eNB2 that a completed handover from a cell of eNB2 to a cell in NG-RAN might have resulted in an inter-system ping-pong and the UE was successfully handed over to a cell of eNB1 (indicated with the *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. If the *Handover Report Type* IE is set to "Inter-system ping-pong", then the *Target cell in NG-RAN* 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



Figure 8.3.11.2-1: Cell Activation, 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



Figure 8.3.11.3-1: Cell Activation, 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



Figure 8.3.12.2-1: X2 Removal, 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



Figure 8.3.12.3-1: X2 Removal, 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



Figure 8.3.13.2-1: Retrieve UE Context, 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,

- *Additional RRM Policy Index* 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,

- *Subscription Based* *UE Differentiation Information* IE,

- *EPC Handover Restriction List Container* 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].

For each E-RAB for which the old eNB proposes to do forwarding of downlink data, the old eNB shall include the *DL Forwarding* IE within the *E-RABs To Be Setup Item* IE of the RETRIEVE UE CONTEXT RESPONSE message.

If the *Bearer Type* IE is included in the RETRIEVE UE CONTEXT RESPONSE message and is set to "non IP", then the new eNB shall not perform IP header compression for the concerned E-RAB.

If the *Ethernet Type* IE is included in the RETRIEVE UE CONTEXT RESPONSE message and is set to "True", then the new eNB shall, if supported, take this into account to perform header compression appropriately for the concerned E-RAB.

If the *NR 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 NR V2X services.

If the *NR* *V2X Services Authorized* IE is contained in the RETRIEVE UE CONTEXT RESPONSE 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 *PC5 QoS Parameters* IE is contained in theRETRIEVE UE CONTEXT RESPONSE message, the target eNB shall, if supported, use it for the concerned UE’s NR sidelink communication as specified in TS 23.285 [41].

If the *UE Radio Capability ID* IE is contained in the RETRIEVE UE CONTEXT RESPONSE message, the target eNB shall, if supported, store this information in the UE context and use it as specified in TS 23.401 [12].

If the *IMS voice EPS fallback from 5G* IE is contained in the RETRIEVE UE CONTEXT RESPONSE message, the new eNB shall, if supported, store this information in the UE context and consider that the UE was previously handed over from NG-RAN to E-UTRAN due to an IMS voice fallback.

If the new eNB receives a RETRIEVE UE CONTEXT RESPONSE message containing the *Source DL Forwarding IP Address* IE as part of the *E-RABs To Be Setup Item* IE, the new eNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

#### 8.3.13.3 Unsuccessful Operation



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 interface instance between eNB and en-gNB in a controlled manner. If successful, this procedure erases any existing application level configuration data in the two nodes.

NOTE: In case the signalling transport is shared among several X2-C interface instances, and the TNL association is still used by one or more X2-C interface instances, the initiating node should not initiate the removal of the TNL association.

The procedure uses non UE-associated signaling.

#### 8.3.14.2 Successful Operation



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



Figure 8.3.14.2-2: en-gNB Initiated EN-DC X2 Removal, successful operation

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC X2 REMOVAL REQUEST message and the EN-DC X2 REMOVAL RESPONSE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

**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 interface instance. The candidate eNB may then remove all resources associated with that interface instance.

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 interface instance with eNB if the X2 Benefit Value of the interface instance 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 interface instance. The candidate eNB may then remove all resources associated with that interface instance.

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 interface instance with en-gNB if the X2 Benefit Value of the interface instance determined at the candidate eNB is lower than the value of the *X2 Removal Threshold* IE.

#### 8.3.14.3 Unsuccessful Operation



Figure 8.3.14.3-1: eNB Initiated EN-DC X2 Removal, unsuccessful operation



Figure 8.3.14.3-2: en-gNB Initiated EN-DC X2 Removal, unsuccessful operation

If the candidate receiving node cannot accept to remove the interface instance with initiating node it shall respond with an EN-DC X2 REMOVAL FAILURE message with an appropriate cause value.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC X2 REMOVAL REQUEST message and the EN-DC X2 REMOVAL FAILURE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 8.3.14.4 Abnormal Conditions

Void.

### 8.3.15 Data Forwarding Address Indication

#### 8.3.15.1 General

The purpose of the Data Forwarding Address Indication procedure is to allow the new eNB to provide data forwarding addresses to the old eNB in case the RRC connection has been re-established, as specified in TS 36.300 [15].

For Dual Connectivity or EN-DC, the Data Forwarding Address Indication procedure is used during a Conditional Handover to provide data forwarding related information from the MeNB to the SeNB as specified in TS 36.300 [15], or from the MeNB to the en-gNB as specified in TS 37.340 [32].

The procedure uses UE-associated signalling.

#### 8.3.15.2 Successful Operation



Figure 8.3.15.2-1: Data Forwarding Address Indication, successful operation

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Figure 8.3.15.2-2: Data Forwarding Address Indication for Conditional Handover, successful operation

The new eNB initiates the procedure by sending a DATA FORWARDING ADDRESS INDICATION message to the old eNB.

For each E-RAB included in *E-RABs Data Forwarding Address List* IE, the new eNB indicates that it requests data forwarding of downlink packets to the GTP TEID indicated in the *DL GTP Tunnel Endpoint* IE.

If the DATA FORWARDING ADDRESS INDICATION message includes the *CHO DC Indicator* IE, the SeNB (respectively, the en-gNB for EN-DC) shall, if supported, consider that the DATA FORWARDING ADDRESS INDICATION message concerns a Conditional Handover, and act as specified in TS 36.300 [15] for dual connectivity (respectively, act as specified in TS 37.340 [32] for EN-DC).

If the DATA FORWARDING ADDRESS INDICATION message includes the *CHO DC Early Data Forwarding Indicator* IE set to “stop”, the SeNB (respectively, the en-gNB for EN-DC) shall, if supported and if already initiated, stop early data forwarding for the provided E-RABs Data Forwarding Address information.

**EN-DC**

If the MeNB sends the message to the en-gNB, then the *SgNB UE X2AP ID* IE shall be included in the DATA FORWARDING ADDRESS INDICATION message, while the *New eNB UE X2AP ID* IE is ignored. The *SgNB UE X2AP ID* IE is used as the new UE ID.

#### 8.3.15.3 Unsuccessful Operation

Not applicable.

#### 8.3.15.4 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

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



Figure 8.5.2-1: X2AP Message Transfer, successful operation

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



Figure 8.6.1.2-1: SeNB Addition Preparation, 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 TDCprep.

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 GTP tunnel endpoint, i.e the information contained in the *Transport Layer Address* IE and the *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 *Bearer Type* IE for the concerned E-RAB is received by the SeNB and is set to "non IP", the SeNB shall, if supported, not perform IP header compression for the concerned E-RAB.

- If the *Ethernet Type* IE for the concerned E-RAB is received by the SeNB and is set to "True", the SeNB shall, if supported, take this into account to perform header compression appropriately 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 TDCprep.

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.

If the *Source DL Forwarding IP Address* IE is included in the SENB ADDITION REQUEST message, the SeNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

If the *Source DL Forwarding IP Address* IE is included in the SENB ADDITION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

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

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

#### 8.6.1.3 Unsuccessful Operation



Figure 8.6.1.3-1: SeNB Addition Preparation, 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 TDCoverall 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 TDCprep 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



Figure 8.6.2.2-1: SeNB Reconfiguration Complete procedure, 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 TDCoverall.

#### 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 TDCprep.

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 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 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 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 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 *Bearer Type* IE for the concerned E-RAB is received by the SeNB and is set to "non IP", the SeNB shall, if supported, not perform IP header compression for the concerned E-RAB.

- If the *Ethernet Type* IE for the concerned E-RAB is received by the SeNB and is set to "True", the SeNB shall, if supported, take this into account to perform header compression appropriately 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 *S1 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 MODIFICAITON 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].

If the *Source DL Forwarding IP Address* IE is included in the SENB MODIFICATION REQUEST message, the SeNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

If the *Source DL Forwarding IP Address* IE is included in the SENB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions to identify source TNL address for data forwarding in case of subsequent handover preparation, if such ACL functionality is deployed.

**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 TDCoverall.

#### 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 Modfication 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 TDCprep 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 TDCoverall 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



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 TDCoverall.

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 Item* 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 TDCoverall.

**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



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



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



Figure 8.6.6.2-1: SeNB initiated SeNB Release, 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



Figure 8.6.7.2-1: SeNB Counter Check procedure, successful operation.

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.

NOTE 1: If X2-C signalling transport is shared among multiple X2-C interface instances, one EN-DC X2 Setup procedure is issued per X2-C interface instance to be setup, i.e. several X2 Setup procedures may be issued via the same TNL association after that TNL association has become operational.

NOTE 2: Exchange of application level configuration data also applies between eNB and en-gNB in case the SN (i.e. the en-gNB) does not broadcast system information other than for radio frame timing and SFN, as specified in the TS 37.340 [32]. How to use this information when this option is used is not explicitly specified.

The procedure uses non UE-associated signalling.

#### 8.7.1.2 Successful Operation



Figure 8.7.1.2-1: eNB Initiated EN-DC X2 Setup, successful operation



Figure 8.7.1.2-2: en-gNB Initiated EN-DC X2 Setup, successful operation

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC X2 SETUP REQUEST message and the EN-DC X2 SETUP RESPONSE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance. In the current version of this specification an eNB shall not include the *Interface Instance Indication* IE in the *Initiating NodeType* IE in the EN-DC X2 SETUP REQUEST message.

If the *SFN Offset* IE is included in the EN-DC X2 SETUP REQUEST or EN-DC X2 SETUP RESPONSE message, the receiving node shall, if supported, use this information to deduce the SFN0 time offset of the reported cell. The receiving node shall consider the received *SFN Offset* IE content valid until reception of an update of the IE for the same cell(s).

**eNB initiated EN-DC X2 Setup:**

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 or if supported, a partial list of its served cells together with the *Partial List Indicator* IE, according to the received information in *Cell and Capacity Assistance Information* IE in EN-DC X2 SETUP REQUEST message. 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 take this into account for cell-level resource coordination with the eNB. 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.

If the *Partial List Indicator* IE is set to "partial" in the EN-DC X2 SETUP RESPONSE message from the en-gNB, the eNB shall, if supported, assume that the en-gNB has included in the *List of Served Cells NR* IE a partial list of cells.

If the EN-DC X2 SETUP REQUEST message contains the *TNL Transport Layer Address info* IE, the receiving en-gNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the EN-DC X2 SETUP RESPONSE message contains the *TNL Transport Layer Address info* IE, the receiving eNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the *NR Cell PRACH Configuration* IE is included in the *Served NR Cell Information* IE contained in the EN-DC X2 SETUP RESPONSE message, the eNB may store the information.

If the *CSI-RS Transmision Indication* IE is contained in the EN-DC X2 SETUP REQUEST message, the en-gNB may use this information for neighbour NR cell’s CSI-RS measurement.

If the *Intended TDD DL-UL Configuration NR* IE is contained in the *NR Neighbour Information* IE in the EN-DC X2 SETUP REQUEST message, en-gNB should take this information into account for cross-link interference management. The en-gNB shall consider the received *Intended TDD DL-UL Configuration NR* IE content valid until reception of an update of the IE for the same cell(s).

**Interaction with the eNB Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC X2 SETUP RESPONSE message to neighbouring eNBs by triggering the eNB Configuration Update procedure.

**Interaction with the EN-DC Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC X2 SETUP RESPONSE message to neighbouring en-gNBs by triggering the EN-DC Configuration Update procedure.

**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 or if supported, a partial list of its served cells together with the *Partial List Indicator* IE in the EN-DC X2 SETUP REQUEST message 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.

If the EN-DC X2 SETUP RESPONSE message contains the *Protected E-UTRA Resource Indication* IE, the receiving en-gNB should take this into account for cell-level resource coordination with the eNB. 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.

If the *Partial List Indicator* IE is set to "partial" in the EN-DC X2 SETUP REQUEST message from the en-gNB, the eNB shall, if supported, assume that the en-gNB has included in the *List of Served Cells NR* IE a partial list of cells.

If the *Cell and Capacity Assistance Information* IE is present in the EN-DC X2 SETUP RESPONSE message from the eNB, the en-gNBshall, if supported, store the collected information to be used for future interface management.

If the EN-DC X2 SETUP REQUEST message contains the *TNL Transport Layer Address info* IE, the receiving eNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the EN-DC X2 SETUP RESPONSE message contains the *TNL Transport Layer Address info* IE, the receiving en-gNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the *NR Cell PRACH Configuration* IE is included in the *Served NR Cell Information* IE contained in the EN-DC X2 SETUP REQUEST message, the eNB may store the information.

If the *CSI-RS Transmision Indication* IE is contained in the EN-DC X2 SETUP REQUEST message, the eNB should take it into account when forwarding neighbour NR cell’s CSI-RS configuration.

If the *Intended TDD DL-UL Configuration NR* IE is contained in the *NR Neighbour Information* IE in the EN-DC X2 SETUP RESPONSE message, en-gNB should take this information into account for cross-link interference management. The en-gNB shall consider the received *Intended TDD DL-UL Configuration NR* IE content valid until reception of an update of the IE for the same cell(s).

**Interaction with the eNB Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC X2 SETUP REQUEST message to neighbouring eNBs by triggering the eNB Configuration Update procedure.

**Interaction with the EN-DC Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC X2 SETUP REQUEST message to neighbouring en-gNBs by triggering the EN-DC Configuration Update procedure.

#### 8.7.1.3 Unsuccessful Operation



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



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

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

If the *Message Oversize Notification* IE is included in the EN-DC X2 SETUP FAILURE, the initiating node shall, if supported, deduce that the failure is due to a too large EN-DC X2 SETUP REQUEST message and ensure that the total number of served cells in following EN-DC X2 SETUP REQUEST message is equal to or lower than the value of the *Message Oversize Notification* IE.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC X2 SETUP REQUEST message and the EN-DC X2 SETUP FAILURE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 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.

If the EN-DC X2 SETUP FAILURE message includes the *Time To Wait* IE the initiating node shall wait at least for the indicated time before reinitiating the EN-DC X2 Setup procedure towards the same peer node.

If the initiating node receives an EN-DC X2 SETUP REQUEST message from the peer entity on the same X2 interface:

- In case the initiating node answers with an EN-DC X2 SETUP RESPONSE message and receives a subsequent EN-DC X2 SETUP FAILURE message, the initiating node shall consider the X2 interface as non operational and the procedure as unsuccessfully terminated according to sub clause 8.7.1.3.

- In case the initiating node answers with an EN-DC X2 SETUP FAILURE message and receives a subsequent EN-DC X2 SETUP RESPONSE message, the initiating node shall ignore the EN-DC X2 SETUP RESPONSE message and consider the X2 interface as non operational.

### 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.

NOTE: Update of application level configuration data also applies between eNB and en-gNB in case the SN (i.e. the en-gNB) does not broadcast system information other than for radio frame timing and SFN, as specified in the TS 37.340 [32]. How to use this information when this option is used is not explicitly specified.

The procedure uses non UE-associated signalling.

#### 8.7.2.2 Successful Operation



Figure 8.7.2.2-1: eNB Initiated EN-DC Configuration Update, successful operation



Figure 8.7.2.2-2: en-gNB Initiated EN-DC Configuration Update, successful operation

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC CONFIGURATION UPDATE message and the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

If the *SFN Offset* IE is included in the EN-DC CONFIGURATION UPDATE or EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message, the receiving node shall, if supported, use this information to update the SFN0 time offset of the reported cell.

**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 shall, if supported, 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 take this into account for cell-level resource coordination with the eNB. 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 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.

If the EN-DC CONFIGURATION UPDATE message contains the *TNL Transport Layer Address info* IE, the receiving en-gNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message contains the *TNL Transport Layer Address info* IE, the receiving eNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the *NR Cell PRACH Configuration* IE is included in the *Served NR Cell Information* IE contained in the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message, the eNB may update the information.

If the C*SI-RS Transmision Indication* IE is contained in the EN-DC CONFIGURATION UPDATE message, the en-gNB may use this information for neighbour NR cell’s CSI-RS measurement.

If the *Intended TDD DL-UL Configuration NR* IE is contained in the *NR Neighbour Information* IE in the EN-DC CONFIGURATION UPDATE message, en-gNB should take this information into account for cross-link interference management. The en-gNB shall consider the received *Intended TDD DL-UL Configuration NR* IE content valid until reception of an update of the IE for the same cell(s).

**Interaction with the eNB Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message to neighbouring eNBs by triggering the eNB Configuration Update procedure.

**Interaction with the EN-DC Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message to neighbouring en-gNBs by triggering the EN-DC Configuration Update procedure.

**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 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 Typ*eIE 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.

If the EN-DC CONFIGURATION UPDATE message contains the *TNL Transport Layer Address info* IE, the receiving eNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message contains the *TNL Transport Layer Address info* IE, the receiving en-gNB shall, if supported, take this into account for IPSEC tunnel establishment.

If the *NR Cell PRACH Configuration* IE is included in the *Served NR Cell Information* IE contained in the EN-DC CONFIGURATION UPDATE message, the eNB may update the information.

If the *CSI-RS Transmision Indication* IE is contained in the EN-DC CONFIGURATION UPDATE message, the eNB should take it into account when forwarding neighbour NR cell’s CSI-RS configuration.

**Update of SCTP associations:**

If the *TNLA to Add List* IE is included in the EN-DC CONFIGURATION UPDATE message, the receiving eNB shall, if supported, use it to establish the TNL association(s) with the en-gNB. If the *TNLA To Add List* IE does not include the *Port Number* IE, the eNB shall assume that port number value 36422 is used for the endpoint. The eNB shall report to the en-gNB, in the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message, the successful establishment of the TNL association(s) with the en-gNB as follows:

- A list of successfully established TNL associations shall be included in the *TNLA Setup List* IE;

- A list of TNL associations that failed to be established shall be included in the *TNLA Failed to Setup List* IE.

If the *TNLA to Remove List* IE is included in the EN-DC CONFIGURATION UPDATE message, the receiving eNB shall, if supported, initiate removal of the TNL association(s) indicated by the received Transport Layer information towards the en-gNB.

- If the received *TNLA Transport Layer Information* IE includes the *Port Number* IE, the en-gNB TNL endpoint is identified by the *Endpoint IP Address* IE and the *Port Number* IE. Otherwise, the en-gNB TNL endpoints correspond to all en-gNB TNL endpoints identified by the *Endpoint IP Address* IE and any Port Number(s).

If the *TNLA to Update List* IE is included in the EN-DC CONFIGURATION UPDATE message the receiving eNB shall, if supported, update the TNL association(s) indicated by the received Transport Layer information towards the en-gNB.

- If the received *TNLA Transport Layer Information* IE includes the *Port Number* IE, the en-gNB TNL endpoint is identified by the *Endpoint IP Address* IE and the *Port Number* IE. Otherwise, the en-gNB TNL endpoints correspond to all en-gNB TNL endpoints identified by the *Endpoint IP Address* IE and any Port Number(s).

If the *Intended TDD DL-UL Configuration NR* IE is contained in the *NR Neighbour Information* IE in the EN-DC CONFIGURATION UPDATE ACKNOWLEDGE message, en-gNB should take this information into account for cross-link interference management. The en-gNB shall consider the received *Intended TDD DL-UL Configuration NR* IE content valid until reception of an update of the IE for the same cell(s).

**Interaction with the eNB Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC CONFIGURATION UPDATE message to neighbouring eNBs by triggering the eNB Configuration Update procedure.

**Interaction with the EN-DC Configuration Update procedure:**

The receiving eNB may forward the *Intended TDD DL-UL Configuration NR* IE received in the *Served NR Cell Information* IE in the EN-DC CONFIGURATION UPDATE message to neighbouring en-gNBs by triggering the EN-DC Configuration Update procedure.

#### 8.7.2.3 Unsuccessful Operation



Figure 8.7.2.3-1: eNB Initiated EN-DC Configuration Update, unsuccessful operation



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

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

If the EN-DC CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE the initiating node shall wait at least for the indicated time before reinitiating the EN-DC Configuration Update procedure towards the same peer node. Both nodes shall continue to operate the X2 with their existing configuration data.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC CONFIGURATION UPDATE message and the EN-DC CONFIGURATION UPDATE FAILURE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 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 receving 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



Figure 8.7.3.2-1: EN-DC Cell Activation, 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-gNBshould 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.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC CELL ACTIVATION REQUEST message and the EN-DC CELL ACTIVATION RESPONSE message shall contain the *Interface Instance Indication* IE to identify the corresponding interface instance.

**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



Figure 8.7.3.3-1: EN-DC Cell Activation, 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.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC CELL ACTIVATION REQUEST message and the EN-DC CELL ACTIVATION FAILURE message shall contain the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 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



Figure 8.7.4.2-1: SgNB Addition Preparation, 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 TDCprep.

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 *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, or to coordinate with sidelink resources used in 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 Coordination Assistance Information* IE is contained in the *MeNB Resource Coordination Information* IE, the en-gNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

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.

If the SGNB ADDITION REQUEST message contains the *Additional RRM Policy Index* 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].

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

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 successfully established in the en-gNB, the en-gNB shall report to the MeNB, in the SGNB ADDITION REQUEST ACKNOWLEDGE message, the same value in the *EN-DC Resource Configuration* IE as received in the SGNB ADDITION REQUEST message.

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 GTP tunnel endpoint, i.e the information contained in the *Transport Layer Address* IE and the *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 *S1 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 Tunnel Endpoint 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 Tunnel Endpoint 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 *S1 DL GTP Tunnel Endpoint at the SgNB* IE.

- the en-gNB shall include in the SGNB ADDITION REQUEST ACKNOWLEDGE message the *RLC Mode* IE.

- the en-gNB may include for each bearer in the *E-RABs Admitted To Be Added List* IE in the SGNB ADDITION REQUEST ACKNOWLEDGE the *PDCP SN Length* IE to indicate the PDCP SN length for that bearer.

- If the *RLC Mode* IE is included for an E-RAB within the *E-RABs To be Added List* IE in the SGNB ADDITION REQUEST message, it indicates the mode that the MeNB used for the E-RAB when it was hosted at the MeNB.

- If the *Bearer Type* IE for the concerned E-RAB is received by the en-gNB and is set to "non IP", the en-gNB shall, if supported, not perform IP header compression for the concerned E-RAB.

- If the *Ethernet Type* IE for the concerned E-RAB is received by the en-gNB and is set to "True", the en-gNB shall, if supported, take this into account to perform header compression appropriately for the concerned E-RAB.

Upon reception of the SGNB ADDITION REQUEST ACKNOWLEDGE message the MeNB shall stop the timer TDCprep.

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 Coordination Assistance Information* IE is contained in the *SgNB Resource Coordination Information* IE, the MeNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

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 entiy is allocated at the MeNB the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* IE in the SGNB ADDITION REQUEST message, it may provide the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE and the *LCID* IE to the MeNB in the SGNB ADDITION REQUEST ACKNOWLEDGE message if PDCP duplication is configured at the en-gNB.

If the SGNB ADDITION REQUEST message contains the *UL PDCP SN Length* IE and the *DL PDCP SN Length* IE, the en-gNB shall, if supported, store this information and use it for lower layer configuration of the concerned MN terminated bearer.

The SgNB may include the *Location Information at SgNB* IE in the SGNB ADDITION REQUEST ACKNOWLEDGE message, if respective information is available at the SgNB.

If the *Location Information at SgNB Reporting* IE set to "pscell" is included in the SGNB ADDITION REQUEST, the SgNB shall start providing information about the current location of the UE. If the *Location Information at SgNB* IE is included in the SGNB ADDITION REQUEST ACKNOWLEDGE, the MeNB shall store the included information so that it may be transferred towards the MME.

If *Trace Activation* IE has previously been received for this UE, it shall be included in the SGNB ADDITION REQUEST message. If the *Trace Activation* IE is included in the SGNB ADDITION REQUEST message, the en-gNB shall, if supported, initiate the requested trace function as described in TS 32.422 [6]. If the *Trace Activation* IE includes the *MDT Configuration NR* IE, the en-gNB shall take it into account for MDT function as described in TS 37.320 [31].

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 SGNB ADDITION REQUEST message, the en-gNB 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].

The MeNB 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 SGNB ADDITION REQUEST message.

If the *UE Context Reference at Source NG-RAN* IE is contained in the SGNB ADDITION REQUEST message, the en-gNB shall, if supported, store this information and use it for UE context retrieval and allocate data forwarding resources as specified in TS 37.340 [32].

If the *Requested Fast MCG recovery via SRB3* IE set to "true" is included in the SGNB ADDITION REQUEST message and the en-gNB decides to configure fast MCG link recovery via SRB3 as specified in TS 37.340 [32], the en-gNB shall, if supported, include the *Available fast MCG recovery via SRB3* IE set to "true" in the SGNB ADDITION REQUEST ACKNOWLEDGE message.

If the *UE Radio Capability ID* IE is contained in the SGNB ADDITION REQUEST message, the en-gNB shall, if supported, store this information and use it as specified in TS 23.401 [12].

If the SGNB ADDITION REQUEST message contains the *IAB Node Indication* IE, the en-gNB shall, if supported, consider that the request is for an IAB node.

If the SGNB ADDITION REQUEST message contains the *IAB Authorized* IE, the en-gNB shall, if supported, store it and use it as defined in TS 38.401[34].

For each requested E-RAB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is contained in the *GTP Tunnel Endpoint* IE in the SGNB ADDITION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from MeNB to en-gNB through the GTP tunnels indicated by the *GTP Tunnel Endpoint* IE.

If the *Source NG-RAN Node ID* IE is included in the SGNB ADDITION REQUEST message, the en-gNB shall, if supported, use it to decide the direct data forwarding path availability with the indicated source NG-RAN node, and if the direct data forwarding path is available, include the *Direct Forwarding Path Availability* IE in the SGNB ADDITION REQUEST ACKNOWLEDGE message.

If the *Source DL Forwarding IP Address* IE or both *Source DL Forwarding IP Address* IEand S*ource Node DL Forwarding IP Address* IE is included in the SGNB ADDITION REQUEST message, the en-gNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

If the *Source DL Forwarding IP Address* IE is included in the SGNB ADDITION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions to identify source TNL address for data forwarding in case of subsequent handover preparation, if such ACL functionality is deployed.

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

If the en-gNB provides for an E-RAB for which the PDCP entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE to the MeNB in the SGNB ADDITION REQUEST ACKNOWLEDGE message and the MeNB has not provided the *Secondary MeNB UL GTP Tunnel Endpoint 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 Tunnel Endpoint 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 TDCoverall when sending the SGNB ADDITION REQUEST ACKNOWLEDGE message to the MeNB. The reception of the SGNB RECONFIGURATION COMPLETE message shall stop the timer TDCoverall.

**Interaction with the Activity Notification procedure**

Upon receiving an SGNB ADDITION REQUEST message containing the *Desired Activity Notification Level* IE, the en-gNB shall, if supported, use this information to decide whether to trigger subsequent SgNB Activitity Notification procedures according to the requested notification level.

#### 8.7.4.3 Unsuccessful Operation



Figure 8.7.4.3-1: SgNB Addition Preparation, 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* IE) 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 entiy is allocated at the MeNB the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* IE in the SGNB ADDITION REQUEST message, and the en-gNB does not provide the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE and the *LCID* 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 entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE and the *LCID* IE to the MeNB in the SGNB ADDITION REQUEST ACKNOWLEDGE message and the MeNB has not provided the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* 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 Tunnel Endpoint at PDCP* IE and the *Duplication Activation* IE to the SgNB the en-gNB before the SgNB Reconfigurationi 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.

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 *RRCReconfigurationComplete* message in the *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 *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 TDCoverall.

#### 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



Figure 8.7.6.2-1: MeNB initiated SgNB Modification Preparation, 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 TDCprep.

The SGNB MODIFICATION REQUEST message may contain:

- within the *UE Context Information* IE (if the modification of the UE context at the en-gNB is requested);

- 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 *SgNB UE Aggregate Maximum Bit Rate* IE;

- the *MeNB to SgNB Container* IE;

- the *SCG Configuration Query* IE;

- the *MeNB Resource Coordination Information* IE;

- the *Requested split SRBs IE*;

- the *Requested split SRBs release* IE;

- the *Requested fast MCG recovery via SRB3 IE*;

- the *Requested fast MCG recovery via SRB3 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 *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, or to coordinate with sidelink resources used in 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 Coordination Assistance Information* IE is contained in the *MeNB Resource Coordination Information* IE, the en-gNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

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.

For each E-RAB successfully established or modified or released in the en-gNB, the en-gNB shall report to the MeNB, in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the same value in the *EN-DC Resource Configuration* IE as received in the SGNB MODIFICATION REQUEST message.

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.

- 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* *PDCP SN Length* IE and the *DL PDCP SN Length* IE to indicate the PDCP SN length for that bearer.

- If the *Bearer Type* IE for the concerned E-RAB is received by the en-gNB and is set to"non IP", then the en-gNB shall, if supported, not perform IP header compression for the concerned E-RAB.

- If the *Ethernet Type* IE for the concerned E-RAB is received by the en-gNB and is set to "True", the en-gNB shall take this into account to perform header compression appropriately for the concerned E-RAB.

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 Tunnel Endpoint 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 Tunnel Endpoint 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 Tunnel Endpoint at SCG* IE.

If, dependent on the configured bearer type, the *Full E-RAB Level QoS Parameters* IE or the *Maximum MCG admittable 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 *S1 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 MN terminated split bearer option, the MeNB may include the *UL Configuration* IEto 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 enitiy in the en-gNB and MCG resources the *MeNB DL GTP Tunnel Endpoint 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.

If the SGNB MODIFICATION REQUEST message contains the *Additional RRM Policy Index* 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 *S1 DL GTP Tunnel Endpoint at the SgNB* IE.

If the SGNB MODIFICATION REQUEST 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 Coordination Assistance Information* IE is contained in the *SgNB Resource Coordination Information* IE, the MeNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

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

If the *SCG Configuration Query* IE is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall 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 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 *Requested Fast MCG recovery via SRB3* IE set to "true" is included in the SGNB MODIFICATION REQUEST message and the en-gNB decides to configure fast MCG link recovery via SRB3 as specified in TS 37.340 [32], the en-gNB shall, if supported, include the *Available fast MCG recovery via SRB3* IE set to "true" in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message. If the *Requested Fast MCG recovery via SRB3 Release* IE set to "true" is included in the SGNB MODIFICATION REQUEST message and the en-gNB decides to release fast MCG link recovery via SRB3, the en-gNB shall, if supported, include the *Release fast MCG recovery via SRB3* IE set to "true" in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message.

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

If the SGNB MODIFICATION REQUEST message contains the *RLC Status* IE, the en-gNB shall assume that RLC has been reestablished at the MeNB and may trigger PDCP data recovery.

If the en-gNB applied a full configuration or delta configuration, e.g. as part of a mobility procedure involving a change of DU, the en-gNB shall inform the MeNB by including the *RRC config indication* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message.

If SGNB MODIFICATION REQUEST message contains the *UL PDCP SN Length* IE and the *DL PDCP SN Length* IE, the en-gNB shall, if supported, store this information and use it for lower layer configuration of the concerned MN terminated bearer.

If the *RLC Mode* IE is included for an E-RAB within the *E-RABs To be Added List* IE in the SGNB MODIFICATION REQUEST message, it indicates the mode that the MeNB used for the E-RAB when it was hosted at the MeNB.

If the SGNB MODIFICATION REQUEST message contains the *MeNB Cell ID* IE, the en-gNB may 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].

If the SGNB MODIFICATION REQUEST ACKNOWLEDGE message contains the *RLC Status* IE, the MeNB shall assume that RLC has been reestablished at the en-gNB and may trigger PDCP data recovery.

The en-gNB may include the *Location Information at SgNB* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, if respective information is available at the en-gNB.

If the *Location Information at* en-gNB *Reporting* IE set to "pscell" is included in the SGNB MODIFICATION REQUEST, the SgNB shall start providing information about the current location of the UE. If the *Location Information* *at SgNB* IE is included in the SGNB MODIFICATION REQUEST ACKNOWLEDGE, the MeNB shall store the included information so that it may be transferred towards the MME.

If the *Lower Layer presence status change* IE set to "release lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the *Lower Layer presence status change* IE set to "re-establish lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the *Lower Layer presence status change* IE set to "suspend lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the *Lower Layer presence status change* IE set to "resume lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the SGNB MODIFICATION REQUEST message contains the *IAB Node Indication* IE, the en-gNB shall, if supported, consider that the request is for an IAB node.

If the SGNB MODIFICATION REQUEST message contains the *IAB Authorized* IE, the en-gNB shall, if supported, store it and use it as defined in TS 38.401[34].

For each requested E-RAB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is contained in the *GTP Tunnel Endpoint* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from MeNB to SgNB through the GTP tunnels indicated by the *GTP Tunnel Endpoint* IE.

If the *Source DL Forwarding IP Address* IE is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

If the *Source DL Forwarding IP Address* IE is included in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, store this information and use it as part of its ACL functionality configuration actions to identify source TNL address for data forwarding in case of subsequent handover preparation, if such ACL functionality is deployed.

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

If the en-gNB provides for an E-RAB to be setup for which the PDCP entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE and the *LCID* IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message and the MeNB has not provided the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* IE in the SGNB MODIFICATION REQUEST message, the MeNB shall trigger the MeNB initiated SgNB Modification procedure to provide the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* 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 TDCoverall when sending the SGNB MODIFICATION REQUEST ACKNOWLEDGE message to the MeNB. The reception of the SGNB RECONFIGURATION COMPLETE message shall stop the timer TDCoverall.

**Interaction with the Activity Notification procedure**

Upon receiving an SGNB MODIFICATION REQUEST message containing the *Desired Activity Notification Level* IE, the en-gNB shall, if supported, use this information to decide whether to trigger subsequent SgNB Activity Notification procedures, or stop or modify ongoing triggering of these procedures due to a previous request.

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

If the MeNB receives the SGNB MODIFICATION REQUIRED message and the requested SN modification procedure needs further information from MeNB, the MeNB shall send SGNB MODIFICATION REQUEST message to en-gNB in response to a previously SgNB initiated SgNB Modification procedure.

#### 8.7.6.3 Unsuccessful Operation



Figure 8.7.6.3-1: MeNB initiated SgNB Modification Preparation, unsuccessful operation

If the en-gNB does not admit any modification requested by the MeNB, or a failure occurs during the MeNB initiated SgNB Modfication 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 *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 TDCprep 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 entiy is allocated at the MeNB the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE in the SGNB MODIFICATION REQUEST message, and the en-gNB does not provide the *Secondary SgNB DL GTP Tunnel Endpoint 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 entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message and the MeNB has not provided the *Secondary MeNB UL GTP Tunnel Endpoint 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 Tunnel Endpoint at PDCP* IE to the SgNB the en-gNB before the SgNB Reconfigurationi 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 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 TDCprep 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.

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 TDCoverall.

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.

The en-gNB may include for each bearer in the *E-RABs to Be Modified* *List* IE in the SGNB MODIFICATION REQUIRED message the *New DRB ID Request* IE to request the MeNB to assign a new DRB ID for that bearer.

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. If the *SgNB Coordination Assistance Information* IE is contained in the *SgNB Resource Coordination Information* IE, the MeNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

If the en-gNB applied a full configuration or delta configuration, e.g. as part of a mobility procedure involving a change of DU, the en-gNB shall inform the MeNB by including the *RRC config indication* IE in the SGNB MODIFICATION REQUIRED message.

For each E-RAB successfully modified as requested by the en-gNB, the MeNB shall inform the en-gNB, in the SGNB MODIFICATION CONFIRM message, the same value in the *EN-DC Resource Configuration* IE as received in the SGNB MODIFICATION REQUIRED message.

If the *SCG resources* IE in the *EN-DC Resource Configuration* IE in the SGNB MODIFICATION REQUIRED message for all the E-RABs of the UE are set to “not present”, the MeNB shall, if supported, deduce that the SCG resources are removed.

Upon reception of the SGNB MODIFICATION CONFIRM message the en-gNB shall stop the timer TDCoverall.

If the SGNB MODIFICATION CONFIRM 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, or to coordinate with sidelink resources used in 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 Coordination Assistance Information* IE is contained in the *MeNB Resource Coordination Information* IE, the en-gNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

If the MeNB receives for an E-RAB for which the PDCP entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE in the SGNB MODIFICATION REQUIRED message, it shall provide the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE to the en-gNB in the SGNB MODIFICATION CONFIRM message. If the *LCID* IE is included in the SGNB MODIFICATION REQUIRED message, the MeNB should take it into account.

If the SGNB MODIFICATION REQUIRED message contains the *RLC Status* IE, the MeNB shall assume that RLC has been reestablished at the en-gNB and may trigger PDCP data recovery.

If the *RLC Mode* IE is included for an E-RAB within the *E-RABs To Be Released List* IE (for E-RABs hosted at the en-gNB) in the SGNB MODIFICATION REQUIRED message, it indicates the mode that the en-gNB used for the E-RAB when it was hosted at the en-gNB.

The MeNB shall include only E-RABs with the following IE in *E-RABs Admitted To Be Modified List* IE:

- the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE.

If the *Location Information* *at SgNB* IE is included in the SGNB MODIFICATION REQUIRED, the MeNB shall store the included information so that it may be transferred towards the MME.

For each requested E-RAB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is included in the *GTP Tunnel Endpoint* IE in the SGNB MODIFICATION REQUIRED message, the MeNB shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from MeNB to SgNB through the GTP tunnels indicated by the *GTP Tunnel Endpoint* IE.

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

If applicable, as specified in TS 37.340 [32], the en-gNB may receive, after having initiated the SgNB initiated 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 [32], the en-gNB may receive, after having initiated the SgNB initiated SgNB Modification procedure, the SGNB MODIFICATION REQUEST message including the *SgNB Security Key* IE within the *UE Context Information* IE.

If applicable, as specified in TS 37.340 [32], the en-gNB may receive, after having initiated the SgNB initiated SgNB Modification procedure, the SGNB MODIFICATION REQUEST message including the *measGapConfig* IE as defined in TS 38.331 [31] within the *MeNB to SgNB Container* IE.

The en-gNB may receive, after having initiated the SgNB initiated SgNB modification procedure including the *New DRB ID Request* IE for an SN terminated bearer within the *E-RABs To Be Modified List* IE, the SGNB MODIFICATION REQUEST message to release and add the same bearer with a new DRB ID or with the same DRB ID but together with the *SgNB Security Key* IE within the *UE Context Information* IE.

The en-gNB may receive, after having initiated the SgNB initiated SgNB modification procedure, the SGNB MODIFICATION REQUEST message including the *SN triggered* IE.

#### 8.7.7.3 Unsuccessful Operation



Figure 8.7.7.3-1: SgNB initiated SgNB Modification, unsuccessful operation.

In case the requested 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 TDCoverall 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 receives for an E-RAB for which the PDCP entiy is allocated at the MeNB the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE to the en-gNB in the SGNB MODIFICATION CONFIRM message although the *Secondary SgNB DL GTP Tunnel Endpoint 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 or applicable measurement gap pattern or information applicable to release and add the same bearer with different DRB ID and/or the *SN triggered* IE set to "True"*,* the en-gNB shall

- regard the SgNB initiated SgNB Modification Procedure as being failed;

- stop the TDCoverall, 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 8.7.6.

**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



Figure 8.7.8.2-1: SgNB Change, 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



Figure 8.7.8.3-1: SgNB Change, 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:**

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



Figure 8.7.9.2-1: MeNB initiated SgNB Release, 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.

If the *RLC Mode* IE is included for an E-RAB within the *E-RABs Admitted To Be Released List* IE (for E-RABs hosted at the en-gNB) in the SGNB RELEASE REQUEST ACKNOWLEDGE message, it indicates the mode that the en-gNB used for the E-RAB when it was hosted at the en-gNB.

If the MeNB did not include the *SgNB UE X2AP ID* IE in the SGNB RELEASE REQUEST message, the MeNB shall ignore the *SgNB UE X2AP ID* IE in the SGNB RELEASE REQUEST ACKNOWLEDGE message.

Upon successful completion of the procedure, the MeNB shall start counting time, so that information regarding time since Secondary Node Release may be transferred towards the MME as specified in TS 36.413 [4].

**Interaction with SN Status Transfer procedure:**

If the *UE Context Kept Indicator* IE set to "True" and the *E-RABs transferred to MeNB* IE are included in the SGNB RELEASE REQUEST message, then the en-gNB shall, if supported, include the uplink/downlink PDCP SN and HFN status for the listed E-RABs, as specified in TS 37.340 [32].

#### 8.7.9.3 Unsuccessful Operation



Figure 8.7.9.3-1: MeNB initiated SgNB Release, 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.

If the MeNB did not include the *SgNB UE X2AP ID* IE in the SGNB RELEASE REQUEST message, the MeNB shall ignore the *SgNB UE X2AP ID* IE in the SGNB RELEASE REQUEST REJECT message.

#### 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 relase 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.

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.

If the *RLC Mode* IE is included for an E-RAB within the *E-RABs To Be Released List* IE (for E-RABs hosted at the en-gNB) in the SGNB RELEASE REQUIRED message, it indicates the mode that the en-gNB used for the E-RAB when it was hosted at the en-gNB.

If the *SgNB to MeNB Container* IE is included in the SGNB RELEASE REQUIRED message, the MeNB may use the contained information to apply delta configuration.

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

Upon successful completion of the procedure, the MeNB shall start counting time, so that information regarding time since Secondary Node Release may be transferred towards the MME as specified in TS 36.413 [4].

#### 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



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 a PDCP-C PDU encapsulating an LTE RRC message 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 is also to enable transfer of the NR RRC message container with the NR failure information from the MeNB to the en-gNB, when received from the UE.

The procedure is also used to enable transfer of the NR RRC message container with an IAB information from the MeNB to the en-gNB, when received from the IAB-MT.

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

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

The procedure uses UE-associated signalling.

#### 8.7.12.2 Successful Operation



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 which does not include the *RRC Container* IE in the *Split SRB* IE, or the *RRC container* IE in *NR UE Report* IE, or the *RRC Container* IE in the *Fast MCG Recovery via SRB3 from MN to SN* IE, or the *RRC Container* IE in the *Fast MCG Recovery via SRB3 from SN to MN* IE, it shall ignore the message. If the en-gNB receives an RRC TRANSFER message with the Delivery Status IE, it shall ignore the message. If the en-gNB receives the *RRC Container* IE in the *Split SRB* IE, it shall deliver the contained PDCP-C PDU encapsulating an RRC message to the UE. If the en-gNB receives the *RRC Container* IE in the *Fast MCG Recovery from MeNB to SgNB* IE, the en-gNB shall, if supported, deliver the contained RRC Container encapsulating an 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 (as defined in TS 36.322 [40]) to the UE by the en-gNB. If the MeNB receives the *RRC Container* IE in the *Fast MCG Recovery from SgNB to MeNB* IE, the MeNB shall, if supported, consider MCG link failure detected at the UE as specified in TS 37.340 [32].

#### 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



Figure 8.7.13.2-1: Secondary RAT Data Usage Report procedure, 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



Figure 8.7.14.2-1: en-gNB initiated Partial Reset of EN-DC, successful operation.



Figure 8.7.14.2-2: eNB initiated Partial Reset of EN-DC, 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 MeNB 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.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the PARTIAL RESET REQUIRED message and the PARTIAL RESET CONFIRM message shall contain the *Interface Instance Indication* IE to identify the corresponding interface instance.

**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 is only to be used for the purpose of E-UTRA – NR spectrum sharing.

The procedure uses non-UE-associated signalling.

#### 8.7.15.2 Successful Operation



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



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

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the E-UTRA – NR CELL RESOURCES COORDINATION REQUEST message and the E-UTRA – NR CELL RESOURCES COORDINATION RESPONSE message shall contain the *Interface Instance Indication* IE to identify the corresponding interface instance.

**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.

If the *Initiating Node Type* is eNB, then the E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message shall contain at least one *EUTRA Cell ID* in the List of E-UTRA Cells in NR Coordination Request. If the *Initiating Node Type* is en-gNB, then the E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message shall contain at least oneNR-Cell ID in the List of NR Cells in NR Coordination Request.

**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. 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.

### 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



Figure 8.7.16.2-1: Activity Notification procedure, successful operation

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

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 SGNB ACTIVITY NOTIFICATION message may contain notification for activity of E-RABs.

#### 8.7.16.3 Abnormal Conditions

Void.

### 8.7.17 gNB Status Indication

#### 8.7.17.1 General

The purpose of the gNB Status Indication procedure is to inform the eNB that the en-gNB is overloaded so that overload reduction actions can be applied. The procedure uses non-UE associated signalling.

#### 8.7.17.2 Successful Operation



Figure 8.7.17.2-1: gNB Status Indiciation procedure, successful operation

If the *gNB* *Overload Information* IE in the GNB STATUS INDICATION message is set to "overloaded", the eNB shall apply overload reduction actions until it receives a subsequent GNB STATUS INDICATION message with *gNB* *Overload Information* IE set to "not-overloaded".

The detailed overload reduction policy is up to eNB implementation.

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the GNB STATUS INDICATION message shall contain the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 8.7.17.3 Abnormal Conditions

Void.

### 8.7.18 EN-DC Configuration Transfer

#### 8.7.18.1 General

The purpose of the EN-DC Configuration Transfer procedure is to transfer the EN-DC SON Configuration container, either from the eNB to the en-gNB or from the en-gNB to the eNB, in the context of en-gNB X2 TNL address discovery as described in TS 36.300 [15].

The procedure uses non UE-associated signalling.

#### 8.7.18.2 Successful Operation



Figure 8.7.18.2-1: eNB initiated EN-DC Configuration Transfer, successful operation



Figure 8.7.18.2-2: en-gNB initiated EN-DC Configuration Transfer, successful operation

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

If the en-gNB receives, in the *EN-DC SON Configuration Transfer* IE, the *SON Information* IE containing the *SON Information Request* IE, it may transfer back the requested information towards the eNB indicated in the *Source eNB-ID* IE of the *EN-DC SON Configuration Transfer* IE by initiating the EN-DC Configuration Transfer procedure.

If the en-gNB receives, in the *EN-DC SON Configuration Transfer* IE, the *X2 TNL Configuration Info* IE containing the *eNB X2 Extended Transport Layer Addresses* IE, it may use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

In case the *IP-Sec Transport Layer Address* IE is present and the *GTP Transport Layer Addresses* IE within the *eNB X2 Extended Transport Layer Addresses* IE is not empty, GTP traffic is conveyed within an IP-Sec tunnel terminated at the IP-Sec tunnel end point given in by the *IP-Sec Transport Layer Address* IE.

In case the *IP-Sec Transport Layer Address* IE is not present, GTP traffic is terminated at the end points given by the list of addresses in *eNB* *GTP Transport Layer Addresses* IE within the *eNB X2 Extended Transport Layer Addresses* IE.

In case the *eNB* *GTP Transport Layer Addresses* IE is empty and the *IP-Sec Transport Layer Address* IE is present, SCTP traffic is conveyed within an IP-Sec tunnel terminated at the IP-Sec tunnel end point given in the *IP-Sec Transport Layer Address* IE, within the *eNB X2 Extended Transport Layer Addresses* IE.

If the en-gNB is configured to use one IPsec tunnel for EN-DC X2 traffic (IPsec star topology) then the traffic to the peer eNB shall be routed through this IPsec tunnel and the *IP-Sec Transport Layer Address* IE shall be ignored.

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

If case of network sharing with multiple cell ID broadcast with shared X2-C signalling transport, as specified in TS 36.300 [15], the EN-DC CONFIGURATION TRANSFER message shall contain the *Interface Instance Indication* IE to identify the corresponding interface instance.

#### 8.7.18.3 Abnormal Conditions

Void.

### 8.7.19 Trace Start

#### 8.7.19.1 General

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

#### 8.7.19.2 Successful Operation



Figure 8.7.19.2-1: Trace Start, successful operation

The Trace Start procedure is initiated by the MeNB sending the TRACE START message to the en-gNB for that specific UE. Upon reception of the TRACE START message, the en-gNB shall initiate the requested trace session as described in TS 32.422 [6]. If the *Trace Activation* IE includes the *MDT Configuration NR* IE, the en-gNB shall take it into account for MDT function as described in TS 37.320 [31].

#### 8.7.19.3 Abnormal Conditions

Void.

### 8.7.20 Deactivate Trace

#### 8.7.20.1 General

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

#### 8.7.20.2 Successful Operation



Figure 8.7.20.2-1: Deactivate Trace, successful opration

The Deactivate Trace procedure is initiated by the MeNB by sending the DEACTIVATE TRACE to the en-gNB for that specific UE. Upon reception of the DEACTIVATE TRACE message, the en-gNB shall stop the trace session for the indicated trace reference in the *E-UTRAN Trace ID* IE.

#### 8.7.20.3 Abnormal Conditions

Void.

### 8.7.21 EN-DC Resource Status Reporting Initiation

#### 8.7.21.1 General

This procedure is used by the eNB to request the reporting of load measurements to the en-gNB .

The procedure uses non UE-associated signalling.

#### 8.7.21.2 Successful Operation

##### 8.7.21.2.1 Successful Operation - eNB-initiated



Figure 8.7.21.2-1: EN-DC Resource Status Reporting Initiation, successful operation - eNB-initiated

The procedure is initiated with an EN-DC RESOURCE STATUS REQUEST message sent from the eNB to the en-gNB to start a measurement, stop a measurement, add cells to report for a measurement.

If the *Report Characteristics EN-DC* IE is included in the EN-DC RESOURCE STATUS REQUEST message and indicates cell specific measurements, the *NR Cell To Report EN-DC* *List* IE shall be included.

Upon receipt of the EN-DC RESOURCE STATUS REQUEST message, the en-gNB:

- shall initiate the requested measurement according to the parameters given in the request in case the *Registration Request* *EN-DC* IE set to "start"; or

- shall stop all cells measurements and terminate the reporting in case the *Registration Request EN-DC* IE is set to "stop"; or

- shall add cells indicated in the *NR* *Cell To Report EN-DC List* IE list to the measurements initiated before for the given measurement IDs, in case the *Registration Request EN-DC* IE is set to "add". If measurements are already initiated for a cell indicated in the *NR* *Cell To Report EN-DC List* IE, this information shall be ignored.

The en-gNB shall send an EN-DC RESOURCE STATUS RESPONSE message to the eNBto indicate that all of the requested measurement objects the measurement can be initiated.

**Interaction with other procedures**

When starting a measurement, the *Report Characteristics EN-DC* IE in the EN-DC RESOURCE STATUS REQUEST indicates the type of objects en-gNB shall perform measurements on. For each cell, the en-gNB shall include in the EN-DC RESOURCE STATUS UPDATE message:

- the *NR Radio* *Resource Status* IE, if the first bit, "PRB Periodic" of the *Report Characteristics EN-DC* IE included in the EN-DC RESOURCE STATUS REQUEST message is set to "1". If the cell for which *NR Radio* *Resource Status* IE is requested to be reported supports more than one SSB, the *NR Radio* *Resource Status* IE for such cell shall include the *SSB Area Radio Resource Status Item* IE for all SSB areas supported by the cell. If the *SSB To Report List* IE is included for a cell, the *NR Radio* *Resource Status* IE for such cell shall include the requested *SSB Area Radio Resource Status List* IE.

- the *TNL Capacity Indicator* IE, if the second bit, "TNL Capacity Ind Periodic" of the *Report Characteristics EN-DC* IE included in the EN-DC RESOURCE STATUS REQUEST message is set to "1". The received *TNL Capacity Indicator* IE represents the lowest TNL capacity available for the cell.

- the *NR Composite Available Capacity Group* IE, if the third bit, "Composite Available Capacity Periodic" of the *Report Characteristics EN-DC* IE included in the EN-DC RESOURCE STATUS REQUEST message is set to "1". If *Cell Capacity Class Value* IE is included within the *NR Composite* *Available Capacity Group* IE, this IE is used to assign weights to the available capacity indicated in the *Capacity Value* IE. If the cell for which *NR Composite Available Capacity Group* IE is requested to be reported supports more than one SSB, and if the *SSB To Report List* IE is included for a cell, the *NR Composite Available Capacity Group* IE for such cell shall include the requested *SSB Area Capacity Value List* IE, providing the SSB area capacity with respect to the Cell Capacity Class Value.

If the *Reporting Periodicity EN-DC* IE in the EN-DC RESOURCE STATUS REQUEST is present, this indicates the periodicity for the reporting of periodic measurements. The en-gNB shall only report more than once if the *Reporting Periodicity EN-DC* IE is included.

##### 8.7.21.2.2 Successful Operation - en-gNB-initiated



Figure 8.7.21.2-2: EN-DC Resource Status Reporting Initiation, successful operation - en-gNB-initiated

The procedure is initiated with an EN-DC RESOURCE STATUS REQUEST message sent from the en-gNB to the eNB to start a measurement, stop a measurement, add cells to report for a measurement.

If the *Report Characteristics EN-DC* IE is included in the EN-DC RESOURCE STATUS REQUEST message and indicates cell specific measurements, the *E-UTRA Cell To Report EN-DC* *List* IE shall be included.

Upon receipt of the EN-DC RESOURCE STATUS REQUEST message, the eNB:

- shall initiate the requested measurement according to the parameters given in the request in case the *Registration Request EN-DC* IE set to "start"; or

- shall stop all cells measurements and terminate the reporting in case the *Registration Request EN-DC* IE is set to "stop"; or

- shall add cells indicated in the *E-UTRA Cell To Report EN-DC List* IE list to the measurements initiated before for the given measurement IDs, in case the *Registration Request EN-DC* IE is set to "add". If measurements are already initiated for a cell indicated in the *E-UTRA Cell To Report EN-DC List* IE, this information shall be ignored. The eNB shall ignore the *E-UTRA Cell To Report EN-DC List* IE, if included.

The eNB shall send an EN-DC RESOURCE STATUS RESPONSE message to the en-gNB to indicate that all of the requested measurement objects the measurement can be initiated.

**Interaction with other procedures, en-gNB-initiated operation**

When starting a measurement, the *Report Characteristics EN-DC* IE in the EN-DC RESOURCE STATUS REQUEST indicates the type of objects eNB shall perform measurements on. For each cell, the eNB shall include in the EN-DC RESOURCE STATUS UPDATE message:

- the *Radio* *Resource Status* IE, if the first bit, "PRB Periodic" of the *Report Characteristics EN-DC* 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 EN-DC* 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 EN-DC* 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 EN-DC* IE included in the RESOURCE STATUS REQUEST message is set to "1". If the *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;

If the *Reporting Periodicity EN-DC* IE in the EN-DC RESOURCE STATUS REQUEST is present, this indicates the periodicity for the reporting of periodic measurements. The eNB shall only report more than once if the *Reporting Periodicity EN-DC* IE is included.

#### 8.7.21.3 Unsuccessful Operation



Figure 8.7.21.3-1: EN-DC Resource Status Reporting Initiation, unsuccessful operation - eNB-initiated



Figure 8.7.21.3-2: EN-DC Resource Status Reporting Initiation, unsuccessful operation - en-gNB-initiated

If any of the requested measurements cannot be initiated, the en-gNB or the eNB shall send an EN-DC RESOURCE STATUS FAILURE message.

#### 8.7.21.4 Abnormal Conditions

Void.

### 8.7.22 EN-DC Resource Status Reporting

#### 8.7.22.1 General

This procedure is initiated by the en-gNB or by the eNB to report the result of measurements admitted by the en-gNB or by the eNB following a successful EN-DC Resource Status Reporting Initiation procedure.

The procedure uses non UE-associated signalling.

#### 8.7.22.2 Successful Operation



Figure 8.7.22.2-1: EN-DC Resource Status Reporting, successful operation - en-gNB-initiated



Figure 8.7.22.2-2: EN-DC Resource Status Reporting, successful operation - eNB-initiated

The en-gNB or the eNB shall report the results of the admitted measurements in the EN-DC RESOURCE STATUS UPDATE message. The admitted measurements are the measurements that were successfully initiated during the preceding EN-DC Resource Status Reporting Initiation procedure.

#### 8.7.22.3 Unsuccessful Operation

Not applicable.

#### 8.7.22.4 Abnormal Conditions

Void.

### 8.7.23 Cell Traffic Trace

#### 8.7.23.1 General

The purpose of the Cell Traffic Trace procedure is to send the allocated Trace Recording Session Reference and the Trace Reference to the MeNB. The procedure uses UE-associated signalling.

#### 8.7.23.2 Successful Operation



Figure 8.7.23.2-1: Cell Traffic Trace procedure. Successful operation.

The procedure is initiated with a CELL TRAFFIC TRACE message sent from the en-gNB to the MeNB.

If the *Privacy Indicator* IE is included in the message, the MeNB shall take the information into account for anonymisation of MDT data as specified in TS 32.422 [6].

### 8.7.24 UE Radio Capability ID Mapping

#### 8.7.24.1 General

The purpose of the UE Radio Capability ID Mapping procedure is to enable an en-gNB to request a connected eNB to provide the UE Radio Capability information that maps to a specific UE Radio Capability ID.

The procedure uses non-UE-associated signalling.

#### 8.7.24.2 Successful Operation



Figure 8.7.24.2-1: UE Radio Capability ID Mapping procedure. Successful operation

The en-gNB initiates the procedure by sending a UE RADIO CAPABILITY ID MAPPING REQUEST message to the eNB.

Upon receipt of the UE RADIO CAPABILITY ID MAPPING REQUEST message, the eNB shall include the UE Radio Capability information that maps to the UE Radio Capability ID indicated in the UE RADIO CAPABILITY ID MAPPING REQUEST message in the UE RADIO CAPABILITY ID MAPPING RESPONSE message.

#### 8.7.24.3 Unsuccessful Operation

Not applicable.

## 8.8 IAB Procedures

### 8.8.1 F1-C Traffic Transfer

#### 8.8.1.1 General

The purpose of the F1-C Traffic Transfer procedure is to deliver F1-C traffic to the MeNB so that it is then forwarded to the IAB-node, or deliver F1-C traffic to the en-gNB, if it was received from the IAB-node.

The procedure uses UE-associated signalling.

#### 8.8.1.2 Successful Operation



Figure 8.8.1.2-1: F1-C Traffic Transfer procedure, successful operation.

Either the MeNB initiates the procedure by sending the F1-C TRAFFIC TRANSFER message including the received F1-C traffic to the en-gNB, or the en-gNB initiates the procedure by sending the F1-C TRAFFIC TRANSFER message to the MeNB.

Upon reception of the F1-C TRAFFIC TRANSFER message, the MeNB shall deliver the contained F1-C traffic to the IAB-node as specified in TS 36.331 [9].

Upon reception of the F1-C TRAFFIC TRANSFER message, the en-gNB shall handle the received F1-C traffic as specified in TS 38.473 [44] and TS 38.472 [48].

#### 8.8.1.3 Unsuccessful Operation

Not applicable.

#### 8.8.1.4 Abnormal Conditions

Not Applicable.

# 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the source eNB | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Target Cell ID | M |  | ECGI  9.2.14 |  | YES | reject |
| GUMMEI | M |  | 9.2.16 |  | YES | reject |
| **UE Context Information** |  | *1* |  |  | YES | reject |
| >MME UE S1AP ID | M |  | INTEGER (0..232 -1) | MME UE S1AP ID allocated at the MME | – |  |
| >UE Security Capabilities | M |  | 9.2.29 |  | – |  |
| >AS Security Information | M |  | 9.2.30 |  | – |  |
| >UE Aggregate Maximum Bit Rate | M |  | 9.2.12 |  | – |  |
| >Subscriber Profile ID for RAT/Frequency priority | O |  | 9.2.25 |  | – |  |
| **>E-RABs To Be Setup List** |  | *1* |  |  | – |  |
| **>>E-RABs To Be Setup Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>E-RAB Level QoS Parameters | M |  | 9.2.9 | Includes necessary QoS parameters | – |  |
| >>>DL Forwarding | O |  | 9.2.5 |  | – |  |
| >>>UL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1 transport bearer. For delivery of UL PDUs. | – |  |
| >>>Bearer Type | O |  | 9.2.92 |  | YES | reject |
| >>>Ethernet Type | O |  | 9.2.157 |  | YES | ignore |
| >>>DAPS Request Information | O |  | 9.2.154 |  | YES | ignore |
| >>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >RRC Context | M |  | OCTET STRING | Includes the RRC *HandoverPreparationInformation* message as defined in subclause 10.2.2 of TS 36.331 [9], or the RRC *HandoverPreparationInformation-NB* message as defined in 10.6.2 of TS 36.331 [9]. | – |  |
| >Handover Restriction List | O |  | 9.2.3 |  | – |  |
| >Location Reporting Information | O |  | 9.2.21 | Includes the necessary parameters for location reporting | – |  |
| >Management Based MDT Allowed | O |  | 9.2.59 |  | YES | ignore |
| >ManagementBasedMDT PLMN List | O |  | MDT PLMN List  9.2.64 |  | YES | ignore |
| >UE Sidelink Aggregate Maximum Bit Rate | O |  | 9.2.97 | This IE applies only if the UE is authorized for V2X services. | YES | ignore |
| >EPC Handover Restriction List Container | O |  | 9.2.153 |  | YES | ignore |
| >Additional RRM Policy Index | O |  | 9.2.25a |  | YES | ignore |
| >NR UE Sidelink Aggregate Maximum Bit Rate | O |  | 9.2.159 | This IE applies only if the UE is authorized for NR V2X services. | YES | ignore |
| >UE Radio Capability ID | O |  | 9.2.171 |  | YES | reject |
| >IMS voice EPS fallback from 5G | O |  | ENUMERATED (true, ...) |  | YES | ignore |
| UE History Information | M |  | 9.2.38 | Same definition as in TS 36.413 [4] | YES | ignore |
| Trace Activation | O |  | 9.2.2 |  | YES | ignore |
| SRVCC Operation Possible | O |  | 9.2.33 |  | YES | ignore |
| CSG Membership Status | O |  | 9.2.52 |  | YES | reject |
| Mobility Information | O |  | BIT STRING (SIZE (32)) | 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. | YES | ignore |
| Masked IMEISV | O |  | 9.2.69 |  | YES | ignore |
| UE History Information from the UE | O |  | OCTET STRING | VisitedCellInfoList contained in the UEInformationResponse message (TS 36.331 [9]) | YES | ignore |
| Expected UE Behaviour | O |  | 9.2.70 |  | YES | ignore |
| ProSe Authorized | O |  | 9.2.78 |  | YES | ignore |
| UE Context Reference at the SeNB | O |  |  |  | YES | ignore |
| >Global SeNB ID | M |  | Global eNB ID  9.2.22 |  | – |  |
| >SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | – |  |
| >SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | – |  |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the source eNB | YES | reject |
| V2X Services Authorized | O |  | 9.2.93 |  | YES | ignore |
| UE Context Reference at the WT | O |  |  |  | YES | ignore |
| >WT ID | M |  | 9.2.95 |  | – |  |
| >WT UE XwAP ID | M |  | 9.2.96 |  | – |  |
| NR UE Security Capabilities | O |  | 9.2.107 |  | YES | ignore |
| UE Context Reference at the SgNB | O |  |  |  | YES | ignore |
| >Global en-gNB ID | M |  | 9.2.112 |  | – |  |
| >SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the SgNB. | – |  |
| Aerial UE subscription information | O |  | 9.2.129 |  | YES | ignore |
| Subscription Based UE Differentiation Information | O |  | 9.2.136 |  | YES | ignore |
| **Conditional Handover Information Request** | O |  |  |  | YES | reject |
| >CHO Trigger | M |  | ENUMERATED (CHO-initiation, CHO-replace, …) |  | – |  |
| >New eNB UE X2AP ID | C-ifCHOmod |  | eNB UE X2AP ID  9.2.24 | Allocated at the target eNB | – |  |
| >New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the target eNB | – |  |
| >Estimated Arrival Probability | O |  | INTEGER (1..100) |  | – |  |
| NR V2X Services Authorized | O |  | 9.2.158 |  | YES | ignore |
| PC5 QoS Parameters | O |  | 9.2.160 | This IE applies only if the UE is authorized for NR V2X services. | YES | ignore |
| IAB Node Indication | O |  | ENUMERATED (true, ...) |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |
| maxnoofMDTPLMNs | PLMNs in the Management Based MDT PLMN list. Value is 16. |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifCHOmod | This IE shall be present if the *CHO Trigger* IE is present and set to "CHO-replace". |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the source eNB | YES | ignore |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the target eNB | YES | ignore |
| **E-RABs Admitted List** |  | *1* |  |  | YES | ignore |
| **>E-RABs Admitted Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>UL GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>DL GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer. used for forwarding of DL PDUs | – |  |
| >>DAPS Response Information | O |  | 9.2.155 |  | YES | reject |
| E-RABs Not Admitted List | O |  | E-RAB List  9.2.28 | 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. | YES | ignore |
| Target eNB To Source eNB Transparent Container | M |  | OCTET STRING | Includes the RRC E-UTRA Handover Command message as defined in subclause 10.2.2 in TS 36.331 [9] | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| UE Context Kept Indicator | O |  | 9.2.85 |  | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the source eNB | YES | ignore |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the target eNB | YES | reject |
| WT UE Context Kept Indicator | O |  | UE Context Kept Indicator  9.2.85 | Indicates that the WT has acknowledged to keep the UE context | YES | ignore |
| E-RABs transferred to MeNB | O |  | E-RAB List  9.2.28 | In case of EN-DC, indicates that SN Status is needed for the listed E-RABs from the SgNB.. | YES | ignore |
| **Conditional Handover Information Acknowledge** | O |  |  |  | YES | ignore |
| >Requested Target Cell ID | M |  | ECGI  9.2.14 | Target cell indicated in the corresponding HANDOVER REQUEST message | – |  |
| >Maximum Number of CHO Preparations | O |  | 9.2.156 |  | – |  |

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

#### 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 → source eNB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the source eNB | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the source eNB | YES | ignore |
| Requested Target Cell ID | O |  | ECGI  9.2.14 | Target cell indicated in the corresponding HANDOVER REQUEST message | YES | reject |

#### 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 → target eNB (handover), eNB from which the E-RAB context is transferred → eNB to which the E-RAB context is transferred (RRC connection re-establishment or dual connectivity), MeNB/en-gNB from which the E-RAB context is transferred → en-gNB/MeNB to which the E-RAB context is transferred (EN-DC).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated for handover at the source eNB and for dual connectivity/EN-DC at the eNB from which the E-RAB context is transferred | YES | reject |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated for handover at the target eNB and for dual connectivity/EN-DC at the eNB to which the E-RAB context is transferred | YES | reject |
| **E-RABs Subject To Status Transfer List** |  | *1* |  |  | YES | ignore |
| **>E-RABs Subject To Status Transfer Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>Receive Status Of UL PDCP SDUs | O |  | BIT STRING (4096) | 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. | – |  |
| >>UL COUNT Value | M |  | COUNT Value  9.2.15 | PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 12 bit long PDCP-SN | – |  |
| >>DL COUNT Value | M |  | COUNT Value  9.2.15 | 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 | – |  |
| >>Receive Status Of UL PDCP SDUs Extended | O |  | BIT STRING (1..16384) | 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 *N*th 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. | YES | ignore |
| >>UL COUNT Value Extended | O |  | COUNT Value Extended 9.2.66 | PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 15 bit long PDCP-SN | YES | ignore |
| >>DL COUNT Value Extended | O |  | COUNT Value Extended 9.2.66 | 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 | YES | ignore |
| >>Receive Status Of UL PDCP SDUs for PDCP SN Length 18 | O |  | BIT STRING (1..131072) | 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. | YES | ignore |
| >>UL COUNT Value for PDCP SN Length 18 | O |  | COUNT Value for PDCP SN Length 18  9.2.82 | PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 18 bit long PDCP-SN | YES | ignore |
| >>DL COUNT Value for PDCP SN Length 18 | O |  | COUNT Value for PDCP SN Length 18  9.2.82 | 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 | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for handover at the source eNB and for dual connectivity/EN-DC at the eNB from which the E-RAB context is transferred. | YES | reject |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for handover at the target eNB and for dual connectivity/EN-DC at the eNB to which the E-RAB context is transferred. | YES | reject |
| SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated for EN-DC at the SgNB. | YES | ignore |

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

#### 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).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated for handover at the source eNB and for dual connectivity at the SeNB. | YES | reject |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated for handover at the target eNB and for dual connectivity/EN-DC at the MeNB. | YES | reject |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for handover at the source eNB and for dual connectivity at the SeNB. | YES | reject |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for handover at the source eNB and for dual connectivity/EN-DC at the MeNB. | YES | reject |
| SIPTO Bearer Deactivation Indication | O |  | ENUMERATED (True, …,) | Indicates that SIPTO@LN PDN connection deactivation is needed. | YES | ignore |
| SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated for EN-DC at the SgNB. | YES | ignore |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the source eNB | YES | reject |
| New eNB UE X2AP ID | O |  | eNB UE X2AP ID  9.2.24 | Allocated at the target eNB | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the source eNB | YES | reject |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the target eNB | YES | ignore |
| **Candidate Cells To Be Cancelled List** |  | *0 .. <maxnoofCellsinCHO>* |  |  | YES | reject |
| >Target Cell ID | M |  | ECGI  9.2.14 |  | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCellsinCHO | Maximum no. cells that can be prepared for a conditional handover. Value is 8. |

#### 9.1.1.7 HANDOVER SUCCESS

This message is sent by the target eNB to the source eNB to indicate the successful access of the UE toward the target eNB.

Direction: target eNB → source eNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the source eNB | YES | reject |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the target eNB | YES | reject |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the source eNB | YES | ignore |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the target eNB | YES | ignore |
| Target Cell ID | M |  | ECGI  9.2.14 | Target cell indicated in the corresponding Handover Preparation procedure | YES | reject |

#### 9.1.1.8 CONDITIONAL HANDOVER CANCEL

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

Direction: target eNB → source eNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the source eNB | YES | ignore |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the target eNB | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the source eNB | YES | ignore |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the target eNB | YES | reject |
| **Candidate Cells To Be Cancelled List** |  | 0 .. <maxnoofCellsinCHO> |  |  | YES | reject |
| >Target Cell ID | M |  | ECGI  9.2.14 |  | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCellsinCHO | Maximum no. cells that can be prepared for a conditional handover. Value is 8. |

#### 9.1.1.9 EARLY STATUS TRANSFER

This message is sent by the source eNB to the target eNB to transfer the COUNT value related to the forwarded downlink SDUs during DAPS Handover or Conditional Handover.

During a Conditional Handover with EN-DC or Dual Connectivity, this message is also used to transfer the COUNT value related to the forwarded downlink SDUs. In case of EN-DC, the COUNT value is transferred from the en-gNB to the eNB, while in case of Dual Connectivity, the COUNT value is transferred from the SeNB to the MeNB.

Direction: source eNB → target eNB (DAPS Handover or Conditional Handover).

Direction: en-gNB → MeNB (Conditional Handover with EN-DC), SeNB → MeNB (Conditional Handover with Dual Connectivity)

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated for DAPS handover or Conditional handover at the source eNB | YES | reject |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated for DAPS handover or Conditional handover at the target eNB | YES | reject |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for DAPS handover or Conditional handover at the source eNB | YES | reject |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for DAPS handover or Conditional handover at the target eNB | YES | reject |
| CHOICE Procedure Stage | M |  |  |  | YES | reject |
| *>First DL COUNT* |  |  |  |  |  |  |
| >>**E-RABs Subject To Early Status Transfer List** |  | *1 .. <maxnoofBearers>* |  |  | – |  |
| >>>**E-RABs Subject To Early Status Transfer Item** |  |  |  |  | – |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>FIRST DL COUNT Value | M |  | COUNT Value  9.2.15 | PDCP-SN and Hyper frame number of the first DL SDU that the source eNB/SeNB/en-gNB forwards to the target eNB/MeNB in case of 12 bit long PDCP-SN | – |  |
| >>>>FIRST DL COUNT Value Extended | O |  | COUNT Value Extended 9.2.66 | PDCP-SN and Hyper frame number of the first DL SDU that the source eNB/SeNB/en-gNB forwards to the target eNB/MeNB in case of 15 bit long PDCP-SN | – |  |
| >>>>FIRST DL COUNT Value for PDCP SN Length 18 | O |  | COUNT Value for PDCP SN Length 18  9.2.82 | PDCP-SN and Hyper frame number of the first DL SDU that the source eNB/SeNB/en-gNB forwards to the target eNB/MeNB in case of 18 bit long PDCP-SN | – |  |
| *>DL Discarding* |  |  |  |  |  |  |
| >>**E-RABs Subject To DL Discarding List** | M | *1* |  |  | – |  |
| >>>**E-RABs Subject To DL Discarding Item** |  | *1 .. <maxnoofBearers>* |  |  | – |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>DISCARD DL COUNT Value | M |  | COUNT Value  9.2.15 | PDCP-SN and Hyper frame number for which the target eNB/MeNB should discard forwarded DL SDUs associated with lower values in case of 12 bit long PDCP-SN | – |  |
| >>>>DISCARD DL COUNT Value Extended | O |  | COUNT Value Extended 9.2.66 | PDCP-SN and Hyper frame number for which the target eNB/MeNB should discard forwarded DL SDUs associated with lower values in case of 15 bit long PDCP-SN | – |  |
| >>>>DISCARD DL COUNT Value for PDCP SN Length 18 | O |  | COUNT Value for PDCP SN Length 18  9.2.82 | PDCP-SN and Hyper frame number for which the target eNB/MeNB should discard forwarded DL SDUs associated with lower values in case of 18 bit long PDCP-SN | – |  |
| SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated for EN-DC at the en-gNB. | YES | ignore |

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

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| **Cell Information** | M |  |  |  | YES | ignore |
| **>Cell Information Item** |  | *1 .. <maxCellineNB>* |  |  | EACH | ignore |
| >>Cell ID | M |  | ECGI  9.2.14 | Id of the source cell | – |  |
| >>UL Interference Overload Indication | O |  | 9.2.17 |  | – |  |
| **>>UL High Interference Information** |  | *0 .. <maxCellineNB>* |  |  | – |  |
| >>>Target Cell ID | M |  | ECGI  9.2.14 | Id of the cell for which the HII is meant | – |  |
| >>>UL High Interference Indication | M |  | 9.2.18 |  | – |  |
| >>Relative Narrowband Tx Power (RNTP) | O |  | 9.2.19 |  | – |  |
| >>ABS Information | O |  | 9.2.54 |  | YES | ignore |
| >>Invoke Indication | O |  | 9.2.55 |  | YES | ignore |
| >>Intended UL-DL Configuration | O |  | ENUMERATED(sa0, sa1, sa2, sa3, sa4, sa5, sa6,…) | One of the UL-DL configurations 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. | YES | ignore |
| >>Extended UL Interference Overload Info | O |  | 9.2.67 | This IE applies to TDD only. | YES | ignore |
| >>CoMP Information | O |  | 9.2.74 |  | YES | ignore |
| >>Dynamic DL transmission information | O |  | 9.2.77 |  | YES | ignore |

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

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Old eNB UE X2AP ID | O |  | eNB UE X2AP ID  9.2.24 | Allocated for handover at the source eNB and for dual connectivity at the SeNB or for a SN Status Transfer procedure at the eNB from which the E-RAB context is transferred. | YES | ignore |
| New eNB UE X2AP ID | O |  | eNB UE X2AP ID  9.2.24 | Allocated for handover at the target eNB and for dual connectivity/EN-DC at the MeNB or for a SN Status Transfer procedure at the eNB to which the E-RAB context is transferred. | YES | ignore |
| Cause | O |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for handover at the source eNB and for dual connectivity at the SeNB or for a SN Status Transfer procedure at the eNB from which the E-RAB context is transferred. | YES | ignore |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated for handover at the target eNB and for dual connectivity/EN-DC at the MeNB or for a SN Status Transfer procedure at the eNB to which the E-RAB context is transferred. | YES | ignore |
| Old en-gNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated for EN-DC at the en-gNB. | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| **Served Cells** |  | *1 .. <maxCellineNB>* |  | Complete list of cells served by the eNB | YES | reject |
| **>**Served Cell Information | M |  | 9.2.8 |  | – |  |
| **>Neighbour Information** |  | *0 .. <maxnoofNeighbours>* |  |  | – |  |
| >>ECGI | M |  | ECGI  9.2.14 | E-UTRAN Cell Global Identifier of the neighbour cell | – |  |
| >>PCI | M |  | INTEGER (0..503, …) | Physical Cell Identifier of the neighbour cell | – |  |
| >>EARFCN | M |  | 9.2.26 | DL EARFCN for FDD or EARFCN for TDD | – |  |
| >>TAC | O |  | OCTET STRING (2) | Tracking Area Code | YES | ignore |
| >>EARFCN Extension | O |  | 9.2.65 | DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the *EARFCN* IE is ignored. | YES | reject |
| >NR Neighbour Information | O |  | 9.2.98 | NR neighbour, capable of performing EN-DC with the served E-UTRA cell | YES | ignore |
| **GU Group Id List** |  | *0 .. <maxfPools>* |  | List of all the pools to which the eNB belongs | GLOBAL | reject |
| >GU Group Id | M |  | 9.2.20 |  | - |  |
| LHN ID | O |  | 9.2.83 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |
| maxnoofNeighbours | Maximum no. of neighbour cells associated to a given served cell. Value is 512. |
| maxPools | Maximum no. of pools an eNB can belong to. Value is 16. |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| **Served Cells** |  | *1 .. <maxCellineNB>* |  | Complete list of cells served by the eNB | GLOBAL | reject |
| >Served Cell Information | M |  | 9.2.8 |  | – |  |
| **>Neighbour Information** |  | *0 .. <maxnoofNeighbours>* |  |  | – |  |
| >>ECGI | M |  | ECGI  9.2.14 | E-UTRAN Cell Global Identifier of the neighbour cell | – |  |
| >>PCI | M |  | INTEGER (0..503, …) | Physical Cell Identifier of the neighbour cell | – |  |
| >>EARFCN | M |  | 9.2.26 | DL EARFCN for FDD or EARFCN for TDD | – |  |
| >>TAC | O |  | OCTET STRING (2) | Tracking Area Code | YES | ignore |
| >>EARFCN Extension | O |  | 9.2.65 | DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the *EARFCN* IE is ignored. | YES | reject |
| >NR Neighbour Information | O |  | 9.2.98 | NR neighbour, capable of performing EN-DC with the served E-UTRA cell | YES | ignore |
| **GU Group Id List** |  | *0 .. <maxPools>* |  | List of all the pools to which the eNB belongs | GLOBAL | reject |
| >GU Group Id | M |  | 9.2.20 |  | - |  |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| LHN ID | O |  | 9.2.83 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |
| maxnoofNeighbours | Maximum no. of neighbour cells associated to a given served cell. Value is 512. |
| maxPools | Maximum no. of pools an eNB can belong to. Value is 16. |

#### 9.1.2.5 X2 SETUP FAILURE

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

Direction: eNB2 → eNB1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Time To Wait | O |  | 9.2.32 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 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.

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| **Served Cells To Add** |  | *0 .. <maxCellineNB>* |  | Complete list of added cells served by the eNB | GLOBAL | reject |
| >Served Cell Information | M |  | 9.2.8 |  | – |  |
| **>Neighbour Information** |  | *0 .. <maxnoofNeighbours>* |  |  | – |  |
| >>ECGI | M |  | ECGI  9.2.14 | E-UTRAN Cell Global Identifier of the neighbour cell | – |  |
| >>PCI | M |  | INTEGER (0..503, …) | Physical Cell Identifier of the neighbour cell | – |  |
| >>EARFCN | M |  | 9.2.26 | DL EARFCN for FDD or EARFCN for TDD | – |  |
| >>TAC | O |  | OCTET STRING (2) | Tracking Area Code | YES | ignore |
| >>EARFCN Extension | O |  | 9.2.65 | DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the *EARFCN* IE is ignored. | YES | reject |
| >NR Neighbour Information | O |  | 9.2.98 | NR neighbour, capable of performing EN-DC with the served E-UTRA cell | YES | ignore |
| **Served Cells To Modify** |  | *0 .. <maxCellineNB>* |  | Complete list of modified cells served by the eNB | GLOBAL | reject |
| >Old ECGI | M |  | ECGI  9.2.14 | Old E-UTRAN Cell Global Identifier | - |  |
| >Served Cell Information | M |  | 9.2.8 |  | – |  |
| **>Neighbour Information** |  | *0 .. <maxnoofNeighbours>* |  |  | – |  |
| >>ECGI | M |  | ECGI  9.2.14 | E-UTRAN Cell Global Identifier of the neighbour cell | – |  |
| >>PCI | M |  | INTEGER (0..503, …) | Physical Cell Identifier of the neighbour cell | – |  |
| >>EARFCN | M |  | 9.2.26 | DL EARFCN for FDD or EARFCN for TDD | – |  |
| >>TAC | O |  | OCTET STRING (2) | Tracking Area Code | YES | ignore |
| >>EARFCN Extension | O |  | 9.2.65 | DL EARFCN for FDD or EARFCN for TDD. If this IE is present, the value signalled in the *EARFCN* IE is ignored. | YES | reject |
| >NR Neighbour Information | O |  | 9.2.98 | NR neighbour, capable of performing EN-DC with the served E-UTRA cell | YES | ignore |
| >Deactivation Indication | O |  | ENUMERATED(deactivated,  …) | Indicates that the concerned cell is switched off for energy saving reasons | YES | ignore |
| **Served Cells To Delete** |  | *0 .. <maxCellineNB>* |  | Complete list of deleted cells served by the eNB | GLOBAL | reject |
| >Old ECGI | M |  | ECGI  9.2.14 | Old E-UTRAN Cell Global Identifier of the cell to be deleted | - |  |
| **GU Group Id To Add List** |  | *0 .. <maxPools>* |  |  | GLOBAL | reject |
| >GU Group Id | M |  | 9.2.20 |  | - |  |
| **GU Group Id To Delete List** |  | *0 .. <maxPools>* |  |  | GLOBAL | reject |
| >GU Group Id | M |  | 9.2.20 |  | - |  |
| Coverage Modification List |  | *0 .. <maxCellineNB>* |  | List of cells with modified coverage | GLOBAL | reject |
| >ECGI | M |  | ECGI  9.2.14 | E-UTRAN Cell Global Identifier of the cell to be modified | - |  |
| >Cell Coverage State | M |  | INTEGER (0..15, …) | 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 | - |  |
| >Cell Deployment Status Indicator | O |  | ENUMERATED(pre-change-notification, ...) | Indicates the Cell Coverage State is planned to be used at the next reconfiguration |  |  |
| >Cell Replacing Info | C-ifCellDeploymentStatusIndicatorPresent |  |  |  |  |  |
| >>Replacing Cells |  | *0 .. <maxCellineNB>* |  |  |  |  |
| >>>ECGI |  |  | ECGI  9.2.14 | E-UTRAN Cell Global Identifier of a cell that may replace all or part of the coverage of the cell to be modified |  |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |
| maxnoofNeighbours | Maximum no. of neighbour cells associated to a given served cell. Value is 512. |
| maxPools | Maximum no. of pools an eNB can belong to. Value is 16. |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifCellDeploymentStatusIndicatorPresent | This IE shall be present if the *Cell Deployment Status Indicator* IE is present. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Time To Wait | O |  | 9.2.32 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| eNB1 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by eNB1 | YES | reject |
| eNB2 Measurement ID | C-ifRegistrationRequestStoporPartialStoporAdd |  | INTEGER (1..4095,...) | Allocated by eNB2 | YES | ignore |
| Registration Request | M |  | ENUMERATED(start, stop,  …, partial stop, add) | Type of request for which the resource status is required. | YES | reject |
| Report Characteristics | O |  | BITSTRING  (SIZE(32)) | Each position in the bitmap indicates measurement object the eNB2 is requested to report.  First Bit = PRB Periodic,  Second Bit = TNL load Ind Periodic,  Third Bit = HW Load Ind Periodic,  Fourth Bit = Composite Available Capacity Periodic, this bit should be set to 1 if at least one of the First, Second or Third bits is set to 1,  Fifth Bit = ABS Status Periodic,  Sixth Bit = RSRP Measurement Report Periodic,  Seventh Bit = CSI Report Periodic.  Other bits shall be ignored by the eNB2. | YES | reject |
| **Cell To Report** |  | *1* |  | Cell ID list to which the request applies. | YES | ignore |
| **>Cell To Report Item** |  | *1 .. <maxCellineNB>* |  |  | EACH | ignore |
| >>Cell ID | M |  | ECGI  9.2.14 |  | – |  |
| Reporting Periodicity | O |  | ENUMERATED(1000ms, 2000ms, 5000ms,10000ms, …) | Periodicity that can be used for reporting of PRB Periodic, TNL Load Ind Periodic, HW Load Ind Periodic, Composite Available Capacity Periodic or ABS Status Periodic. | YES | ignore |
| Partial Success Indicator | O |  | ENUMERATED(partial success allowed, ...) | Included if partial success is allowed | YES | ignore |
| Reporting Periodicity of RSRP Measurement Report | O |  | ENUMERATED(120ms, 240ms, 480ms, 640ms, ...) | Periodicity that can be used for the reporting of RSRP Measurement Report Periodic. | YES | ignore |
| Reporting Periodicity of CSI Report | O |  | ENUMERATED(5ms, 10ms, 20ms, 40ms, 80ms, ...) | Periodicity that can be used for the reporting of CSI Report Periodic. | YES | ignore |

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

|  |  |
| --- | --- |
| Condition | Explanation |
| ifRegistrationRequestStoporPartialStoporAdd | This IE shall be present if the *Registration Request* IE is set to the value "stop", "partial stop" or "add". |

#### 9.1.2.12 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| eNB1 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by eNB1 | YES | reject |
| eNB2 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by eNB2 | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| **Measurement Initiation Result** |  | *0..1* |  | List of all cells in which measurement objects were requested, included when indicating partial success | YES | ignore |
| >**Measurement Initiation Result Item** |  | *1 .. <maxCellineNB>* |  |  | EACH | ignore |
| >>Cell ID | M |  | ECGI  9.2.14 |  | – |  |
| >>**Measurement Failure Cause List** |  | *0..1* |  | Indicates that eNB2 could not initiate the measurement for at least one of the requested measurement objects in the cell | – |  |
| >>>**Measurement Failure Cause Item** |  | *1 .. <maxFailedMeasObjects>* |  |  | EACH | ignore |
| >>>>Measurement Failed Report Characteristics | M |  | BITSTRING  (SIZE(32)) | 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. | – |  |
| >>>>Cause | M |  | 9.2.6 | Failure cause for measurement objects for which the measurement cannot be initiated | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxFailedMeasObjects | Maximum number of measurement objects that can fail per measurement. Value is 32. |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| eNB1 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by eNB1 | YES | reject |
| eNB2 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by eNB2 | YES | reject |
| Cause | M |  | 9.2.6 | Ignored by the receiver when the Complete Failure Cause Information IE is included | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| **Complete Failure Cause Information** |  | *0..1* |  | Complete list of failure causes for all requested cells | YES | ignore |
| >**Complete Failure Cause Information Item** |  | *1 .. <maxCellineNB>* |  |  | EACH | ignore |
| >>Cell ID | M |  | ECGI  9.2.14 |  | – |  |
| >>**Measurement Failure Cause List** |  | *1* |  |  | – |  |
| >>>**Measurement Failure Cause Item** |  | *1 .. <maxFailedMeasObjects>* |  |  | EACH | ignore |
| >>>>Measurement Failed Report Characteristics | M |  | BITSTRING  (SIZE(32)) | 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. | – |  |
| >>>>Cause | M |  | 9.2.6 | Failure cause for measurements that cannot be initiated | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |
| maxFailedMeasObjects | Max number of measurement objects that can fail per measurement. Value is 32. |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| eNB1 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by eNB1 | YES | reject |
| eNB2 Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by eNB2 | YES | reject |
| **Cell Measurement Result** |  | *1* |  |  | YES | ignore |
| **>Cell Measurement Result Item** |  | *1 .. <maxCellineNB>* |  |  | EACH | ignore |
| >>Cell ID | M |  | ECGI  9.2.14 |  |  |  |
| >>Hardware Load Indicator | O |  | 9.2.34 |  |  |  |
| >>S1 TNL Load Indicator | O |  | 9.2.35 |  |  |  |
| >>Radio Resource Status | O |  | 9.2.37 |  |  |  |
| >>Composite Available Capacity Group | O |  | 9.2.44 |  | YES | ignore |
| >>ABS Status | O |  | 9.2.58 |  | YES | ignore |
| >>RSRP Measurement Report List | O |  | 9.2.76 |  | YES | ignore |
| >>CSI Report | O |  | 9.2.79 |  | YES | ignore |
| >>Cell Reporting Indicator | O |  | ENUMERATED(stop request, ...) |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| 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 an eNB1 to neighbouring eNB2 to initiate adaptation of mobility parameters.

Direction: eNB1 → eNB2.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| eNB1 Cell ID | M |  | ECGI  9.2.14 |  | YES | reject |
| eNB2 Cell ID | M |  | ECGI  9.2.14 |  | YES | reject |
| eNB1 Mobility Parameters | O |  | Mobility Parameters Information 9.2.48 | Configuration change in eNB1 cell | YES | ignore |
| eNB2 Proposed Mobility Parameters | M |  | Mobility Parameters Information 9.2.48 | Proposed configuration change in eNB2 cell | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | reject |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| eNB1 Cell ID | M |  | ECGI  9.2.14 |  | YES | reject |
| eNB2 Cell ID | M |  | ECGI  9.2.14 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| eNB1 Cell ID | M |  | ECGI  9.2.14 |  | YES | ignore |
| eNB2 Cell ID | M |  | ECGI  9.2.14 |  | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Mobility Parameters Modification Range | O |  | 9.2.49 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| Failure cell PCI | M |  | INTEGER (0..503, …) | Physical Cell Identifier | YES | ignore |
| Re-establishment cell ECGI | M |  | ECGI  9.2.14 |  | YES | ignore |
| C-RNTI | M |  | BIT STRING (SIZE (16)) | C-RNTI contained in the RRC Re-establishment Request message (TS 36.331 [9]) | YES | ignore |
| ShortMAC-I | O |  | BIT STRING (SIZE (16)) | ShortMAC-I contained in the RRC Re-establishment Request message (TS 36.331 [9]) | YES | ignore |
| UE RLF Report Container | O |  | OCTET STRING | *RLF -Report-r*9 IE contained in the UEInformationResponse message (TS 36.331 [9]) | YES | ignore |
| RRC Conn Setup Indicator | O |  | ENUMERATED(RRC Conn Setup, ...) | Included if the RLF Report within the *UE RLF Report Container* IE is retrieved after an RRC connection setup or an incoming successful handover | YES | reject |
| RRC Conn Reestab Indicator | O |  | ENUMERATED(reconfigurationFailure, handoverFailure, otherFailure, ...) | The Reestablishment Cause in RRCConnectionReestablishmentRequest message(TS 36.331 [9]) | YES | ignore |
| UE RLF Report Container for extended bands | O |  | OCTET STRING | *RLF-Report-v9e0* IE contained in the UEInformationResponse message (TS 36.331 [9]) | YES | ignore |
| NB-IoT RLF Report Container | O |  | OCTET STRING | *RLF-Report-NB-r16* IE contained in the UEInformationResponse-NB message (TS 36.331 [9]) | YES | ignore |

#### 9.1.2.19 HANDOVER 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, Inter System ping-pong) |  | YES | ignore |
| Handover Cause | M |  | Cause  9.2.6 | Indicates handover cause employed for handover from eNB2 | 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 |
| Target cell in NG-RAN | C-  ifHandoverReportType Inter-system pingpong |  | OCTET STRING | Encoded according to *NG-RAN CGI* IE in TS 38.413 [39]. | 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" |
| ifHandoverReportType Inter-system pingpong | This IE shall be present if the Handover Report Type IE is set to the value "Inter-system 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| **Served Cells To Activate** |  | *1 .. <maxCellineNB>* |  |  | GLOBAL | reject |
| >ECGI | M |  | 9.2.14 |  | - |  |

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

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| **Activated Cell List** |  | *1 .. <maxCellineNB>* |  |  | GLOBAL | ignore |
| >ECGI | M |  | 9.2.14 |  | - |  |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 9.1.2.23 X2 RELEASE

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

Direction: eNB1 🡪 eNB2.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Global eNB ID | M |  | 9.2.22 |  | YES | reject |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| RNL Header | M |  | 9.2.68 |  | YES | reject |
| X2AP Message | O |  | OCTET STRING | Includes any X2AP message except the X2AP MESSAGE TRANSFER message | YES | reject |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| X2 Removal Threshold | O |  | X2 Benefit Value 9.2.90 |  | YES | reject |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 9.1.2.28 RETRIEVE UE CONTEXT REQUEST

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

Direction: new eNB → old eNB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the new eNB | YES | reject |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the new eNB  See Note 1) | YES | reject |
| Resume ID | M |  | 9.2.91 |  | YES | reject |
| ShortMAC-I | M |  | BIT STRING (SIZE (16)) | **RRC Resume:**  Corresponds to the *ShortResumeMAC-I* in the *RRCConnection ResumeRequest* message as defined in TS 36.331 [9]  **RRC Reestablishment:**  Corresponds to the *ShortMAC-I* in the *RRCConnectionReestablishmentRequest*message as defined in TS 36.331 [9]. | YES | reject |
| New E-UTRAN Cell Identifier | M |  | BIT STRING (SIZE (28)) | **RRC Resume:**  Corresponds to the *cellIdentity* within the *VarShortResumeMAC-Input* as specified in TS 36.331 [9].  **RRC Reestablishment:**  Corresponds to the *cellIdentity* within the *VarShortMAC-Input* as specified in TS 36.331 [9]. | YES | reject |
| C-RNTI | O |  | BIT STRING (SIZE (16)) | 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 | YES | reject |
| Failure cell PCI | O |  | INTEGER (0..503, …) | Physical Cell Identifier | YES | reject |

NOTE 1: The ASN.1 definition of the RETRIEVE UE CONTEXT REQUEST message contains the a wrong IE-Id, which references the *SeNB UE X2AP ID Extension* IE instead of the *New eNB UE X2AP ID Extension* IE. The old eNB interprets the content of this IE as the Extended eNB UE X2AP ID, which, together with the *New eNB UE X2AP ID* IE represents the eNB UE X2AP ID allocated at the new eNB.

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the new eNB | YES | ignore |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the new eNB | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the old eNB | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the old eNB | YES | ignore |
| GUMMEI | M |  | 9.2.16 |  | YES | reject |
| **UE Context Information** |  | 1 |  |  | YES | reject |
| >MME UE S1AP ID | M |  | INTEGER (0..232 -1) | MME UE S1AP ID allocated at the MME | – |  |
| >UE Security Capabilities | M |  | 9.2.29 |  | – |  |
| >AS Security Information | M |  | 9.2.30 |  | – |  |
| >UE Aggregate Maximum Bit Rate | M |  | 9.2.12 |  | – |  |
| >Subscriber Profile ID for RAT/Frequency priority | O |  | 9.2.25 |  | – |  |
| **>E-RABs To Be Setup List** |  | 1 |  |  | – |  |
| **>>E-RABs To Be Setup Item** |  | 1 .. <maxnoofBearers> |  |  | EACH | ignore |
| >>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>E-RAB Level QoS Parameters | M |  | 9.2.9 | Includes necessary QoS parameters | – |  |
| >>>Bearer Type | O |  | 9.2.92 |  | – |  |
| >>>UL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1 transport bearer. For delivery of UL PDUs. | YES | reject |
| >>>DL Forwarding | O |  | 9.2.5 |  | YES | ignore |
| >>>Ethernet Type | O |  | 9.2.157 |  | YES | ignore |
| >>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >RRC Context | M |  | OCTET STRING | 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]. | – |  |
| >Handover Restriction List | O |  | 9.2.3 |  | – |  |
| >Location Reporting Information | O |  | 9.2.21 | Includes the necessary parameters for location reporting | – |  |
| >Management Based MDT Allowed | O |  | 9.2.59 |  | – |  |
| >ManagementBasedMDT PLMN List | O |  | MDT PLMN List  9.2.64 |  | – |  |
| >UE Sidelink Aggregate Maximum Bit Rate | O |  | 9.2.97 | This IE applies only if the UE is authorized for V2X services. | YES | ignore |
| >Additional RRM Policy Index | O |  | 9.2.25a |  | YES | ignore |
| >EPC Handover Restriction List Container | O |  | 9.2.153 |  | YES | ignore |
| >NR UE Sidelink Aggregate Maximum Bit Rate | O |  | 9.2.159 | This IE applies only if the UE is authorized for NR V2X services. | YES | ignore |
| >UE Radio Capability ID | O |  | 9.2.171 |  | YES | reject |
| >IMS voice EPS fallback from 5G | O |  | ENUMERATED (true, …) |  | YES | ignore |
| Trace Activation | O |  | 9.2.2 |  | YES | ignore |
| SRVCC Operation Possible | O |  | 9.2.33 |  | YES | ignore |
| Masked IMEISV | O |  | 9.2.69 |  | YES | ignore |
| Expected UE Behaviour | O |  | 9.2.70 |  | YES | ignore |
| ProSe Authorized | O |  | 9.2.78 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| V2X Services Authorized | O |  | 9.2.93 |  | YES | ignore |
| Aerial UE subscription information | O |  | 9.2.129 |  | YES | ignore |
| Subscription Based UE Differentiation Information | O |  | 9.2.136 |  | YES | ignore |
| NR V2X Services Authorized | O |  | 9.2.158 |  | YES | ignore |
| PC5 QoS Parameters | O |  | 9.2.160 | This IE applies only if the UE is authorized for NR V2X services. | YES | ignore |

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

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the new eNB | YES | ignore |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the new eNB | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE *Initiating NodeType* | M |  |  |  | YES | reject |
| >*eNB* |  |  |  |  |  |  |
| >>Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| **>>List of Served E-UTRA Cells** |  | *1 .. <maxCellineNB>* |  | Complete list of cells served by the eNB | YES | reject |
| >>>Served E-UTRA Cell Information | M |  | Served Cell Information 9.2.8 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours | – |  |
| >>Interface Instance Indication | O |  | 9.2.143 | NOTE: In the current version of this specification this IE is not included in the *Initiating Node Type* IE. | YES | reject |
| >>Cell and Capacity Assistance Information | O |  | 9.2.146 |  | YES | ignore |
| >*en-gNB* |  |  |  |  |  |  |
| >>Global en-gNB ID | M |  | 9.2.112 |  | YES | reject |
| **>>List of Served NR Cells** |  | *1 .. <maxCellinengNB>* |  | List of cells served by the en-gNB. If a partial list of cells is signalled, it contains at least one cell per carrier configured at the gNB. | YES | reject |
| >>>Served NR Cell Information | M |  | 9.2.110 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours. | – |  |
| >>Partial List Indicator | O |  | ENUMERATED (partial, ...) | Value “partial” indicates that a partial list of cells is included in the *List of Served NR Cells* IE | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |
| TNL Transport Layer Address info | O |  | 9.2.149 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |
| maxCellinengNB | Maximum no. cells that can be served by an en-gNB. Value is 16384. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE *Responding NodeType* | M |  |  |  | YES | reject |
| >*eNB* |  |  |  |  |  |  |
| >>Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| **>>List of Served E-UTRA Cells** |  | *1 .. <maxCellineNB>* |  | Complete list of cells served by the eNB | YES | reject |
| >>>Served E-UTRA Cell Information | M |  | Served Cell Information 9.2.8 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours | – |  |
| >>Cell and Capacity Assistance Information | O |  | 9.2.146 |  | YES | ignore |
| >*en-gNB* |  |  |  |  |  |  |
| >>Global en-gNB ID | M |  | 9.2.112 |  | YES | reject |
| **>>List of Served NR Cells** |  | *1 .. <maxCellinengNB>* |  | List of cells served by the en-gNB. If a partial list of cells is signalled, it contains at least one cell per carrier configured at the gNB. | YES | reject |
| >>>Served NR Cell Information | M |  | 9.2.110 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours | – |  |
| >>Partial List Indicator | O |  | ENUMERATED (partial, ...) | Value “partial” indicates that a partial list of cells is included in the *List of Served NR Cells* IE | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |
| TNL Transport Layer Address info | O |  | 9.2.149 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |
| maxCellinengNB | Maximum no. cells that can be served by an en-gNB. Value is 16384. |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Time To Wait | O |  | 9.2.32 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |
| Message Oversize Notification | O |  | 9.2.148 |  | YES | ignore |

#### 9.1.2.34 EN-DC CONFIGURATION UPDATE

This message is sent by an initiating node to a peer neighbouring node.

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE Initiating NodeType | M |  |  |  | YES | reject |
| >*eNB* |  |  |  |  |  |  |
| >>Cell Assistance Information | O |  | 9.2.115 |  | YES | reject |
| **>>Served E-UTRA Cells To Add** |  | *0 .. <maxCellineNB>* |  |  | GLOBAL | reject |
| >>>Served E-UTRA Cell Information | M |  | Served Cell Information 9.2.8 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours | – |  |
| **>>Served E-UTRA Cells To Modify** |  | *0 .. <maxCellineNB>* |  | Complete list of modified cells served by the eNB | GLOBAL | reject |
| >>>Old ECGI | M |  | ECGI  9.2.14 | Old E-UTRAN Cell Global Identifier | – |  |
| >>>Served E-UTRA Cell Information | M |  | Served Cell Information 9.2.8 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours | – |  |
| **>>Served E-UTRA Cells To Delete** |  | *0 .. <maxCellineNB>* |  | Complete list of deleted cells served by the eNB | GLOBAL | reject |
| >>>Old ECGI | M |  | ECGI  9.2.14 | Old E-UTRAN Cell Global Identifier of the cell to be deleted | - |  |
| >*en-gNB* |  |  |  |  |  |  |
| **>>Served NR Cells To Add** |  | *0 .. <maxCellinengNB>* |  |  | GLOBAL | reject |
| >>>Served NR Cell Information | M |  | 9.2.110 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours | – |  |
| **>>Served NR Cells To Modify** |  | *0 .. <maxCellinengNB>* |  |  | GLOBAL | reject |
| >>>Old NR-CGI | M |  | NR CGI  9.2.111 |  | - |  |
| >>>Served NR Cell Information | M |  | 9.2.110 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours | – |  |
| >>>NR Deactivation Indication | O |  | ENUMERATED(deactivated,  …) | 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. | YES | ignore |
| **>>Served NR Cells To Delete** |  | *0 .. <maxCellinengNB>* |  |  | GLOBAL | reject |
| >>>Old NR-CGI | M |  | NR CGI  9.2.111 |  | - |  |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |
| TNL Transport Layer Address info | O |  | 9.2.149 |  | YES | ignore |
| **TNLA To Add List** |  | *0..1* |  |  | YES | ignore |
| >**TNLA To Add Item IEs** |  | *1..<maxnoofTNLAssociations>* |  |  | – |  |
| >>TNLA Transport Layer Information | M |  | 9.2.150 | CP Transport Layer Information of the en-gNB | - | - |
| >>TNLA Usage | M |  | 9.2.151 |  | - | - |
| **TNLA To Update List** |  | *0..1* |  |  | YES | ignore |
| >**TNLA To Update Item IEs** |  | *1..<maxnoofTNLAssociations>* |  |  | – |  |
| >>TNLA Transport Layer Information | M |  | 9.2.150 | CP Transport Layer Information of the en-gNB | - | - |
| >>TNLA Usage | O |  | 9.2.151 |  | - | - |
| **TNLA To Remove List** |  | *0..1* |  |  | YES | ignore |
| >**TNLA To Remove Item IEs** |  | *1..<maxnoofTNLAssociations>* |  |  | – |  |
| >>TNLA Transport Layer Information | M |  | 9.2.150 | CP Transport Layer Information of the en-gNB | - | - |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |
| maxCellinengNB | Maximum no. cells that can be served by an en-gNB. Value is 16384. |
| maxnoofTNLAssociations | Maximum numbers of TNL Associations between the eNB and the en-gNB. Value is 32. |

#### 9.1.2.35 EN-DC CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a neighbouring node to a peer node.

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE Responding NodeType | M |  |  |  | YES | reject |
| >*eNB* |  |  |  |  |  |  |
| >*en-gNB* |  |  |  |  |  |  |
| **>>List of Served NR Cells** |  | 0 .. <maxCellinengNB> |  | Complete or limited list of cells served by the en-gNB, if requested by the eNB. | – |  |
| >>>Served NR Cell Information | M |  | 9.2.110 |  | – |  |
| >>>NR Neighbour Information | O |  | 9.2.98 | NR neighbours. | – |  |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| TNL Transport Layer Address info | O |  | 9.2.149 |  | YES | ignore |
| **TNLA Setup List** |  | 0..1 |  |  | YES | ignore |
| >**TNLA Setup Item** |  | 1..<maxnoofTNLAssociations> |  |  | – |  |
| >>TNLA Transport Layer Address | M |  | 9.2.150 | CP Transport Layer Information of the en-gNB | – |  |
| **TNLA Failed to Setup List** |  | 0..1 |  |  | YES | ignore |
| >**TNLA Failed To Setup Item** |  | 1..<maxnoofTNLAssociations> |  |  | – |  |
| >>TNLA Transport Layer Address | M |  | 9.2.150 | CP Transport Layer Information of the en-gNB | – |  |
| >>Cause | M |  | 9.2.6 |  | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellinengNB | Maximum no. cells that can be served by an en-gNB. Value is 16384. |
| maxnoofTNLAssociations | Maximum numbers of TNL Associations between the eNB and the en-gNB. Value is 32. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Time To Wait | O |  | 9.2.32 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| **Served NR Cells To Activate** |  | *1* |  |  | GLOBAL | reject |
| **>Served NR Cells To Activate Item** |  | *1 .. <* *maxCellinengNB >* |  |  |  |  |
| >>NR CGI | M |  | 9.2.111 |  | - |  |
| Activation ID | M |  | INTEGER (0..255) | Allocated by the eNB | YES | reject |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellinengNB | Maximum no. cells that can be served by an en-gNB. Value is 16384. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| **Activated NR Cell List** |  | *1* |  |  | GLOBAL | ignore |
| **>Activated NR Cell Item** |  | *1 .. < maxCellinengNB >* |  |  |  |  |
| >>NR CGI | M |  | 9.2.111 |  | - |  |
| Activation ID | M |  | INTEGER (0..255) | Allocated by the eNB | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellinengNB | Maximum no. cells that can be served by an en-gNB. Value is 16384. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Activation ID | M |  | INTEGER (0..255) | Allocated by the eNB | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 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 interface instance.

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE *Initiating Node Type* | M |  |  |  |  |  |
| >*eNB* |  |  |  |  |  |  |
| >>Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| >*en-gNB* |  |  |  |  |  |  |
| >>Global en-gNB ID | M |  | 9.2.112 |  |  |  |
| X2 Removal Threshold | O |  | X2 Benefit Value 9.2.90 |  | YES | reject |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 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 interface instance.

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE *Initiating Node Type* | M |  |  |  |  |  |
| >*eNB* |  |  |  |  |  |  |
| >>Global eNB ID | M |  | 9.2.22 |  | YES | reject |
| >*en-gNB* |  |  |  |  |  |  |
| >>Global en-gNB ID | M |  | 9.2.112 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 9.1.2.42 EN-DC X2 REMOVAL FAILURE

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

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 9.1.2.43 DATA FORWARDING ADDRESS INDICATION

This message is sent by the new eNB to indicate to the old eNB forwarding addresses for each E-RAB for which it admits data forwarding.

During a Conditional Handover with EN-DC or Dual Connectivity, this message is also used to provide data forwarding related information. In case of EN-DC, the data forwarding related information is transferred from the eNB to the en-gNB, while in case of Dual Connectivity, the data forwarding related information is transferred from the MeNB to the SeNB.

Direction: new eNB → old eNB.

Direction: MeNB → en-gNB (Conditional Handover with EN-DC), MeNB → SeNB (Conditional Handover with Dual Connectivity)

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| New eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the new eNB | YES | ignore |
| New eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the new eNB | YES | ignore |
| Old eNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the old eNB | YES | ignore |
| Old eNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the old eNB | YES | ignore |
| **E-RABs Data Forwarding Address List** |  | *1* |  |  | YES | ignore |
| **> E-RABs Data Forwarding Address Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>DL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| CHO DC Indicator | O |  | ENUMERATED (true, ...) | Indicating that the DATA FORWARDING ADDRESS INDICATION message is for a Conditional Handover. | YES | reject |
| CHO DC Early Data Forwarding Indicator | O |  | ENUMERATED (stop, ...) |  | YES | ignore |
| SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated for EN-DC at the en-gNB. | YES | ignore |

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

#### 9.1.2.44 EN-DC CONFIGURATION TRANSFER

This message is sent by an eNB in order to transfer the EN-DC SON Configuration container to an en-gNB, or it is sent by an en-gNB in order to transfer the EN-DC SON Configuration container to an eNB.

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| EN-DC SON Configuration Transfer | O |  | OCTET STRING | Contains the *EN-DC SON Configuration Transfer* IE as defined in TS 36.413 [4]. | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 9.1.2.45 EN-DC RESOURCE STATUS REQUEST

This message is sent by the eNB to the en-gNB or by the en-gNB to the eNB to initiate the requested measurement according to the parameters given in the message.

Direction: E-UTRAN node1 → E-UTRAN node2 (eNB → en-gNB, en-gNB → eNB).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| E-UTRAN node1 Measurement ID | M |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node1. | YES | reject |
| E-UTRAN node2 Measurement ID | C-ifRegistrationRequestStoporAdd |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node2. | YES | ignore |
| Registration Request EN-DC | M |  | ENUMERATED (start, stop, add,  …) | Type of request for which the resource status is required. | YES | reject |
| Reporting Periodicity EN-DC | O |  | ENUMERATED (500ms, 1000ms, 2000ms, 5000ms,10000ms, …) | Periodicity that can be used for reporting of PRB Periodic, TNL Capacity Ind Periodic, Composite Available Capacity Periodic.  Also used as the averaging window length for all measurement object if supported. | YES | ignore |
| Report Characteristics EN-DC | C-ifRegistrationRequestStart |  | BITSTRING  (SIZE(32)) | When sent by the eNB, each position in the bitmap indicates measurement object the en-gNB is requested to report.  First Bit = PRB Periodic,  Second Bit = TNL Capacity Ind Periodic,  Third Bit =  Composite Available Capacity Periodic, Fourth Bit = Number of Active UEs.  Other bits shall be ignored by the en-gNB.  When sent by the en-gNB, each position in the bitmap indicates measurement object the eNB is requested to report.  First Bit = PRB Periodic,  Second Bit = TNL load Ind Periodic,  Third Bit = HW Load Ind Periodic,  Fourth Bit = Composite Available Capacity Periodic, this bit should be set to 1 if at least one of the First, Second or Third bits is set to 1.  Other bits shall be ignored by the eNB. | YES | ignore |
| **NR Cell To Report EN-DC List** |  | *0..1* |  | NR cell ID list to which the request applies. | YES | ignore |
| **>NR Cell To Report EN-DC Item** |  | *1 .. <maxCellinengNB>* |  |  | EACH | ignore |
| >>NR Cell ID | M |  | NR CGI 9.2.111 |  | – |  |
| >>**SSB To Report List** |  | *0..1* |  | SSB list to which the request applies. | YES | ignore |
| >>>**SSB To Report Item** |  | *1 .. <maxnoofSSBAreas>* |  |  | EACH | ignore |
| >>>>SSB Index | M |  | 9.2.167 |  | – |  |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |
| **E-UTRA Cell To Report EN-DC List** |  | *0..1* |  | E-UTRA cell ID list to which the request applies. | YES | ignore |
| **>E-UTRA Cell To Report EN-DC Item** |  | *1 .. <maxCellineNB>* |  |  | EACH | ignore |
| >>E-UTRA Cell ID | M |  | ECGI  9.2.14 |  | – |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifRegistrationRequestStoporAdd | This IE shall be present if the *Registration Request EN-DC* IE is set to the value "stop", or "add". |
| ifRegistrationRequestStart | This IE shall be present if the Registration Request *EN-DC* IE is set to the value "start". |

| Range bound | Explanation |
| --- | --- |
| *maxCellinengNB* | Maximum no. cells that can be served by an en-gNB. Value is 16384. |
| *maxnoofSSBAreas* | Maximum no. SSB Areas that can be served by a NG-RAN node cell. Value is 64. |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |

#### 9.1.2.46 EN-DC RESOURCE STATUS RESPONSE

This message is sent by the en-gNB or by the eNB to indicate that the requested measurement, for all of the measurement objects included in the measurement is successfully initiated.

Direction: E-UTRAN node2 → E-UTRAN node1 (en-gNB → eNB, eNB → en-gNB).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| E-UTRAN node1 Measurement ID | M |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node1. | YES | reject |
| E-UTRAN node2 Measurement ID | M |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node2. | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 9.1.2.47 EN-DC RESOURCE STATUS FAILURE

This message is sent by the en-gNB or by the eNB to indicate that for any of the requested measurement objects the measurement cannot be initiated.

Direction: E-UTRAN node2 → E-UTRAN node1 (en-gNB → eNB, eNB → en-gNB).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| E-UTRAN node1 Measurement ID | M |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node1. | YES | reject |
| E-UTRAN node2 Measurement ID | M |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node2. | YES | reject |
| Cause | M |  | 9.2.6 | Ignored by the receiver when the Complete Failure Cause Information IE is included | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 9.1.2.48 EN-DC RESOURCE STATUS UPDATE

This message is sent by the en-gNB or by the eNB to the en-gNB to the eNB to report the results of the requested measurements.

Direction: E-UTRAN node2 → E-UTRAN node1 (en-gNB → eNB, eNB → en-gNB).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.3.1 |  | YES | ignore |
| E-UTRAN node1 Measurement ID | M |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node1. | YES | reject |
| E-UTRAN node2 Measurement ID | M |  | INTEGER (1..4095, ...) | Allocated by the E-UTRAN node2. | YES | reject |
| **NR Cell Measurement Result** |  | *0..1* |  | Concerned NR cells in the en-gNB. | YES | ignore |
| **>NR Cell Measurement Result Item** |  | *1 .. <maxCellinengNB>* |  |  | EACH | ignore |
| >>NR Cell ID | M |  | NR CGI 9.2.111 |  | – |  |
| >>NR Radio Resource Status | O |  | 9.2.162 |  | – |  |
| >>TNL Capacity Indicator | O |  | 9.2.161 |  | – |  |
| >>NR Composite Available Capacity Group | O |  | 9.2.163 |  | – |  |
| >>Number of Active UEs | O |  | INTEGER (0..16777215, ...) | As defined in TS 38.314 [45]. Value "1" is equivalent to 0.1 Active UEs, value "2" is equivalent to 0.2 Active UEs, value n is equivalent to n/10 Active UEs. | – |  |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |
| **E-UTRA Cell Measurement Result** |  | *0..1* |  | Concerned E-UTRA cells in the eNB. | YES | ignore |
| **>E-UTRA Cell Measurement Result Item** |  | *1 .. <maxCellineNB>* |  |  | EACH | ignore |
| >>E-UTRA Cell ID | M |  | ECGI  9.2.14 |  | – |  |
| >>Hardware Load Indicator | O |  | 9.2.34 |  | – |  |
| >>S1 TNL Load Indicator | O |  | 9.2.35 |  | – |  |
| >>Radio Resource Status | O |  | 9.2.37 |  | – |  |
| >>Composite Available Capacity Group | O |  | 9.2.44 |  | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| *maxCellinengNB* | Maximum no. cells that can be served by an en-gNB. Value is 16384. |
| maxCellineNB | Maximum no. cells that can be served by an eNB. Value is 256. |

#### 9.1.2.49 CELL TRAFFIC TRACE

This message is sent by en-gNB to transfer the trace information to the MeNB.

Direction: en-gNB → MeNB

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.1.1 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| E-UTRAN Trace ID | M |  | OCTET STRING (SIZE(8)) | As per E-UTRAN Trace ID in *Trace Activation* IE | YES | ignore |
| Trace Collection Entity IP Address | M |  | Transport Layer Address 9.2.2.1 | Defined in TS 32.422 [6] | YES | ignore |
| Privacy Indicator | O |  | ENUMERATED (Immediate MDT, ...) |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

### 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** |  | *1* |  |  | YES | reject |
| **>E-RABs To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | reject |
| >>CHOICE Bearer Option | M |  |  |  |  |  |
| >>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>E-RAB Level QoS Parameters | M |  | 9.2.9 | Includes necessary QoS parameters | – |  |
| >>>>DL Forwarding | O |  | 9.2.5 |  | – |  |
| >>>>S1 UL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1 transport bearer. For delivery of UL PDUs. | – |  |
| >>>>Correlation ID | O |  | Correlation ID  9.2.84 |  | – |  |
| >>>>SIPTO Correlation ID | O |  | Correlation ID  9.2.84 |  | – |  |
| >>>>Bearer Type | O |  | 9.2.92 |  | YES | ignore |
| >>>>Ethernet Type | O |  | 9.2.157 |  | YES | ignore |
| >>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>>*Split Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>E-RAB Level QoS Parameters | M |  | 9.2.9 | Includes necessary QoS parameters | – |  |
| >>>>MeNB GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2 transport bearer. For delivery of UL PDUs. | – |  |
| >>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| MeNB to SeNB Container | M |  | OCTET STRING | Includes the *SCG-ConfigInfo* message as defined in TS 36.331 [9] | YES | reject |
| CSG Membership Status | O |  | 9.2.52 |  | YES | reject |
| SeNB UE X2AP ID | O |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |
| Expected UE Behaviour | O |  | 9.2.70 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |

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

|  |  |
| --- | --- |
| Condition | Explanation |
| ifSCGBearerOption | This IE shall be present if the *Bearer Option* IE is set to the value "SCG bearer". |

#### 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.

| 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 |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| **E-RABs Admitted To Be Added List** |  | *1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>CHOICE Bearer Option | M |  |  |  |  |  |
| >>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>S1 DL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SeNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>>*Split Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>SeNB GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2 transport bearer at the SeNB. | – |  |
| >>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| E-RABs Not Admitted List | O |  | E-RAB List  9.2.28 | 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. | YES | ignore |
| SeNB to MeNB Container | M |  | OCTET STRING | Includes the *SCG-Config* message as defined in TS 36.331 [9] | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| GW Transport Layer Address | O |  | BIT STRING (1..160, ...) | Indicating GW Transport Layer Address. | YES | ignore |
| SIPTO L-GW Transport Layer Address | O |  | BIT STRING (1..160, ...) | Indicating SIPTO L-GW Transport Layer Address. | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |
| Tunnel Information for BBF | O |  | Tunnel Information 9.2.89 | Indicating eNB’s Local IP Address assigned by the broadband access provider, UDP port Number. | YES | ignore |

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

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | Allocatedat the MeNB | YES | reject |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| **Response Information** | M |  |  |  | YES | ignore |
| >CHOICE *Response Type* | M |  |  |  |  |  |
| >>*Configuration successfully applied* |  |  |  |  |  |  |
| >>>MeNB to SeNB Container | O |  | OCTET STRING | Includes the *SCG-ConfigInfo* message as defined in TS 36.331 [9] | - |  |
| >>*Configuration rejected by the MeNB* |  |  |  |  |  |  |
| >>>Cause | M |  | 9.2.6 |  | - |  |
| >>>MeNB to SeNB Container | O |  | OCTET STRING | Includes the *SCG-ConfigInfo* message as defined in TS 36.331 [9] | - |  |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |

#### 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.

| 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 |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| SCG Change Indication | O |  | 9.2.73 |  | YES | ignore |
| Serving PLMN | O |  | PLMN Identity  9.2.4 | The serving PLMN of the SCG in the SeNB. | YES | ignore |
| **UE Context Information** |  | *0..1* |  |  | YES | reject |
| >UE Security Capabilities | O |  | 9.2.29 |  | – |  |
| >SeNB Security Key | O |  | 9.2.72 |  | – |  |
| >SeNB UE Aggregate Maximum Bit Rate | O |  | UE Aggregate Maximum Bit Rate  9.2.12 |  | – |  |
| **>E-RABs To Be Added List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>E-RAB Level QoS Parameters | M |  | 9.2.9 | Includes necessary QoS parameters | – |  |
| >>>>>DL Forwarding | O |  | 9.2.5 |  | – |  |
| >>>>>S1 UL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1 transport bearer. For delivery of UL PDUs. | – |  |
| >>>>>Correlation ID | O |  | Correlation ID  9.2.84 |  | – |  |
| >>>>>SIPTO Correlation ID | O |  | Correlation ID  9.2.84 |  | – |  |
| >>>>>Bearer Type | O |  | 9.2.92 |  | YES | ignore |
| >>>>>Ethernet Type | O |  | 9.2.157 |  | YES | ignore |
| >>>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>>>*Split Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>E-RAB Level QoS Parameters | M |  | 9.2.9 | Includes necessary QoS parameters | – |  |
| >>>>>MeNB GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2 transport bearer. For delivery of UL PDUs. | – |  |
| >>>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| **>E-RABs To Be Modified List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>E-RAB Level QoS Parameters | O |  | 9.2.9 | Includes QoS parameters to be modified | – |  |
| >>>>>S1 UL GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1 transport bearer. For delivery of UL PDUs. | – |  |
| >>>>*Split Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>E-RAB Level QoS Parameters | O |  | 9.2.9 | Includes QoS parameters to be modified | – |  |
| >>>>>MeNB GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2 transport bearer. For delivery of UL PDUs. | – |  |
| **>E-RABs To Be Released List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer. used for forwarding of UL PDUs | – |  |
| >>>>*Split Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| MeNB to SeNB Container | O |  | OCTET STRING | Includes the *SCG-ConfigInfo* message as defined in TS 36.331 [9] | YES | ignore |
| CSG Membership Status | O |  | 9.2.52 |  | YES | reject |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| 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.

| 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 | ignore |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | ignore |
| **E-RABs Admitted List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Added List** |  | *1* |  |  | – |  |
| **>>E-RABs Admitted To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>S1 DL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SeNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>>>*Split Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>SeNB GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2 transport bearer at the SeNB. | – |  |
| >>>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| **>E-RABs Admitted To Be Modified List** |  | *0..1* |  |  | – |  |
| **>>E-RABs Admitted To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>S1 DL GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | SeNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>*Split Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>>SeNB GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2 transport bearer at the SeNB. | – |  |
| **>E-RABs Admitted To Be Released List** |  | *0..1* |  |  | – |  |
| **>>E-RABs Admitted To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>*Split Bearer* |  |  |  |  |  |  |
| >>>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| E-RABs Not Admitted List | O |  | E-RAB List  9.2.28 | 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. | YES | ignore |
| SeNB to MeNB Container | O |  | OCTET STRING | Includes the *SCG-Config* message as defined in TS 36.331 [9] | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| 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 | Explanation |
| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | ignore |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| 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 |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| SCG Change Indication | O |  | 9.2.73 |  | YES | ignore |
| **E-RABs To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>Cause | M |  | 9.2.6 |  | – |  |
| SeNB to MeNB Container | O |  | OCTET STRING | Includes the *SCG-Config* message as defined in TS 36.331 [9] | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |

|  |  |
| --- | --- |
| 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.

| 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 | ignore |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | ignore |
| MeNB to SeNB Container | O |  | OCTET STRING | Includes the *SCG-ConfigInfo* message as defined in TS 36.331 [9] | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| 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 |

#### 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 → 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 | ignore |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| MeNB to SeNB Container | O |  | OCTET STRING | Includes the *SCG-ConfigInfo* message as defined in TS 36.331 [9] | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| 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 |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID | O |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| Cause | O |  | 9.2.6 |  | YES | ignore |
| **E-RABs To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **> E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer. used for forwarding of DL PDUs | – |  |
| >>>*Split Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer. used for forwarding of DL PDUs | – |  |
| UE Context Kept Indicator | O |  | 9.2.85 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |
| MakeBeforeBreak Indicator | O |  | ENUMERATED (True, …,) |  | YES | ignore |

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

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| SeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the SeNB | YES | reject |

#### 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.

| 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 | ignore |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | ignore |
| **E-RABs to be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | – |  |
| >>CHOICE *Bearer Option* | M |  |  |  |  |  |
| >>>*SCG Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>*Split Bearer* |  |  |  |  |  |  |
| >>>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| 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 |

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

#### 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.

| 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 | ignore |
| SeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the SeNB | YES | ignore |
| **E-RABs Subject to**  **Counter Check List** |  | *1* |  |  | YES | ignore |
| **>E-RABs Subject to Counter Check Item** |  | *1 .. <maxnoofBearers>* |  |  | 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 | Explanation |
| 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.

| 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 |
| NR UE Security Capabilities | M |  | 9.2.107 |  | YES | reject |
| SgNB Security Key | M |  | 9.2.101 | The S-KgNB which is provided by the MeNB, see TS 33.401 [18]. | YES | reject |
| SgNB 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 SgNB UE Aggregate Maximum Bit Rate which are enforced by MeNB and en-gNB respectively. | YES | reject |
| Selected PLMN | O |  | PLMN Identity  9.2.4 | The selected PLMN of the SCG in the en-gNB. | YES | ignore |
| Handover Restriction List | O |  | 9.2.3 |  | YES | ignore |
| **E-RABs To Be Added List** |  | *1* |  |  | YES | reject |
| **>E-RABs To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | reject |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>DRB ID | M |  | 9.2.122 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*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 "present". |  |  |
| >>>>Full E-RAB Level QoS Parameters | M |  | E-RAB Level QoS Parameters 9.2.9 | Includes the E-RAB level QoS parameters as received on S1-MME. | – |  |
| >>>>Maximum MCG admittable E-RAB Level QoS Parameters | C-ifMCGandSCGpresent\_GBR |  | GBR QoS Information 9.2.10 | Includes the GBR QoS Information admittable by the MCG. | – |  |
| >>>>DL Forwarding | O |  | 9.2.5 |  | – |  |
| >>>>MeNB DL GTP Tunnel Endpoint at MCG | C-ifMCGpresent |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>S1 UL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1-U transport bearer. For delivery of UL PDUs from the en-gNB. | – |  |
| >>>>RLC Mode | O |  | RLC Mode  9.2.119 | Indicates the RLC mode at the MeNB for PDCP transfer to en-gNB. | YES | ignore |
| >>>>Bearer Type | O |  | 9.2.92 |  | YES | ignore |
| >>>>Ethernet Type | O |  | 9.2.157 |  | YES | ignore |
| >>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source MN for data forwarding. | YES | ignore |
| >>>>Source Node DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | This IE is present only for the case of SA to EN-DC handover and it is used to identify the TNL address allocated by the source NG-RAN node for data forwarding. | YES | ignore |
| >>>*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 | M |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the SCG. | – |  |
| >>>>MeNB UL GTP Tunnel Endpoint at PDCP | M |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs. | – |  |
| >>>>Secondary MeNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs in case of PDCP duplication. | – |  |
| >>>>RLC Mode | M |  | RLC Mode  9.2.119 | Indicates the RLC mode to be used in the assisting node. | – |  |
| >>>>UL Configuration | C-ifMCGandSCGpresent |  | 9.2.118 | Information about UL usage in the en-gNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the UL. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the DL. | YES | ignore |
| >>>>Duplication activation | O |  | 9.2.137 | Indicated the initial staus of PDCP duplication. | YES | ignore |
| MeNB to SgNB Container | M |  | OCTET STRING | Includes the *CG-ConfigInfo* message as defined in TS 38.331 [31]. | YES | reject |
| SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Expected UE Behaviour | O |  | 9.2.70 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |
| Requested split SRBs | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRB are requested. | YES | reject |
| MeNB Resource Coordination Information | O |  | 9.2.116 | Information used to coordinate resources utilisation between MeNB and en-gNB. | YES | ignore |
| SGNB Addition Trigger Indication | O |  | ENUMERATED (SN change, inter-eNB HO, intra-eNB HO, ...) | This IE indicates the trigger for SGNB Addition procedure. | YES | reject |
| Subscriber Profile ID for RAT/Frequency priority | O |  | 9.2.25 |  | YES | ignore |
| MeNB Cell ID | M |  | ECGI  9.2.14 | Indicates the cell ID for PCell in MeNB. | YES | reject |
| Desired Activity Notification Level | O |  | 9.2.141 |  | YES | ignore |
| Trace Activation | O |  | 9.2.2 |  | YES | ignore |
| Location Information at SgNB reporting | O |  | ENUMERATED (pscell, ...) | Indicates that the user’s location information is to be provided. | YES | ignore |
| Masked IMEISV | O |  | 9.2.69 |  | YES | ignore |
| Additional RRM Policy Index | O |  | 9.2.25a |  | YES | ignore |
| Requested Fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates that the resources for fast MCG recovery via SRB3 are requested. | YES | ignore |
| UE Context Reference at Source NG-RAN | O |  | RAN UE NGAP ID 9.2.152 |  | YES | ignore |
| Management Based MDT Allowed | O |  | 9.2.59 |  | YES | ignore |
| Management Based MDT PLMN List | O |  | MDT PLMN List  9.2.64 |  | YES | ignore |
| UE Radio Capability ID | O |  | 9.2.171 |  | YES | reject |
| IAB Node Indication | O |  | ENUMERATED (true, ...) |  | YES | reject |
| Source NG-RAN Node ID | O |  | Global RAN Node ID  9.2.176 |  | YES | ignore |
| IAB Authorized | O |  | 9.2.184 |  | YES | ignore |

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

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| Condition | Explanation |
| ifMCGandSCGpresent | 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 "present". |
| ifMCGpresent | 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 "present". |
| C-ifMCGandSCGpresent\_GBR | 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 "present", and *GBR QoS Information* IE is present in *Full E-RAB Level QoS Parameters* IE. |

#### 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| **E-RABs Admitted To Be Added List** |  | *1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| *>>>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 "present". |  |  |
| >>>>S1 DL GTP Tunnel Endpoint at the SgNB | M |  | GTP Tunnel Endpoint 9.2.1 | en-gNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | C-ifMCGpresent |  | GTP Tunnel Endpoint 9.2.1 | en-gNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>RLC Mode | C-ifMCGpresent |  | RLC Mode  9.2.119 | Indicates the RLC mode. | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>Requested MCG E-RAB Level QoS Parameters | C-ifMCGandSCGpresent\_GBRpresent |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the MCG. | – |  |
| >>>>UL Configuration | C-ifMCGandSCGpresent |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the UL. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the DL. | YES | ignore |
| >>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>>*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 Tunnel Endpoint at SCG | M |  | 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 Tunnel Endpoint 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 in case of PDCP duplication | – |  |
| >>>>LCID | O |  | 9.2.138 | LCID for the primary path in case of PDCP duplication | YES | ignore |
| E-RABs Not Admitted List | O |  | E-RAB List  9.2.28 | 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. | YES | ignore |
| SgNB to MeNB Container | M |  | OCTET STRING | Includes the *CG-Config* message as defined in TS 38.331[31]. | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| Admitted split SRBs | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs | YES | reject |
| SgNB Resource Coordination Information | O |  | 9.2.117 | Information used to coordinate resources utilisation between en-gNB and MeNB. | YES | ignore |
| RRC config indication | O |  | 9.2.132 | Indicates the type of RRC configuration used at the en-gNB. | YES | reject |
| Location Information at SgNB | O |  | 9.2.142 | Contains information to support localisation of the UE | YES | ignore |
| Available fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 is enabled. | YES | ignore |
| Direct Forwarding Path Availability | O |  | ENUMERATED (direct path available, …) | Indicates direct forwarding path is available between the target en-gNB and source NG-RAN node for SA to EN-DC handover. | YES | ignore |

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

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| --- | --- |
| Condition | Explanation |
| ifMCGpresent | 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 "present". |
| ifMCGandSCGpresent | 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 "present". |
| C-ifMCGandSCGpresent\_GBRpresent | 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 "present", and the *GBR QoS Information* IE is present in the *Requested MCG E-RAB Level QoS Parameters* IE. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | Allocatedat the MeNB. | YES | reject |
| SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| **Response Information** | M |  |  |  | YES | ignore |
| >CHOICE *Response Type* | M |  |  |  |  |  |
| >>*Configuration successfully applied* |  |  |  |  |  |  |
| >>>MeNB to SgNB Container | O |  | OCTET STRING | Includes the NR *RRCReconfigurationComplete* message as defined in TS 38.331 [31]. | - |  |
| >>*Configuration rejected* |  |  |  |  |  |  |
| >>>Cause | M |  | 9.2.6 |  | - |  |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |

#### 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Selected PLMN | O |  | PLMN Identity  9.2.4 | The selected PLMN of the SCG in the en-gNB. | YES | ignore |
| Handover Restriction List | O |  | 9.2.3 |  | YES | ignore |
| SCG Configuration Query | O |  | 9.2.103 |  | YES | ignore |
| **UE Context Information** |  | *0..1* |  |  | YES | reject |
| >NR UE Security Capabilities | O |  | 9.2.107 |  | – |  |
| >SgNB Security Key | O |  | 9.2.101 |  | – |  |
| >SgNB UE Aggregate Maximum Bit Rate | O |  | UE Aggregate Maximum Bit Rate  9.2.12 |  | – |  |
| >Lower Layer presence status change | O |  | 9.2.145 |  | – |  |
| **>E-RABs To Be Added List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>DRB ID | M |  | 9.2.122 |  | – |  |
| >>>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>>*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 "present". | – |  |
| >>>>>Full E-RAB Level QoS Parameters | M |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters as received on S1-MME. | – |  |
| >>>>>Maximum MCG admittable E-RAB Level QoS Parameters | C-ifMCGandSCGpresent\_GBR |  | GBR QoS Information 9.2.10 | Includes the GBR QoS Information admittable by the MCG. | – |  |
| >>>>>DL Forwarding | O |  | 9.2.5 |  | – |  |
| >>>>>MeNB DL GTP Tunnel Endpoint at MCG | C-ifMCGpresent |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>>S1 UL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1-U transport bearer. For delivery of UL PDUs from the en-gNB. | – |  |
| >>>>>RLC Mode | O |  | RLC Mode  9.2.119 | Indicates the RLC mode at the MeNB for PDCP transfer to en-gNB. | YES | ignore |
| >>>>>Bearer Type | O |  | 9.2.92 |  | YES | ignore |
| >>>>>Ethernet Type | O |  | 9.2.157 |  | YES | ignore |
| >>>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>>>*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 | M |  | E-RAB Level QoS Parameters 9.2.9 | Includes necessary E-RAB level QoS parameters requested to be provided by the SCG. | – |  |
| >>>>>MeNB UL GTP Tunnel Endpoint at PDCP | M |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs. | – |  |
| >>>>>Secondary MeNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs in case of PDCP duplication. | – |  |
| >>>>>RLC Mode | M |  | RLC Mode  9.2.119 | Indicates the RLC mode to be used in the assisting node. | – |  |
| >>>>>UL Configuration | C-ifMCGandSCGpresent |  | 9.2.118 | Information about UL usage in the en-gNB. | – |  |
| >>>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the UL. | YES | ignore |
| >>>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the DL. | YES | ignore |
| >>>>>Duplication activation | O |  | 9.2.137 | Indicated the initial staus of PDCP duplication. | YES | ignore |
| **>E-RABs To Be Modified List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>>*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 "present". |  |  |
| >>>>>Full E-RAB Level QoS Parameters | O |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters to be modified as received on S1-MME | – |  |
| >>>>>Maximum MCG admittable E-RAB Level QoS Parameters | O |  | GBR QoS Information 9.2.10 | Includes the GBR QoS information admittable by the MCG | – |  |
| >>>>>MeNB GTP Tunnel Endpoint at MCG | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>>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. | – |  |
| >>>>>RLC Status | O |  | 9.2.131 | Indicates the RLC has been re-established.. |  |  |
| >>>>*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 Tunnel Endpoint 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. | – |  |
| >>>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the en-gNB if received. | YES | ignore |
| >>>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the en-gNB if received. | YES | ignore |
| >>>>>Secondary MeNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs in case of PDCP duplication. | YES | ignore |
| **>E-RABs To Be Released List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>>*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 "present". |  |  |
| >>>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer. used for forwarding of UL PDUs | – |  |
| >>>>*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". |  |  |
| >Subscriber Profile ID for RAT/Frequency priority | O |  | 9.2.25 |  | YES | ignore |
| >Additional RRM Policy Index | O |  | 9.2.25a |  | YES | ignore |
| MeNB to SgNB Container | O |  | OCTET STRING | Includes the *CG-ConfigInfo* message as defined in TS 38.331 [31]. | YES | reject |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| MeNB Resource Coordination Information | O |  | 9.2.116 | Information used to coordinate resources utilisation between MeNB and en-gNB. | YES | ignore |
| Requested split SRBs | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRB are requested. | YES | ignore |
| Requested split SRBs release | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRB are requested to be released. | YES | ignore |
| Desired Activity Notification Level | O |  | 9.2.141 |  | YES | ignore |
| Location Information at SgNB reporting | O |  | ENUMERATED (pscell, ...) | Indicates that the user’s location information is to be provided. | YES | ignore |
| MeNB Cell ID | O |  | ECGI  9.2.14 | Indicates the cell ID for PCell in MeNB. | YES | ignore |
| Requested Fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates that the resources for fast MCG recovery via SRB3 are requested. | YES | ignore |
| Requested Fast MCG recovery via SRB3 Release | O |  | ENUMERATED (true, ...) | Indicates that the resources for fast MCG recovery via SRB3 are requested to be released. | YES | ignore |
| SN triggered | O |  | ENUMERATED (True, ...) |  | YES | ignore |
| IAB Node Indication | O |  | ENUMERATED (true, ...) |  | YES | reject |
| IAB Authorized | O |  | 9.2.184 |  | YES | ignore |

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

|  |  |
| --- | --- |
| Condition | Explanation |
| ifMCGandSCGpresent | 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 "present". |
| ifMCGpresent | 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 "present". |
| C-ifMCGandSCGpresent\_GBR | 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 "present", and *GBR QoS Information* IE is present in *Full E-RAB Level QoS Parameters* IE. |

#### 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.

| 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 | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| **E-RABs Admitted To Be Added List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*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 "present". |  |  |
| >>>>S1 DL GTP Tunnel Endpoint at the SgNB | M |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | C-ifMCGpresent |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>RLC Mode | C-ifMCGpresent |  | RLC Mode  9.2.119 | Indicates the RLC mode to be used at the assisting node. | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>Requested MCG E-RAB Level QoS Parameters | C-ifMCGandSCGpresent\_GBRpresent |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the MCG. | – |  |
| >>>>UL Configuration | C-ifMCGandSCGpresent |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the UL. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Indicates the PDCP SN length of the bearer for the DL. | YES | ignore |
| >>>>Source DL Forwarding IP Address | O |  | BIT STRING (1..160, ...) | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>>*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 Tunnel Endpoint at SCG | M |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>Secondary SgNB DL GTP Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs in case of PDCP duplication. | – |  |
| >>>>LCID | O |  | 9.2.138 | LCID for the primary path in case of PDCP duplication configured. | YES | ignore |
| **E-RABs Admitted To Be Modified List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*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 "present". |  |  |
| >>>>S1 DL GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>Requested MCG 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 MCG. | – |  |
| >>>>UL Configuration | O |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>*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 Tunnel Endpoint 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 Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs in case of PDCP duplication. | YES | ignore |
| >>>>RLC Status | O |  | 9.2.131 | Indicates the RLC has been re-established. | YES | ignore |
| **E-RABs Admitted To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  | Note: no further information contained in the IE container |  |  |
| E-RABs Not Admitted List | O |  | E-RAB List  9.2.28 | 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. | YES | ignore |
| SgNB to MeNB Container | O |  | OCTET STRING | Includes the NR *CG-Config* message as defined in TS 38.331 [31]. | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | ignore |
| SgNB Resource Coordination Information | O |  | 9.2.117 | Information used to coordinate resources utilisation between en-gNB and MeNB. | YES | ignore |
| Admitted split SRBs | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs | YES | ignore |
| Admitted split SRBs release | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs release | YES | ignore |
| RRC config indication | O |  | 9.2.132 | Indicates the type of RRC configuration used at the en-gNB. | YES | reject |
| Location Information at SgNB | O |  | 9.2.142 | Contains information to support localisation of the UE | YES | ignore |
| Available fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 isenabled. | YES | ignore |
| Release fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 is released. | YES | ignore |

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

| Condition | Explanation |
| --- | --- |
| ifMCGandSCGpresent | 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 "present". |
| ifMCGpresent | 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 "present". |
| C-ifMCGandSCGpresent\_GBRpresent | 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 "present", and the *GBR QoS Information* IE is present in the *Requested MCG E-RAB Level QoS Parameters* IE. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | ignore |

#### 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| PDCP Change Indication | O |  | 9.2.109 |  | YES | ignore |
| **E-RABs To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>Cause | M |  | 9.2.6 |  | – |  |
| >>RLC Mode | O |  | RLC Mode  9.2.119 | Indicates the RLC mode at the en-gNB for PDCP transfer to MeNB. | YES | ignore |
| SgNB to MeNB Container | O |  | OCTET STRING | Includes the NR *CG-Config* message as defined in TS 38.331 [31]. | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| **E-RABs To Be Modified List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*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 "present". |  |  |
| >>>>Requested MCG 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 MCG. | – |  |
| >>>>UL Configuration | O |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>S1 DL GTP Tunnel Endpoint at the SgNB | O |  | GTP Tunnel Endpoint 9.2.1 | en-gNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>New DRB ID Request | O |  | ENUMERATED (True, …,) |  | YES | ignore |
| *>>>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 Tunnel Endpoint 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 Tunnel Endpoint 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. | – |  |
| >>>>RLC Status | O |  | 9.2.131 | Indicates the RLC has been re-established.. |  |  |
| >>>>LCID | O |  | 9.2.138 | Indicate the LCID of the primary path in case of PDCP duplication | YES | ignore |
| SgNB Resource Coordination Information | O |  | 9.2.117 | Information used to coordinate resources utilisation between the en-gNB and the MeNB. | YES | ignore |
| RRC config indication | O |  | 9.2.132 | Indicates the type of RRC configuration used at the en-gNB. | YES | reject |
| Location Information at SgNB | O |  | 9.2.142 | Contains information to support localisation of the UE | YES | ignore |

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

#### 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.

| 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 | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| **E-RABs Admitted To Be Modified List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| *>>>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". |  |  |
| >>>>Secondary MeNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer at the PDCP. For delivery of UL PDCP PDUs for PDCP duplication. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the en-gNB if received. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length  9.2.133 | Shall be ignored by the en-gNB if received. | YES | ignore |
| MeNB to SgNB Container | O |  | OCTET STRING | Includes the NR *RRCReconfigurationComplete* message as defined in TS 38.331 [31]. | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | ignore |
| MeNB Resource Coordination Information | O |  | 9.2.116 | Information used to coordinate resources utilisation between the MeNB and the en-gNB. | YES | ignore |

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

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| MeNB to SgNB Container | O |  | OCTET STRING | Includes the *CG-ConfigInfo* message as defined in TS 38.331 [31]. | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | ignore |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| **E-RABs To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*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 "present". |  |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the transport bearer used for forwarding of UL PDUs | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the transport bearer used for forwarding of DL PDUs | – |  |
| >>>*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". |  |  |
| UE Context Kept Indicator | O |  | 9.2.85 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | reject |
| MeNB to SgNB Container | O |  | OCTET STRING | Includes the *CG-ConfigInfo* message as defined in TS 38.331 [31]. | YES | reject |
| E-RABs transferred to MeNB | O |  | E-RAB List  9.2.28 | Indicates the target MeNB reconfigured the listed E-RABs as MN-terminated bearers. | YES | ignore |

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

#### 9.1.4.12 SGNB RELEASE REQUEST ACKNOWLEDGE

This message is sent by the en-gNB to the MeNB to confirme the request to release en-gNB resources.

Direction: en-gNB → MeNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |
| **E-RABs Admitted To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>RLC Mode | M |  | RLC Mode  9.2.119 | Indicates the RLC mode at the en-gNB for PDCP transfer to MeNB. | – |  |

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

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

#### 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |
| **E-RABs To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>RLC Mode | M |  | RLC Mode  9.2.119 | Indicates the RLC mode at the en-gNB for PDCP transfer to MeNB. | – |  |
| SgNB to MeNB Container | O |  | OCTET STRING | Includes the NR *CG-Config* message as defined in TS 38.331 [31]. | YES | ignore |

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

#### 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 → en-gNB.

| 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 | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| **E-RABs to be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | – |  |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*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 "present". |  |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>*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". |  |  |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | ignore |

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

#### 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| **E-RABs Subject to**  **Counter Check List** |  | *1* |  |  | YES | ignore |
| **>E-RABs Subject to Counter Check Item** |  | *1 .. <maxnoofBearers>* |  |  | 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 |

|  |  |
| --- | --- |
| 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Target SgNB ID Information | M |  | 9.2.102 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| SgNB to MeNB Container | O |  | OCTET STRING | Includes the *CG-Config* message as defined in TS 38.331 [31]. | YES | reject |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

#### 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.

| 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 | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| **E-RABs to be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | – |  |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration 9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*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 "present". |  |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>*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". |  |  |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB | YES | ignore |

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

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

#### 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

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Secondary RAT Usage Report List | M |  | 9.2.120 |  | YES | reject |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

#### 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| **Split SRB** |  | *0..1* |  |  | YES | reject |
| >RRC Container | O |  | OCTET STRING | Contains a PDCP-C PDU encapsulating an RRC message as defined in subclause 6.2.1 of TS 36.331 [9] and ciphered with the key of the MeNB | – |  |
| >SRB Type | M |  | ENUMERATED (srb1, srb2, ...) | The SRB type | – |  |
| >Delivery Status | O |  | 9.2.104 | DL RRC delivery status of split SRB | – |  |
| **NR UE Report** |  | *0..1* |  |  | YES | reject |
| >RRC Container | M |  | OCTET STRING | Includes the UL-DCCH-Message as defined in subclause 6.2.1 of TS 38.331 [31] containing the *MeasurementReport* message, or the *FailureInformation* message, or the *RRCReconfigurationComplete* message, or the *UEAssistanceInformation* message, or the *IABOtherInformation* message. | – |  |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |
| **Fast MCG Recovery via SRB3 from SgNB to MeNB** |  | *0..1* |  |  | YES | ignore |
| >RRC Container | O |  | OCTET STRING | Includes the *UL-DCCH-Message* as defined in subclause 6.2.1 of TS 36.331 [9] containing *MCGFailureInformation* message. | – |  |
| **Fast MCG Recovery via SRB3 from MeNB to SgNB** |  | *0..1* |  |  | YES | ignore |
| >RRC Container | O |  | OCTET STRING | Includes the *DL-DCCH-Message* as defined in subclause 6.2.1 of TS 36.331 [9] containing the *RRCConnectionReconfiguration* message, or the *RRCConnectionRelease* message, or the *MobilityfromEUTRACommand* message. | – |  |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| **UEs to be Reset List** |  | *1* |  |  | YES | reject |
| **>UEs To Be Reset Item** |  | *1 .. <maxnoof UEs>* |  |  |  |  |
| >>MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. |  |  |
| >>SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. |  |  |
| >>MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. |  |  |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofUEs | Maximum no. of UEs. Value is 8192. |

#### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| **UEs Admitted to be Reset List** |  | *1* |  |  | YES | reject |
| **>UEs Admitted To Be Reset Item** |  | *1 .. <maxnoof UEsinengNBDU>* |  |  |  |  |
| >>MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. |  |  |
| >>SgNB UE X2AP ID | O |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. |  |  |
| >>MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. |  |  |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofUEsinengNBDU | Maximum no. of UEs. Value is 8192. |

#### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE*Initiating Node Type* | M |  |  |  | - |  |
| **>***eNB* |  |  |  |  |  |  |
| >>Data Traffic Resource Indication | M |  | 9.2.126 | Indicates resource allocations for data traffic. | YES | reject |
| >>Spectrum Sharing Group ID | M |  | INTEGER (1..maxCellineNB) | Indicates the E-UTRA cells involved in resource coordination with the NR cells affiliated with the same ***Spectrum Sharing Group ID****.* | YES | reject |
| **>>List of E-UTRA Cells in E-UTRA Coordination Request** |  | *0 .. <maxCellineNB>* |  | List of applicable E-UTRA cells. | YES | reject |
| >>>EUTRA Cell ID | M |  | ECGI 9.2.14 |  | - |  |
| **>***en-gNB* |  |  |  |  |  |  |
| >>Data Traffic Resource Indication | M |  | 9.2.126 | Indicates resource allocations for data traffic. | YES | reject |
| **>>List of E-UTRA Cells in NR Coordination Request** |  | *1 .. <maxCellineNB>* |  | List of applicable E-UTRA cells | YES | reject |
| >>>EUTRA Cell ID | M |  | ECGI 9.2.14 |  | – |  |
| >>Spectrum Sharing Group ID | M |  | INTEGER (1..maxCellineNB) | Indicates the NR cells involved in resource coordination with the E-UTRA cells affiliated with the same ***Spectrum Sharing Group ID****.* | YES | reject |
| **>>List of NR Cells in NR Coordination Request** |  | *0 .. <* maxnoNRcellsSpectrumSharingwithE-UTRA *>* |  | List of applicable NR cells | YES | reject |
| >>>NR-Cell ID | M |  | NR-CGI 9.2.111 |  | - |  |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. of E-UTRA cells in eNB. Value is 256. |
| maxnoNRcellsSpectrumSharingwithE-UTRA | Maximum no. of NR cells affiliated to a Spectrum Sharing Group ID involved in cell resource coordination with a number of E-UTRA cells affiliated with the same Spectrum Sharing Group ID. Value is 64. |

#### 9.1.4.25 E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE

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.

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| CHOICE*Responding NodeType* | M |  |  |  | - |  |
| **>***eNB* |  |  |  |  |  |  |
| >>Data Traffic Resource Indication | M |  | 9.2.126 | Indicates resource allocations for data traffic. | YES | reject |
| >>Spectrum Sharing Group ID | M |  | INTEGER (1..maxCellineNB) | Indicates the E-UTRA cells involved in resource coordination with the NR cells affiliated with the same *Spectrum Sharing Group ID.* | YES | reject |
| **>>List of E-UTRA Cells in E-UTRA Coordination Response** |  | *0 .. <maxCellineNB>* |  | List of applicable E-UTRA cells | YES | reject |
| >>>EUTRA Cell ID | M |  | ECGI 9.2.14 |  | - |  |
| **>***en-gNB* |  |  |  |  |  |  |
| >>Data Traffic Resource Indication | M |  | 9.2.126 | Indicates resource allocations for data traffic. | YES | reject |
| >>Spectrum Sharing Group ID | M |  | INTEGER (1..maxCellineNB) | Indicates the NR cells involved in resource coordination with the E-UTRA cells affiliated with the same *Spectrum Sharing Group ID.* | YES | reject |
| **>>List of NR Cells in NR Coordination Response** |  | *0 .. < maxnoNRcellsSpectrumSharingwithE-UTRA >* |  | List of applicable NR cells | YES | reject |
| >>>NR Cell ID | M |  | NR-CGI 9.2.111 |  | - |  |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellineNB | Maximum no. of E-UTRA cells in eNB. Value is 256. |
| maxnoNRcellsSpectrumSharingwithE-UTRA | Maximum no. of NR cells affiliated to a Spectrum Sharing Group ID involved in cell resource coordination with a number of E-UTRA cells affiliated with the same Spectrum Sharing Group ID. Value is 64. |

#### 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.

| 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 |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| UE Context level user plane activity report | O |  | User plane traffic activity report  9.2.130 |  | YES | ignore |
| **E-RAB Activity Notify Item List** |  | *0..<maxnoofBearers>* |  |  | EACH | ignore |
| >E-RAB ID | M |  | 9.2.23 |  | – |  |
| >User plane traffic activity report | M |  | 9.2.130 |  | – |  |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

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

#### 9.1.4.27 GNB STATUS INDICATION

This message is sent by the en-gNB to indicate to the eNB its status of overload.

Direction: en-gNB → eNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| gNB Overload Information | M |  | ENUMERATED (overloaded, not-overloaded, ...) |  | YES | ignore |
| Interface Instance Indication | O |  | 9.2.143 |  | YES | reject |

#### 9.1.4.28 TRACE START

This message is sent by the MeNB to initiate a trace session for a UE.

Direction: MeNB → en-gNB

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| Trace Activation | M |  | 9.2.2 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

#### 9.1.4.29 DEACTIVATE TRACE

This message is sent by the MeNB to deactivate a trace session.

Direction: MeNB → en-gNB

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| E-UTRAN Trace ID | M |  | OCTET STRING (SIZE(8)) | As per E-UTRAN Trace ID in *Trace Activation* IE | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

#### 9.1.4.30 UE Radio Capability ID Mapping Request

This message is sent by the en-gNB and is used to request the UE Radio Capability information that maps to a specific UE Radio Capability ID.

Direction: en-gNB → eNB

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| UE Radio Capability ID | M |  | 9.2.171 |  | YES | reject |

#### 9.1.4.31 UE Radio Capability ID Mapping Response

This message is sent by the eNB and is used to provide the UE Radio Capability information that maps to a specific UE Radio Capability ID indicated in the UE RADIO CAPABILITY ID MAPPING REQUEST message.

Direction: eNB → en-gNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| UE Radio Capability ID | M |  | 9.2.171 |  | YES | reject |
| UE Radio Capability | M |  | 9.2.173 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

### 9.1.5 Messages for IAB Procedures

#### 9.1.5.1 F1-C TRAFFIC TRANSFER

This message is sent by the en-gNB to the MeNB or by the MeNB to the en-gNB to transfer the F1-C traffic to and from an IAB-node.

Direction: MeNB → en-gNB or en-gNB → MeNB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.13 |  | YES | ignore |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID  9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID  9.2.100 | Allocated at the en-gNB. | YES | reject |
| F1-C Traffic Container | M |  | OCTET STRING | Contains an F1-C interface SCTP CHUNK and IP header, or an IP packet to protect the traffic on the F1-C interface as defined in TS 33.501 [50]. This IE corresponds to the *dedicatedInfoF1c-r16* defined in TS 36.331 [9]. | YES | reject |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID  9.2.86 | Allocated at the MeNB. | YES | reject |

## 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. The QoS Mapping Information is used to set the IP header of packets in case that the en-gNB serves the IAB, and the packets belonging to MN-terminated split bearer/SCG bearer are transmitted from MeNB to en-gNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Transport Layer Address | M |  | BIT STRING (1..160, ...) | For details on the Transport Layer Address, see TS 36.424 [8], TS 36.414 [19] | – |  |
| GTP TEID | M |  | OCTET STRING (4) | For details and range, see TS 29.281 [26] | – |  |
| QoS Mapping Information | O |  | 9.2.172 |  | YES | reject |

### 9.2.2 Trace Activation

Defines parameters related to trace activation.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| E-UTRAN Trace ID | M |  | OCTET STRING (8) | 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) | – |  |
| Interfaces To Trace | M |  | BIT STRING (8) | Each position in the bitmap represents a eNB interface:  first bit =S1-MME, second bit =X2, third bit =Uu, fourth bit = F1-C, fifth bit = E1.  Other bits reserved for future use. Value ‘1’ indicates ‘should be traced’. Value ‘0’ indicates ‘should not be traced’. | – |  |
| Trace Depth | M |  | ENUMERATED(  minimum, medium, maximum,  MinimumWithoutVendorSpecificExtension,  MediumWithoutVendorSpecificExtension,  MaximumWithoutVendorSpecificExtension, ...) | Defined in TS 32.421 [7] | – |  |
| Trace Collection Entity IP Address | M |  | BIT STRING (1..160,…) | For File based Reporting.  Defined in TS 32.422 [6].  For details on the Transport Layer Address, see TS 36.424 [8], TS 36.414 [19]. This IE is ignored if the *Trace Collection Entity URI* IE is present. | \_ |  |
| MDT Configuration | O |  | 9.2.56 |  | YES | ignore |
| UE Application layer measurement configuration | O |  | 9.2.121 |  | YES | ignore |
| MDT Configuration NR | O |  | OCTET STRING | Defined in TS 38.413 [39]. Only the immediate MDT configurations are included in the IE in this version of the specification. | YES | ignore |
| Trace Collection Entity URI | O |  | URI  9.2.174 | For Streaming based Reporting.  Defined in TS 32.422 [11].  Replaces Trace Collection Entity IP Address if present. | YES | ignore |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Serving PLMN | M |  | PLMN Identity  9.2.4 |  | – |  |
| **Equivalent PLMNs** |  | *0..<maxnoofEPLMNs>* |  | Allowed PLMNs in addition to Serving PLMN.  This list corresponds to the list of "equivalent PLMNs list" 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. | – |  |
| >PLMN Identity | M |  | 9.2.4 |  | – |  |
| **Forbidden TAs** |  | *0..<maxnoofEPLMNsPlusOne>* |  | intra E-UTRAN roaming restrictions | – |  |
| >PLMN Identity | M |  | 9.2.4 | The PLMN of forbidden TACs | – |  |
| **>Forbidden TACs** |  | *1..<maxnoofForbTACs>* |  |  | – |  |
| >>TAC | M |  | OCTET STRING(2) | The forbidden TAC | – |  |
| **Forbidden LAs** |  | *0..<maxnoofEPLMNsPlusOne>* |  | inter-3GPP RAT roaming restrictions | – |  |
| >PLMN Identity | M |  | 9.2.4 |  | – |  |
| **>Forbidden LACs** |  | *1..<maxnoofForbLACs>* |  |  | – |  |
| >>LAC | M |  | OCTET STRING(2) |  | – |  |
| Forbidden inter RATs | O |  | ENUMERATED(ALL, GERAN, UTRAN, CDMA2000, …,GERAN and UTRAN, CDMA2000 and UTRAN) | inter-3GPP and 3GPP2 RAT access restrictions. "ALL" means that all RATs mentioned in the enumeration of this IE are restricted. | – |  |
| NR restriction in EPS as secondary RAT | O |  | ENUMERATED(NRrestrictedinEPSasSecondaryRAT, …) | Restriction to use NR when the NR is used as secondary RAT in EN-DC. | YES | ignore |
| **Core Network Type Restrictions** |  | *0..<maxnoofEPLMNsPlusOne>* |  | Includes any of the Serving PLMN or any PLMN of the Equivalent PLMNs listed in the *Mobility Restriction List* IE for which core network type restriction applies as specified in TS 23.501 [38]. | YES | ignore |
| >PLMN Identity | M |  | 9.2.4 |  |  |  |
| >Core Network Type | M |  | ENUMERATED (5GCForbidden, …, EPCForbidden) | The indication indicates whether the UE is restricted to connect to 5GC or to EPC for this PLMN. |  |  |
| NR Restriction in 5GS | O |  | ENUMERATED(NRrestrictedin5GS, …) | Restriction to use NR when the NR connects to 5GS. | YES | ignore |
| Last NG-RAN PLMN Identity | O |  | 9.2.4 | Indicates the NG-RAN PLMN from where the UE formerly handed over to EPS and which is preferred in case of subsequent mobility to 5GS. | YES | ignore |
| Unlicensed Spectrum Restriction | O |  | ENUMERATED(UnlicensedRestricted, …) | Restriction to use unlicensed spectrum in the form of LAA or LWA/LWIP or NR-U as described in TS 23.401 [11]. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofEPLMNs | Maximum no. of equivalent PLMN Ids. Value is 15. |
| maxnoofEPLMNsPlusOne | Maximum no. of equivalent PLMN Ids plus one. Value is 16. |
| maxnoofForbTACs | Maximum no. of forbidden Tracking Area Codes. Value is 4096. |
| maxnoofForbLACs | Maximum no. of forbidden Location Area Codes. Value is 4096. |

### 9.2.4 PLMN Identity

This information element indicates the PLMN Identity.

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

### 9.2.5 DL Forwarding

This element indicates that the E-RAB is proposed for forwarding of downlink packets.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DL Forwarding | M |  | ENUMERATED (DL forwarding proposed, …) |  |

### 9.2.6 Cause

The purpose of the cause information element is to indicate the reason for a particular event for the whole protocol.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| CHOICE Cause Group | M |  |  |  |
| *>Radio Network Layer* |  |  |  |  |
| >>Radio Network Layer Cause | M |  | ENUMERATED  (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 Group ID,  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,  No Radio Resources Available,  Invalid QoS combination, Encryption Algorithms Not Supported, Procedure cancelled, RRM purpose,  Improve 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, CHO-CPC resources to be changed, UE Power Saving, Insufficient UE Capabilities, Normal Release, Unknown E-UTRAN node Measurement ID) |  |
| *>Transport Layer* |  |  |  |  |
| >>Transport Layer Cause | M |  | ENUMERATED (Transport Resource Unavailable,  Unspecified,...) |  |
| *>Protocol* |  |  |  |  |
| >>Protocol Cause | M |  | ENUMERATED (Transfer Syntax Error,Abstract Syntax Error (Reject),Abstract Syntax Error (Ignore and Notify),Message not Compatible with Receiver State,Semantic Error,Unspecified,Abstract Syntax Error (Falsely Constructed Message),...) |  |
| *>Misc* |  |  |  |  |
| >>Miscellaneous Cause | M |  | ENUMERATED (Control Processing Overload, Hardware Failure,O&M Intervention,Not enough User Plane Processing Resources,Unspecified,...) |  |

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.

| Radio Network Layer cause | Meaning |
| --- | --- |
| Cell not Available | The concerned cell is not available. |
| Handover Desirable for Radio Reasons | The reason for requesting handover is radio related. |
| Handover Target not Allowed | Handover to the indicated target cell is not allowed for the UE in question |
| Invalid MME Group ID | The target eNB doesn’t belong to the same pool area of the source eNB i.e. S1 handovers should be attempted instead. |
| No Radio Resources Available in Target Cell | The target cell doesn’t have sufficient radio resources available. |
| Partial Handover | 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. |
| Reduce Load in Serving Cell | Load in serving cell needs to be reduced. When applied to handover preparation, it indicates the handover is triggered due to load balancing. |
| Resource Optimisation Handover | The reason for requesting handover is to improve the load distribution with the neighbour cells. |
| Time Critical Handover | 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. |
| TX2RELOCoverall Expiry | The reason for the action is expiry of timer TX2RELOCoverall. |
| TRELOCprep Expiry | Handover Preparation procedure is cancelled when timer TRELOCprep expires. |
| Unknown MME Code | 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. |
| Unknown New eNB UE X2AP ID | The action failed because the New eNB UE X2AP ID or the MeNB UE X2AP ID is unknown. |
| Unknown Old eNB UE X2AP ID | The action failed because the Old eNB UE X2AP ID or the SeNB UE X2AP ID is unknown. |
| Unknown Pair of UE X2AP ID | The action failed because the pair of UE X2 AP IDs is unknown. |
| Encryption And/Or Integrity Protection Algorithms Not Supported | 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. |
| ReportCharacteristicsEmpty | The action failed because there is no characteristic reported. |
| NoReportPeriodicity | The action failed because the periodicity is not defined. |
| ExistingMeasurementID | The action failed because measurement-ID is already used. |
| Unknown eNB Measurement ID | The action failed because some eNB Measurement-ID is unknown. |
| Measurement Temporarily not Available | The eNB can temporarily not provide the requested measurement object. |
| Load Balancing | The reason for mobility settings change is load balancing. |
| Handover Optimisation | The reason for mobility settings change is handover optimisation. |
| Value out of allowed range | The action failed because the proposed Handover Trigger parameter change in the eNB2 Proposed Mobility Parameters IE is too low or too high. |
| Multiple E-RAB ID Instances | The action failed because multiple instances of the same E-RAB had been provided to the eNB. |
| Switch Off Ongoing | 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. |
| Not supported QCI value | The action failed because the requested QCI is not supported. |
| Unspecified | Sent when none of the above cause values applies but still the cause is Radio Network Layer related. |
| Measurement not Supported For The Object | At least one of the concerned cell(s) does not support the requested measurement. |
| TDCoverall Expiry | The reason for the action is expiry of timer TDCoverall. |
| TDCprep Expiry | The reason for the action is expiry of timer TDCprep. |
| Action Desirable for Radio Reasons | The reason for requesting the action is radio related. In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| Reduce Load | 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 and EN-DC only. |
| Resource Optimisation | 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 and EN-DC only. |
| Time Critical action | 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 and EN-DC only. |
| Target not Allowed | 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 and EN-DC only. |
| No Radio Resources Available | 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 and EN-DC only. |
| Invalid QoS combination | The action was failed because of invalid QoS combination.  In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| Encryption Algorithms Not Supported | 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 and EN-DC only. |
| Procedure cancelled | 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 and EN-DC only. |
| RRM purpose | The procedure is initiated due to node internal RRM purposes.  In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| Improve User Bit Rate | The reason for requesting this action is to improve the user bit rate.  In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| User Inactivity | 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 and EN-DC only. |
| Radio Connection With UE Lost | The action is requested due to losing the radio connection to the UE.  In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| Failure in the Radio Interface Procedure | Radio interface procedure has failed.  In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| Bearer Option not Supported | The requested bearer option is not supported by the sending node.  In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| MCG Mobility | The procedure is initiated due to mobility related at MCG radio resource. |
| SCG Mobility | The procedure is initiated due to mobility related at SCG radio resource. |
| Count reaches max value | Indicates the PDCP COUNT for UL or DL reached the max value and the bearer may be released. |
| Unknown Old en-gNB UE X2AP ID | The action failed because the Old en-gNB UE X2AP ID or the SgNB UE X2AP ID is unknown. |
| PDCP Overload | The procedure is initiated due to PDCP resource limitation. |
| CHO-CPC resources to be changed | The prepared resources for CHO or CPC for a UE are to be changed. |
| UE Power Saving | The procedure is initiated to accommodate the preference indicated by UE to release the SCG for UE power saving purpose.  In the current version of this specification applicable for Dual Connectivity and EN-DC only. |
| Insufficient UE Capabilities | The procedure can’t proceed due to insufficient UE capabilities. |
| Normal Release | The release is due to normal reasons. |
| Unknown E-UTRAN node Measurement ID | The action failed because some E-UTRAN node Measurement-ID is unknown. |

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

|  |  |
| --- | --- |
| Protocol cause | Meaning |
| Abstract Syntax Error (Reject) | The received message included an abstract syntax error and the concerned criticality indicated "reject" (see sub clause 10.3 of TS 36.413 [4]). |
| Abstract Syntax Error (Ignore and Notify) | 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]). |
| Abstract syntax error (falsely constructed message) | 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]). |
| Message not Compatible with Receiver State | The received message was not compatible with the receiver state (see sub clause 10.4 of TS 36.413 [4]). |
| Semantic Error | The received message included a semantic error (see sub clause 10.4 of TS 36.413 [4]). |
| Transfer Syntax Error | The received message included a transfer syntax error (see sub clause 10.2 of TS 36.413 [4]). |
| Unspecified | Sent when none of the above cause values applies but still the cause is Protocol related |

|  |  |
| --- | --- |
| Miscellaneous cause | Meaning |
| Control Processing Overload | eNB control processing overload |
| Hardware Failure | eNB hardware failure |
| Not enough User Plane Processing Resources | eNB has insufficient user plane processing resources available. |
| O&M Intervention | Operation and Maintenance intervention related to eNB equipment |
| Unspecified | Sent when none of the above cause values applies and the cause is not related to any of the categories Radio Network Layer, Transport Network Layer or Protocol |

### 9.2.7 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.

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

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

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| PCI | M |  | INTEGER (0..503, …) | Physical Cell ID | – |  |
| Cell ID | M |  | ECGI  9.2.14 |  | – |  |
| TAC | M |  | OCTET STRING(2) | Tracking Area Code | – |  |
| **Broadcast PLMNs** |  | *1..<maxnoofBPLMNs>* |  | Broadcast PLMNs in SIB1 associated to the E-UTRA Cell Identity in the *Cell ID* IE. | – |  |
| >PLMN Identity | M |  | 9.2.4 |  | – |  |
| CHOICE *EUTRA-Mode-Info* | M |  |  |  | – |  |
| *>FDD* |  |  |  |  |  |  |
| **>>FDD Info** |  | *1* |  |  | – |  |
| >>>UL EARFCN | M |  | EARFCN  9.2.26 | 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 | – |  |
| >>>DL EARFCN | M |  | EARFCN  9.2.26 | Corresponds to NDL in TS 36.104 [16] | – |  |
| >>>UL Transmission Bandwidth | M |  | Transmission Bandwidth  9.2.27 | Same as DL Transmission Bandwidth in this release; ignored in case UL EARFCN value is ignored | – |  |
| >>>DL Transmission Bandwidth | M |  | Transmission Bandwidth  9.2.27 |  | – |  |
| >>>UL EARFCN Extension | O |  | EARFCN Extension 9.2.65 | If this IE is present, the value signalled in the *UL EARFCN* IE is ignored. | YES | reject |
| >>>DL EARFCN Extension | O |  | EARFCN Extension 9.2.65 | If this IE is present, the value signalled in the *DL EARFCN* IE is ignored. | YES | reject |
| >>>Offset of NB-IoT Channel Number to DL EARFCN | O |  | Offset of NB-IoT Channel Number to EARFCN  9.2.94 | Corresponds to MDL in TS 36.104 [16] | YES | reject |
| >>>Offset of NB-IoT Channel Number to UL EARFCN | O |  | Offset of NB-IoT Channel Number to EARFCN  9.2.94 | Corresponds to MUL in TS 36.104 [16] | YES | reject |
| >>>NRS-NSSS-PowerOffset | O |  | ENUMERATED (-3, 0, 3, …) | NRS to NSSS power ratio,  as defined in TS6.213 [11]. | YES | Ignore |
| >>>NSSS-NumOccasionDifferentPrecoder | O |  | ENUMERATED (2, 4, 8, …) | The number of consecutive NSSS occasions that use different precoders for NSSS transmission, as defined in TS6.213 [11]. | YES | ignore |
| *>TDD* |  |  |  |  | – |  |
| **>>TDD Info** |  | *1* |  |  | – |  |
| >>>EARFCN | M |  | 9.2.26 | Corresponds to NDL/NUL in TS 36.104 [16] | – |  |
| >>>Transmission Bandwidth | M |  | Transmission Bandwidth  9.2.27 |  | – |  |
| >>>Subframe Assignment | M |  | ENUMERATED(sa0, sa1, sa2, sa3, sa4, sa5, sa6,…) | Uplink-downlink subframe configuration information defined in TS 36.211 [10].  In NB-IOT, sa0 and sa6 are not applicable. | – |  |
| **>>>Special Subframe Info** |  | *1* |  | Special subframe configuration information defined in TS 36.211 [10] | – |  |
| >>>>Special Subframe Patterns | M |  | ENUMERATED(ssp0, ssp1, ssp2, ssp3, ssp4, ssp5, ssp6, ssp7, ssp8, …) |  | – |  |
| >>>>Cyclic Prefix DL | M |  | ENUMERATED(Normal, Extended,…) |  | – |  |
| >>>>Cyclic Prefix UL | M |  | ENUMERATED(Normal, Extended,…) |  | – |  |
| **>>>Additional Special Subframe Info** | O |  |  | Special subframe configuration information defined in TS 36.211 [10]. Only for newly defined configuration of special subframe from Release 11. | YES | ignore |
| >>>>Additional Special Subframe Patterns | M |  | ENUMERATED(ssp0, ssp1, ssp2, ssp3, ssp4, ssp5, ssp6, ssp7, ssp8, ssp9, …) |  | – |  |
| >>>>Cyclic Prefix DL | M |  | ENUMERATED(Normal, Extended,…) |  | – |  |
| >>>>Cyclic Prefix UL | M |  | ENUMERATED(Normal, Extended,…) |  | – |  |
| >>>EARFCN Extension | O |  | 9.2.65 | If this IE is present, the value signalled in the *EARFCN* IE is ignored. | YES | reject |
| **>>>Additional Special Subframe Extension Info** | O |  |  | Special subframe configuration information defined in TS 36.211 [10]. Only for newly defined configuration of special subframe from Release 14. | YES | ignore |
| >>>>Additional Special Subframe Patterns Extension | M |  | ENUMERATED(ssp10, …) |  | – |  |
| >>>>Cyclic Prefix DL | M |  | ENUMERATED(Normal, Extended,…) |  | – |  |
| >>>>Cyclic Prefix UL | M |  | ENUMERATED(Normal, Extended,…) |  | – |  |
| >>>Offset of NB-IoT Channel Number to DL EARFCN | O |  | Offset of NB-IoT Channel Number to EARFCN  9.2.94 | Corresponds to MDL in TS 36.104 [16] | YES | reject |
| >>>NB-IoT UL DL Alignment Offset | O |  | NB-IoT UL DL Alignment Offset  9.2.144 | Corresponds to the TDD-UL-DL-AlignmentOffset-NB in TS 36.331 [9]. | YES | reject |
| Number of Antenna Ports | O |  | 9.2.43 |  | YES | ignore |
| PRACH Configuration | O |  | PRACH Configuration  9.2.50 |  | YES | ignore |
| **MBSFN Subframe Info** |  | *0..<maxnoofMBSFN>* |  | MBSFN subframe defined in TS 36.331 [9] | GLOBAL | ignore |
| >Radioframe Allocation Period | M |  | ENUMERATED(n1, n2, n4, n8, n16, n32, …) |  | – |  |
| >Radioframe Allocation Offset | M |  | INTEGER (0..7, ...) |  | – |  |
| >Subframe Allocation | M |  | 9.2.51 |  | – |  |
| CSG ID | O |  | 9.2.53 |  | YES | ignore |
| **MBMS Service Area Identity List** |  | *0..<maxnoofMBMSServiceAreaIdentities >* |  | Supported MBMS Service Area Identities in the cell | GLOBAL | ignore |
| >MBMS Service Area Identity |  |  | OCTET STRING(2) | MBMS Service Area Identities as defined in TS 23.003 [29] |  |  |
| MultibandInfoList | O |  | 9.2.60 |  | YES | ignore |
| FreqBandIndicatorPriority | O |  | 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]) | YES | ignore |
| 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 |
| **Broadcast PLMN Identity Info List E-UTRA** |  | *0..<maxnoofBPLMNs>* |  | This IE corresponds to the *cellAccessRelatedInfo* IE in *SIB1* as specified in TS 36.331 [9]. All PLMN Identities and associated information contained in the *cellAccessRelatedInfo* IE are included and provided in the same order as broadcast in SIB1. | YES | ignore |
| **>Broadcast PLMNs** |  | *1..<maxnoof BPLMNs>* |  | Broadcast PLMN IDs in SIB1 associated to the *E-UTRA Cell Identity* IE. | – |  |
| >>PLMN Identity | M |  | 9.2.4 |  | – |  |
| >TAC | M |  | OCTET STRING(2) |  | – |  |
| >E-UTRA Cell Identity | M |  | BIT STRING (28) |  | – |  |
| NPRACH Configuration | O |  | NPRACH Configuration  9.2.170 |  | YES | ignore |
| SFN Offset | O |  | 9.2.175 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofBPLMNs | Maximum no. of Broadcast PLMN Ids. Value is 6. |
| maxnoofMBSFN | Maximum no. of MBSFN frame allocation with different offset. Value is 8. |
| maxnoofMBMSServiceAreaIdentities | Maximum no. of MBMS Service Area Identities. Value is 256. |

### 9.2.9 E-RAB Level QoS Parameters

This IE defines the QoS to be applied to an E-RAB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| QCI | M |  | INTEGER (0..255) | QoS Class Identifier defined in TS 23.401 [12].  Logical range and coding specified in TS 23.203 [13]. | – |  |
| Allocation and Retention Priority | M |  | 9.2.31 |  | – |  |
| GBR QoS Information | O |  | 9.2.10 | This IE applies to GBR bearers only and shall be ignored otherwise. | – |  |
| Downlink Maximum Packet Loss Rate | O |  | Packet Loss Rate  9.2.124 | 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]. | YES | ignore |
| Uplink Maximum Packet Loss Rate | O |  | Packet Loss Rate  9.2.124 | 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]. | YES | ignore |

### 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]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| E-RAB Maximum Bit Rate Downlink | M |  | Bit Rate  9.2.11 | 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. | – |  |
| E-RAB Maximum Bit Rate Uplink | M |  | Bit Rate 9.2.11 | 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. | – |  |
| E-RAB Guaranteed Bit Rate Downlink | M |  | Bit Rate 9.2.11 | 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. | – |  |
| E-RAB Guaranteed Bit Rate Uplink | M |  | Bit Rate 9.2.11 | 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. | – |  |
| Extended E-RAB Maximum Bit Rate Downlink | O |  | Extended Bit Rate 9.2.99 | Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer.  Details in TS 23.401 [12]. | – |  |
| Extended E-RAB Maximum Bit Rate Uplink | O |  | Extended Bit Rate 9.2.99 | Maximum Bit Rate in UL (i.e. from E-UTRAN to EPC) for the bearer.  Details in TS 23.401 [12]. | – |  |
| Extended E-RAB Guaranteed Bit Rate Downlink | O |  | Extended Bit Rate 9.2.99 | 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]. | – |  |
| Extended E-RAB Guaranteed Bit Rate Uplink | O |  | Extended Bit Rate 9.2.99 | 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]. | – |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Bit Rate | M |  | INTEGER (0..10,000,000,000) | The unit is: bit/s |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| UE Aggregate Maximum Bit Rate Downlink | M |  | Bit Rate  9.2.11 | If the *Extended UE Aggregate Maximum Bit Rate Downlink* IE is included, the *UE Aggregate Maximum Bit Rate Downlink* IE shall be ignored. | – |  |
| UE Aggregate Maximum Bit Rate Uplink | M |  | Bit Rate  9.2.11 | If the *Extended UE Aggregate Maximum Bit Rate Uplink* IE is included, the *UE Aggregate Maximum Bit Rate Uplink* IE shall be ignored. | – |  |
| Extended UE Aggregate Maximum Bit Rate Downlink | O |  | Extended Bit Rate 9.2.99 | UE Aggregate Maximum Bit Rate in DL. Details in TS 23.401 [12]. | – |  |
| Extended UE Aggregate Maximum Bit Rate Uplink | O |  | Extended Bit Rate 9.2.99 | UE Aggregate Maximum Bit Rate in UL. Details in TS 23.401 [12]. | – |  |

### 9.2.13 Message Type

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

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

### 9.2.14 ECGI

The E-UTRAN Cell Global Identifier (ECGI) is used to globally identify a cell (see TS 36.401 [2]).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| PLMN Identity | M |  | 9.2.4 |  | – |  |
| E-UTRAN Cell Identifier | M |  | BIT STRING (28) | 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. | – |  |

### 9.2.15 COUNT Value

This information element indicates the 12 bit PDCP sequence number and the corresponding 20 bit Hyper frame number.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| PDCP-SN | M |  | INTEGER (0..4095) |  | – |  |
| HFN | M |  | INTEGER (0..1048575) |  | – |  |

### 9.2.16 GUMMEI

This information element indicates the globally unique MME identity.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| GU Group Id | M |  | 9.2.20 |  | – |  |
| MME code | M |  | OCTET STRING (1) |  | – |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **UL Interference Overload Indication List** |  | *1..<maxnoofPRBs>* |  |  |
| >UL Interference Overload Indication | M |  | ENUMERATED (high interference, medium interference, low interference, …) | 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. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofPRBs | Maximum no. Physical Resource Blocks. Value is 110. |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| HII | M |  | BIT STRING (1..110, …) | 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. |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| RNTP Per PRB | M |  | BIT STRING (6..110, …) | 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 "Tx not exceeding RNTP threshold".  Value 1 indicates "no promise on the Tx power is given". The IE is ignored if the *Enhanced RNTP* IE is included. | – |  |
| RNTP Threshold | M |  | ENUMERATED (-∞, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, …) | RNTPthreshold is defined in TS 36.213 [11]. | – |  |
| Number Of Cell-specific Antenna Ports | M |  | ENUMERATED (1, 2, 4, …) | *P* (number of antenna ports for cell-specific reference signals) defined in TS 36.211 [10] | – |  |
| P\_B | M |  | INTEGER (0..3, …) | PB is defined in TS 36.213 [11]. | – |  |
| PDCCH Interference Impact | M |  | INTEGER (0..4, …) | Measured by Predicted Number Of Occupied PDCCH OFDM Symbols (see TS 36.211 [10]).  Value 0 means "no prediction is available". | – |  |
| Enhanced RNTP | O |  |  |  | YES | ignore |
| *>Enhanced RNTP Bitmap* | M |  | BIT STRING (12..8800, …) | Each position in the bitmap represents a PRB in a subframe; value "00" indicates "Tx not exceeding RNTP Threshold", value "01" indicates "Tx not exceeding RNTP High Power Threshold", value "11" indicates that "no promise on the Tx power is given". Value "10" 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 .  is defined in TS 36.211 [10].  The Enhanced RNTP pattern is continuously repeated. |  |  |
| *>RNTP High Power Threshold* | M |  | ENUMERATED (-∞, -11, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, …) | Defined as the  RNTPthreshold in TS 36.213 [11]. |  |  |
| >Enhanced RNTP Start Time |  | 0..1 |  |  |  |  |
| >>Start SFN | M |  | INTEGER (0..1023, …) | SFN of the radio frame containing the first subframe when the *Enhanced RNTP* IE is valid. |  |  |
| >>Start Subframe Number | M |  | INTEGER (0..9, …) | Subframe number, within the radio frame indicated by the *Start SFN* IE, of the first subframe when the *Enhanced RNTP* IE is valid. |  |  |

### 9.2.20 GU Group Id

The *GU Group Id* IE is the globally unique group id corresponding to a pool area.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| PLMN Id | M |  | PLMN Identity  9.2.4 |  | – |  |
| MME Group Id | M |  | OCTET STRING(2) |  | – |  |

### 9.2.21 Location Reporting Information

This information element indicates how the location information should be reported.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Event | M |  | ENUMERATED (Change of serving cell, …) |  | – |  |
| Report Area | M |  | ENUMERATED (ECGI, …) |  | – |  |
| Additional Location Information | O |  | ENUMERATED (Include PSCell, ...) |  | YES | ignore |

### 9.2.22 Global eNB ID

This IE is used to globally identify an eNB (see TS 36.401 [2]).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| PLMN Identity | M |  | 9.2.4 |  | – |  |
| CHOICE *eNB ID* | M |  |  |  | – |  |
| *>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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| E-RAB ID | M |  | INTEGER (0..15, ...) |  |

### 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].

NOTE: If X2-C signalling transport is shared among multiple interface instances, the value of the eNB UE X2AP ID,combined with the eNB UE X2AP ID Extension, if applicable, is allocated so that it can be associated with an X2-C interface instance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| eNB UE X2AP ID | M |  | INTEGER (0..4095) |  |

### 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]).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Subscriber Profile ID for RAT/Frequency Priority | M |  | INTEGER (1..256) |  |

### 9.2.25a Additional RRM Policy Index

The *Additional RRM Policy Index* IE is used to provide additional information independent from the Subscriber Profile ID for RAT/Frequency priority as specified in TS 36.300 [15].

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

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| EARFCN | M |  | INTEGER (0..maxEARFCN) | The relation between EARFCN and carrier frequency (in MHz) are defined in TS 36.104 [16]. |

| Range bound | Explanation |
| --- | --- |
| maxEARFCN | Maximum value of EARFCNs. Value is 65535. |

### 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 " NRB " (TS 36.104 [16]). The values bw1, bw6, bw15, bw25, bw50, bw75, bw100 correspond to the number of resource blocks "NRB" 6, 15, 25, 50, 75, 100.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Transmission Bandwidth | **M** |  | ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100,... , bw1) |  |

### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| **E-RAB List Item** |  | *1..<maxnoofBearers>* |  |  | EACH | ignore |
| >E-RAB ID | M |  | 9.2.23 |  | – |  |
| >Cause | M |  | 9.2.6 |  | – |  |

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

### 9.2.29 UE Security Capabilities

The *UE Security Capabilities* IE defines the supported algorithms for encryption and integrity protection in the UE.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Encryption Algorithms | M |  | BIT STRING (16, ...) | Each position in the bitmap represents an encryption algorithm:  "all bits equal to 0" - UE supports no other algorithm than EEA0  "first bit" - 128-EEA1,  "second bit" - 128-EEA2,  "third bit" - 128-EEA3,  other bits reserved for future use. Value ‘1’ indicates support and value "0" indicates no support of the algorithm.  Algorithms are defined in TS 33.401 [18]. |
| Integrity Protection Algorithms | M |  | BIT STRING (16, ...) | Each position in the bitmap represents an integrity protection algorithm:  all bits equal to 0" - UE supports no other algorithm than EIA0 (TS 33.401 [18]) "first bit" - 128-EIA1,  "second bit" - 128-EIA2,  "third bit" - 128-EIA3,  other bits reserved for future use.  Value '1' indicates support and value "0" indicates no support of the algorithm.  Algorithms are defined in TS 33.401 [18]. |

### 9.2.30 AS Security Information

The *AS Security Information* IEis used to generate the key material to be used for AS security with the UE.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Key eNodeB Star | M |  | BIT STRING (256) | 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]. |
| Next Hop Chaining Count | M |  | INTEGER (0..7) | Next Hop Chaining Count (NCC) defined in TS 33.401 [18] |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Priority Level | M |  | INTEGER (0..15) | **Desc.:** This IE should be understood as "priority of allocation and retention" (see TS 23.401 [12]).  **Usage:**  Value 15 means "no priority".  Values between 1 and 14 are ordered in decreasing order of priority, i.e. 1 is the highest and 14 the lowest.  Value 0 shall be treated as a logical error if received. |
| Pre-emption Capability | M |  | ENUMERATED(shall not trigger pre-emption, may trigger pre-emption) | **Descr.:** This IE indicates the pre-emption capability of the request on other E-RABs  **Usage:**  The E-RAB shall not pre-empt other E-RABs or, the E-RAB may pre-empt other E-RABs  The Pre-emption Capability indicator applies to the allocation of resources for an E-RAB and as such it provides the trigger to the pre-emption procedures/processes of the eNB. |
| Pre-emption Vulnerability | M |  | ENUMERATED(not pre-emptable, pre-emptable) | **Desc.:** This IE indicates the vulnerability of the E-RAB to pre-emption of other E-RABs.  **Usage**:  The E-RAB shall not be pre-empted by other E-RABs or the E-RAB may be pre-empted by other RABs.  Pre-emption Vulnerability indicator applies for the entire duration of the E-RAB, unless modified, and as such indicates whether the E-RAB is a target of the pre-emption procedures/processes of the eNB. |

### 9.2.32 Time To Wait

This IE defines the minimum allowed waiting times.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Time To Wait | M |  | ENUMERATED(1s, 2s, 5s, 10s, 20s, 60s, …) |  |

### 9.2.33 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| SRVCC Operation Possible | M |  | ENUMERATED(Possible, …) |  |

### 9.2.34 Hardware Load Indicator

The *Hardware Load Indicator* IE indicates the status of the Hardware Load experienced by the cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DL Hardware Load Indicator | M |  | Load Indicator  9.2.36 |  |
| UL Hardware Load Indicator | M |  | Load Indicator  9.2.36 |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DL S1TNL Load Indicator | M |  | Load Indicator  9.2.36 |  |
| UL S1TNL Load Indicator | M |  | Load Indicator  9.2.36 |  |

### 9.2.36 Load Indicator

The *Load Indicator* IE indicates the status of Load.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Load Indicator | M |  | ENUMERATED (LowLoad,  MediumLoad, HighLoad, Overload, ...) |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DL GBR PRB usage | M |  | INTEGER (0..100) |  |
| UL GBR PRB usage | M |  | INTEGER (0..100) |  |
| DL non-GBR PRB usage | M |  | INTEGER (0..100) |  |
| UL non-GBR PRB usage | M |  | INTEGER (0..100) |  |
| DL Total PRB usage | M |  | INTEGER (0..100) |  |
| UL Total PRB usage | M |  | INTEGER (0..100) |  |
| DL scheduling PDCCH CCE usage | O |  | INTEGER (0..100) |  |
| UL scheduling PDCCH CCE usage | O |  | INTEGER (0..100) |  |

### 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].

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| **Last Visited Cell List** |  | *1..<maxnoofCells>* |  | Most recent information is added to the top of this list | – |  |
| >Last Visited Cell Information | M |  | 9.2.39 |  | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCells | Maximum number of last visited cell information records that can be reported in the IE. Value is 16. |

### 9.2.39 Last Visited Cell Information

The Last Visited Cell Information may contain cell specific information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| CHOICE *Last Visited Cell Information* | M |  |  |  | - |  |
| >*E-UTRAN Cell* |  |  |  |  | - |  |
| >>Last Visited E-UTRAN Cell Information | M |  | 9.2.40 |  | - |  |
| >*UTRAN Cell* |  |  |  |  | - |  |
| >>Last Visited UTRAN Cell Information | M |  | OCTET STRING | Defined in TS 25.413 [24] |  |  |
| >*GERAN Cell* |  |  |  |  | - |  |
| >>Last Visited GERAN Cell Information | M |  | 9.2.41 |  | - |  |
| >*NG-RAN Cell* |  |  |  |  | - |  |
| >>Last Visited NG-RAN Cell Information | M |  | OCTET STRING | Defined in TS 38.413 [39]. (see subclause 9.3.1.97). |  |  |

### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Global Cell ID | M |  | ECGI  9.2.14 |  | - |  |
| Cell Type | M |  | 9.2.42 |  | - |  |
| Time UE stayed in Cell | M |  | INTEGER (0..4095) | 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. | - |  |
| Time UE stayed in Cell Enhanced Granularity | O |  | INTEGER (0..40950) | 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. | YES | ignore |
| HO Cause Value | O |  | Cause  9.2.6 | The cause for the handover from the E-UTRAN cell. | YES | ignore |

### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| CHOICE *Last Visited GERAN Cell Information* | M |  |  |  | - |  |
| >*Undefined* | M |  | NULL |  | - |  |

### 9.2.42 Cell Type

The cell type provides the cell coverage area.

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

### 9.2.43 Number of Antenna Ports

The *Number of Antenna Ports* IE is used to indicate the number of cell specific antenna ports.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Number of Antenna Ports |  |  | ENUMERATED (an1, an2, an4,...) | an1 = One antenna port  an2 = Two antenna ports  an4 = Four antenna ports |

### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Composite Available Capacity Downlink | M |  | Composite Available Capacity 9.2.45 | For the Downlink | - |  |
| Composite Available Capacity Uplink | M |  | Composite Available Capacity 9.2.45 | For the Uplink | - |  |

### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Cell Capacity Class Value | O |  | 9.2.46 |  | - |  |
| Capacity Value | M |  | 9.2.47 | ‘0’ indicates no resource is available, Measured on a linear scale. | - |  |

### 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* IEonly indicates resources that are configured for traffic purposes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Cell Capacity Class Value | M |  | INTEGER (1..100,...) | 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. | - |  |

### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Capacity Value | M |  | INTEGER (0..100) | Value 0 shall indicate no available capacity, and 100 shall indicate maximum available capacity . Capacity Value should be measured on a linear scale. | - |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Handover Trigger Change | M |  | INTEGER (-20..20) | The actual value is IE value \* 0.5 dB. |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Handover Trigger Change Lower Limit | M |  | INTEGER (-20..20) | The actual value is IE value \* 0.5 dB. |
| Handover Trigger Change Upper Limit | M |  | INTEGER (-20..20) | The actual value is IE value \* 0.5 dB. |

### 9.2.50 PRACH Configuration

This IE indicates the PRACH resources used in neighbor cell.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| RootSequenceIndex | M |  | INTEGER  (0..837) | See section 5.7.2. in TS 36.211 [10] | – |  |
| ZeroCorrelationZoneConfiguration | M |  | INTEGER  (0..15) | See section 5.7.2. in TS 36.211 [10] | – |  |
| HighSpeedFlag | M |  | BOOLEAN | TRUE corresponds to Restricted set and FALSE to Unrestricted set. See section 5.7.2 in TS 36.211 [10] | – |  |
| PRACH-FrequencyOffset | M |  | INTEGER  (0..94) | See section 5.7.1 of TS 36.211 [10] | – |  |
| PRACH-ConfigurationIndex | O |  | INTEGER  (0..63) | Mandatory for TDD, shall not be present for FDD.  See section 5.7.1. in TS 36.211 [10] | – |  |

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE *Subframe Allocation* | M |  |  |  |
| *>Oneframe* | M |  | BITSTRING (SIZE(6)) |  |
| *>Fourframes* | M |  | BITSTRING (SIZE(24)) |  |

### 9.2.52 CSG Membership Status

This element indicates the membership status of the UE to a particular CSG.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| CSG Membership Status | M |  | ENUMERATED (member, not-member) |  | - |  |

### 9.2.53 CSG ID

This element indicates the identifier of the Closed Subscriber Group.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| CSG ID | M |  | BIT STRING (SIZE (27)) |  | - |  |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| CHOICE ABS Information | M |  |  |  |
| *>FDD* |  |  |  |  |
| >>ABS Pattern Info | M |  | BIT STRING (SIZE(40)) | Each position in the bitmap represents a DL subframe, for which value "1" indicates ‘ABS’ and value "0" 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. |
| >>Number Of Cell-specific Antenna Ports | M |  | ENUMERATED (1, 2, 4, …) | *P* (number of antenna ports for cell-specific reference signals) defined in TS 36.211 [10] |
| >>Measurement Subset | M |  | BIT STRING (SIZE(40)) | Indicates a subset of the ABS Pattern Info above, and is used to configure specific measurements towards the UE. |
| *>TDD* |  |  |  |  |
| >>ABS Pattern Info | M |  | BIT STRING (1..70, ...) | Each position in the bitmap represents a subframe. Value "1" indicates ‘ABS’ and value "0" 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. |
| >>Number Of Cell-specific Antenna Ports | M |  | ENUMERATED (1, 2, 4, …) | *P* (number of antenna ports for cell-specific reference signals) defined in TS 36.211 [10] |
| >>Measurement Subset | M |  | BIT STRING (1..70, ...) | Indicates a subset of the ABS Pattern Info above, and is used to configure specific measurements towards the UE |
| *>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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Invoke Indication | M |  | ENUMERATED (ABS Information, …, Start NAICS Information, Stop NAICS Information) |  |

### 9.2.56 MDT Configuration

The IE defines the MDT configuration parameters.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| MDT Activation | M |  | ENUMERATED(Immediate MDT only, Immediate MDT and Trace, …) |  | – |  |
| CHOICE *Area Scope of MDT* | M |  |  |  | – |  |
| >*Cell Based* |  |  |  |  | – |  |
| >>**Cell ID List for MDT** |  | *1..<maxnoofCellIDforMDT>* |  |  | – |  |
| >>>ECGI | M |  | 9.2.14 |  | – |  |
| >*TA Based* |  |  |  |  | – |  |
| >>**TA List for MDT** |  | *1..<maxnoofTAforMDT>* |  |  | – |  |
| >>>TAC | M |  | OCTET STRING (2) | Tracking Area Code.  The TAI is derived using the current serving PLMN. | – |  |
| *>PLMN Wide* |  |  | NULL |  | – |  |
| >*TAI based* |  |  |  |  |  |  |
| >>**TAI List for MDT** |  | *1..<maxnoofTAforMDT>* |  |  |  |  |
| >>>TAC | M |  | OCTET STRING (2) | Tracking Area Code |  |  |
| >>>PLMN Identity | M |  | 9.2.4 |  |  |  |
| Measurements to Activate | M |  | BITSTRING  (SIZE(8)) | 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". | – |  |
| M1 Reporting Trigger | M |  | ENUMERATED (periodic, A2event-triggered, …, A2event-triggered periodic) | This IE shall be ignored if the *Measurements to Activate* IE has the first bit set to "0". | – |  |
| M1 Threshold Event A2 | C-ifM1A2trigger |  |  | Included in case of event-triggered or event-triggered periodic reporting for measurement M1 | – |  |
| >CHOICE *Threshold* | M |  |  |  | – |  |
| >>*RSRP* |  |  |  |  | – |  |
| >>>Threshold RSRP | M |  | INTEGER (0..97) | This IE is defined in TS 36.331 [9]. | – |  |
| >>*RSRQ* |  |  |  |  | – |  |
| >>>Threshold RSRQ | M |  | INTEGER (0..34) | This IE is defined in TS 36.331 [9]. | – |  |
| M1 Periodic reporting | C-ifperiodicMDT |  |  | Included in case of periodic or event-triggered periodic reporting for measurement M1 | – |  |
| >Report interval | M |  | ENUMERATED ( ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, min1, min6, min12, min30, min60) | This IE is defined in TS 36.331 [9]. | – |  |
| >Report amount | M |  | ENUMERATED (1, 2, 4, 8, 16, 32, 64, infinity) | Number of reports | – |  |
| M3 Configuration | C-ifM3 |  | 9.2.61 |  | YES | ignore |
| M4 Configuration | C-ifM4 |  | 9.2.62 |  | YES | ignore |
| M5 Configuration | C-ifM5 |  | 9.2.63 |  | YES | ignore |
| MDT Location Information | O |  | BITSTRING(SIZE(8)) | 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". | YES | ignore |
| Signalling based MDT PLMN List | O |  | MDT PLMN List  9.2.64 |  | YES | ignore |
| M6 Configuration | C-ifM6 |  | 9.2.87 |  | YES | ignore |
| M7 Configuration | C-ifM7 |  | 9.2.88 |  | YES | ignore |
| Bluetooth Measurement Configuration | O |  | 9.2.134 |  | YES | ignore |
| WLAN Measurement Configuration | O |  | 9.2.135 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCellIDforMDT | Maximum no. of Cell ID subject for MDT scope. Value is 32. |
| maxnoofTAforMDT | Maximum no. of TA subject for MDT scope. Value is 8. |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifM1A2trigger | 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". |
| ifperiodicMDT | This IE shall be present if the *M1* *Reporting Trigger* IE is set to "periodic" or to "A2event-triggered periodic". |
| ifM3 | This IE shall be present if the *Measurements to Activate* IE has the third bit set to "1". |
| ifM4 | This IE shall be present if the *Measurements to Activate* IE has the fourth bit set to "1". |
| ifM5 | This IE shall be present if the *Measurements to Activate* IE has the fifth bit set to "1". |
| ifM6 | This IE shall be present if the *Measurements to Activate* IE has the seventh bit set to "1". |
| ifM7 | This IE shall be present if the *Measurements to Activate* IE has the eighth bit set to "1". |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| DL ABS status | M |  | INTEGER (0..100) | 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. |
| CHOICE *Usable ABS Information* | M |  | – | – |
| >*FDD* |  |  | – | – |
| >>Usable ABS Pattern Info | M |  | BIT STRING (SIZE(40)) | Each position in the bitmap represents a subframe, for which value "1" 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 "0" 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. |
| >*TDD* |  |  | – | – |
| >>Usable ABS Pattern Info | M |  | BIT STRING (1..70) | Each position in the bitmap represents a subframe, for which value "1" 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 "0" 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. |

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Management Based MDT Allowed | M |  | ENUMERATED (Allowed, ...) |  |

### 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].

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| **BandInfo** |  | *1..<maxnoofBands>* |  |  | – |  |
| >FrequencyBandIndicator | M |  | INTEGER (1.. 256, ...) | E-UTRA operating band as defined in TS 36.101 [42, table 5.5-1] | – |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofBands | Maximum number of frequency bands that a cell belongs to. The value is 16. |

### 9.2.61 M3 Configuration

This IE defines the parameters for M3 measurement collection.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| M3 Collection Period | M |  | ENUMERATED (ms100, ms1000, ms10000, …) |  |

### 9.2.62 M4 Configuration

This IE defines the parameters for M4 measurement collection.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| M4 Collection Period | M |  | ENUMERATED (ms1024, ms2048, ms5120, ms10240, min1, …) |  |
| M4 Links to log | M |  | ENUMERATED(uplink, downlink, both-uplink-and-downlink, …) |  |

### 9.2.63 M5 Configuration

This IE defines the parameters for M5 measurement collection.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| M5 Collection Period | M |  | ENUMERATED (ms1024, ms2048, ms5120, ms10240, min1, …) |  |
| M5 Links to log | M |  | ENUMERATED(uplink, downlink, both-uplink-and-downlink, …) |  |

### 9.2.64 MDT PLMN List

The purpose of the *MDT PLMN List* IE is to provide the list of PLMNs allowed for MDT.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **MDT PLMN List** |  | *1..<maxnoofMDTPLMNs>* |  |  |
| >PLMN Identity | M |  | 9.2.4 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofMDTPLMNs | Maximum no. of PLMNs in the MDT PLMN list. Value is 16. |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| EARFCN Extension | M |  | INTEGER (maxEARFCN+1 .. newmaxEARFCN, ...) | The relation between EARFCN and carrier frequency (in MHz) are defined in TS 36.104 [16]. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxEARFCN | Maximum value of EARFCNs. Value is 65535. |
| newmaxEARFCN | New maximum value of EARFCNs. Value is 262143. |

### 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| PDCP-SN Extended | M |  | INTEGER (0..32767) |  | - |  |
| HFN Modified | M |  | INTEGER (0..131071) |  | - |  |

### 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 | Presence | Range | IE type and reference | Semantics description |
| Associated Subframes | M |  | BITSTRING  (SIZE(5)) | 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 "1" in a bit position indicates that the Extended UL interference overload indication is applicable to the corresponding subframe; and value "0" indicates otherwise. |
| Extended UL Interference Overload Indication | M |  | UL Interference Overload Indication  9.2.17 |  |

### 9.2.68 RNL Header

The *RNL Header* IE indicates the target eNB ID and source eNB ID.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Source eNB ID | M |  | Global eNB ID 9.2.22 |  | - |  |
| Target eNB ID | O |  | Global eNB ID 9.2.22 |  | - |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Masked IMEISV | M |  | BIT STRING (SIZE(64)) | Coded as the International Mobile station Equipment Identity and Software Version Number (IMEISV) defined in TS 23.003 [29] with the last 4 digits of the SNR masked by setting the corresponding bits to 1. |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Expected UE Activity Behaviour | M |  | 9.2.71 |  |
| Expected HO Interval | O |  | ENUMERATED (sec15, sec30, sec60, sec90, sec120, sec180, long-time, …) | Indicates the expected time interval between inter-eNB handovers.  If "long-time" is included, the interval between inter-eNB handovers is expected to be longer than 180 seconds. |

### 9.2.71 Expected UE Activity Behaviour

Indicates information about the expected "UE activity behaviour" as defined in TS 23.401 [12].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Expected Activity Period | O |  | INTEGER (1..30|40|50|60|80| 100|120|150|180| 181, ...) | If this IE is set to "181" the expected activity time is longer than 180 seconds.  The remaining values indicate the expected activity time in [seconds]. |
| Expected Idle Period | O |  | INTEGER (1..30|40|50|60|80| 100|120|150|180| 181, ...) | If this IE is set to "181" the expected idle time is longer than 180 seconds.  The remaining values indicate the expected idle time in [seconds]. |
| Source of UE Activity Behaviour Information | O |  | ENUMERATED (subscription information, statistics, ...) | If "subscription information" 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 "statistics" is indicated, the information contained in the *Expected Activity Period* IE and the *Expected Idle Period* IE, if present, is derived from statistical information. |

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SeNB Security Key | M |  | BIT STRING (SIZE(256)) | The S-KeNB which is provided by the MeNB, see TS 33.401 [18]. |

### 9.2.73 SCG Change Indication

The *SCG Change Indication* IEis 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]).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SCG Change Indication | M |  | ENUMERATED (PDCPCountWrapAround, PSCellChange, other, …) |  |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| CoMP Information Item |  | *1 .. <maxnoofCoMPHypothesisSet>* |  |  |
| >CoMP Hypothesis Set | M |  | 9.2.75 |  |
| >Benefit Metric | M |  | INTEGER (-101..100, …) | Value -100 indicates the maximum cost, and 100 indicates the maximum benefit.  Value -101 indicates unknown benefit.  Values from -100 to 100 should be calculated on a linear scale. |
| CoMP Information Start Time |  | *0..1* |  |  |
| >Start SFN | M |  | INTEGER (0..1023, …) | SFN of the radio frame containing the first subframe when the *CoMP Information* IE is valid. |
| >Start Subframe Number | M |  | INTEGER (0..9, …) | Subframe number, within the radio frame indicated by the *Start SFN* IE, of the first subframe when the *CoMP Information* IE is valid. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCoMPHypothesisSet | Maximum number of CoMP Hypothesis sets. The value is 256. |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CoMP Hypothesis Set Item |  | *1..<maxnoofCoMPCells>* |  |  |
| >Cell ID | M |  | ECGI  9.2.14 | ID of the cell for which the *CoMP Hypothesis* IE is applied. |
| >CoMP Hypothesis | M |  | BIT STRING (6..4400, …) | Each position in the bitmap represents a PRB in a subframe, for which value "1" indicates ‘interference protected resource’ and value "0" 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 .  is defined in TS 36.211 [10].  The CoMP hypothesis pattern is continuously repeated. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| RSRP Measurement Report Item |  | *1 .. <maxUEReport>* |  |  |
| >RSRP Measurement Result |  | *1 .. <maxCellReport>* |  |  |
| >>RSRP Cell ID | M |  | ECGI  9.2.14 | ID of the cell on which the RSRP is measured. |
| >>RSRP Measured | M |  | INTEGER (0..97, ...) | Measured RSRP.  Defined in TS 36.331 [9]. |
| >UE ID | O |  | BIT STRING (SIZE(16)) | ID assigned by eNB2 for the UE. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *NAICS Information* | M |  |  |  |
| *>NAICS Active* |  |  |  |  |
| >>Transmission Modes | O |  | BIT STRING (SIZE(8)) | 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. |
| >>P\_B | O |  | INTEGER (0..3) | See TS 36.213 [23, Table 5.2-1] |
| >>P\_A\_list |  | *0 .. <maxnoofPA>* |  |  |
| >>>P\_A | M |  | ENUMERATED (dB-6, dB-4dot77, dB-3, dB-1dot77,  dB0, dB1, dB2, dB3,...) | See PA TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc. |
| *>NAICS Inactive* |  |  | NULL |  |

|  |  |
| --- | --- |
| 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).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| ProSe Direct Discovery | O |  | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized for ProSe Direct Discovery | - |  |
| ProSe Direct Communication | O |  | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized for ProSe Direct Communication | - |  |
| ProSe UE-to-Network Relaying | O |  | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized to act as ProSe UE-to-Network Relay | YES | ignore |

### 9.2.79 CSI Report

This IE provides CSI reports of UEs served by the cell for which the information is provided.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| CSI Report per Cell |  | *1 .. <maxUEReport>* |  |  |
| >UE ID | M |  | BIT STRING (SIZE(16)) | ID assigned by eNB2 for the UE. |
| >CSI Report per CSI Process |  | 1 .. <maxCSIProcess> |  |  |
| >>CSI Process Configuration Index | M |  | INTEGER (1..7, …) | Indicates one of the possible CSI Process configurations in the serving cell. |
| >>CSI Report per CSI Process Item |  | 1..  <maxCSIReport> |  |  |
| >>>RI | M |  | INTEGER (1..8, …) | The RI corresponding to the CQI being reported for this CSI process item. Value defined in TS 36.213 [11]. |
| >>>Wideband CQI | M |  | 9.2.80 |  |
| >>>Subband Size | M |  | ENUMERATED (2, 3, 4, 6, 8, …) | Corresponds to a value of subband size *k* defined in TS 36.213 [11] for the system bandwidth. |
| >>>Subband CQI List |  | *0 .. <maxSubband>* |  |  |
| >>>>Subband CQI | M |  | 9.2.81 |  |
| >>>>Subband Index | M |  | INTEGER (0..27, …) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxUEReport | Maximum number of UE. Value is 128. |
| maxCSIProcess | Maximum number of CSI processes per UE. The value is 4. |
| maxCSIReport | Maximum number of CSI Reports per CSI Process. The value is 2. |
| maxSubband | Maximum number of subbands. The value is 14. |

### 9.2.80 Wideband CQI

This IE indicates the Wideband CQI as defined in TS 36.213 [11].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Wideband CQI Codeword 0 | M |  | INTEGER (0..15, …) | Value defined in TS 36.213 [11]. |
| CHOICE *Wideband CQI Codeword 1* | O |  |  |  |
| >*4-bit CQI* | M |  | INTEGER (0..15, …) | Value defined in TS 36.213 [11]. |
| >*3-bit spatial differential CQI* | M |  | INTEGER (0..7, …) | Value defined in TS 36.213 [11]. |

### 9.2.81 Subband CQI

This IE indicates the Subband CQI as defined in TS 36.213 [11].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| CHOICE *Subband CQI Codeword 0* | M |  |  |  |
| >*4-bit CQI* | M |  | INTEGER (0..15, …) | Value defined in TS 36.213 [11]. |
| >*2-bit* *Subband differential CQI* | M |  | INTEGER (0..3, …) | Value defined in TS 36.213 [11]. |
| >*2-bit differential CQI* | M |  | INTEGER (0..3, …) | Value defined in TS 36.213 [11]. |
| CHOICE *Subband CQI Codeword 1* | O |  |  |  |
| >*4-bit CQI* | M |  | INTEGER (0..15, …) | Value defined in TS 36.213 [11]. |
| >*3-bit* s*patial differential CQI* | M |  | INTEGER (0..7, …) | Value defined in TS 36.213 [11]. |
| >*2-bit* *Subband differential CQI* | M |  | INTEGER (0..3, …) | Value defined in TS 36.213 [11]. |
| >*2-bit differential CQI* | M |  | INTEGER (0..3, …) | Value 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| PDCP-SN Length 18 | M |  | INTEGER (0..262143) |  | – |  |
| HFN for PDCP-SN Length 18 | M |  | INTEGER (0..16383) |  | – |  |

### 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 [29].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Local Home Network ID | M |  | OCTET STRING (SIZE (32..256)) | Identifies the Local Home Network. |

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Correlation ID | M |  | OCTET STRING (SIZE(4)) |  |

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| UE Context Kept Indicator | M |  | ENUMERATED (True, …) |  |

### 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 associcated 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].

NOTE: If X2-C signalling transport is shared among multiple interface instances, the value of the eNB UE X2AP ID, combined with the eNB UE X2AP ID Extension, is allocated so that it can be associated with an X2-C interface instance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| eNB UE X2AP ID Extension | M |  | INTEGER (0..4095,…) |  |

### 9.2.87 M6 Configuration

This IE defines the parameters for M6 measurement collection.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| M6 Report Interval | M |  | ENUMERATED (ms1024, ms2048, ms5120, ms10240, …) |  |
| M6 Delay Threshold | C-ifUL |  | ENUMERATED (ms30, ms40, ms50, ms60, ms70, ms80, ms90, ms100, ms150, ms300, ms500, ms750, …) |  |
| M6 Links to log | M |  | ENUMERATED(uplink, downlink, both-uplink-and-downlink, …) |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifUL | This IE shall be present if the *M6 Links to log* IE is set to "uplink" or to "both-uplink-and-downlink". |

### 9.2.88 M7 Configuration

This IE defines the parameters for M7 measurement collection.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| M7 Collection Period | M |  | INTEGER (1..60, …) | Unit: minutes |
| M7 Links to log | M |  | ENUMERATED(uplink, downlink, both-uplink-and-downlink, …) |  |

### 9.2.89 Tunnel Information

The *Tunnel Information* IE indicates the transport layer address and UDP port number.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Transport Layer Address | M |  | BIT STRING (1..160, ...) | eNB’s Transport Layer Address. |
| UDP Port Numbers | O |  | OCTET STRING (SIZE(2)) | 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| X2 Benefit Value | M |  | INTEGER (1..8, …) | Value 1 indicates low benefit, and 8 indicates high benefit. |

### 9.2.91 Resume ID

The *Resume ID* IE is used to address a suspended UE Context within an eNB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE *Resume ID* | M |  |  |  |
| *>Resume ID not truncated* |  |  |  |  |
| >>Resume ID not truncated | M |  | BIT STRING (SIZE (40)) | 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. |
| *>Resume ID truncated* |  |  |  |  |
| >>Resume ID truncated | M |  | BIT STRING (SIZE (24)) | 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. |

### 9.2.92 Bearer Type

This IE is used to support Non-IP data as specified in TS 23.401 [11].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Bearer Type | M |  | ENUMERATED (non IP, …) |  |

### 9.2.93 V2X Services Authorized

This IE provides information on the authorization status of the UE to use the sidelink for V2X services.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Vehicle UE | O |  | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Vehicle UE | - |  |
| Pedestrian UE | O |  | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Pedestrian UE | - |  |

### 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]).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Offset of NB-IoT Channel Number to EARFCN | M |  | ENUMERATED (-10,-9,-8,-7,-6,-5,-4,-3,-2,-1,-0.5,0,1,2,3,4,5,6,7,8,9,... , -8.5, -4.5, 3.5, 7.5) |  |

### 9.2.95 WT ID

This IE is used to identify a WT.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *WT ID Type* | M |  |  |  |
| *>WT ID Type 1* |  |  |  |  |
| >>PLMN ID | M |  | PLMN Identity  9.2.4 |  |
| >>Short WT ID | M |  | BIT STRING (24) |  |
| *>WT ID Type 2* |  |  |  |  |
| >>Long WT ID | M |  | BIT STRING (48) |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| WT UE XwAP ID | M |  | OCTET STRING (SIZE(3)) |  |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| UE Sidelink Aggregate Maximum Bit Rate | M |  | Bit Rate 9.2.11 | Value 0 shall be considered as a logical error by the receiving eNB. |

### 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.

| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| --- | --- | --- | --- | --- | --- | --- |
| **NR** **Neighbour Information** |  | *1 .. <maxnoofNRNeighbours>* |  |  | – |  |
| >**NR Neighbour Information Item** |  |  |  |  | – |  |
| >>NRPCI | M |  | INTEGER (0..1007) | NR Physical Cell ID | – |  |
| >>NR CGI | M |  | 9.2.111 |  | – |  |
| >>5GS-TAC | O |  | OCTET STRING (3) | Broadcast 5GS Tracking Area Code | – |  |
| >>Configured TAC | O |  | OCTET STRING (2) | 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]. | – |  |
| >>Measurement Timing Configuration | M |  | OCTET STRING | Contains the MeasurementTimingConfiguration inter-node message for the neighbour cell, as defined in TS 38.331 [31]. | – |  |
| >>CHOICE *NR-Neighbour-Mode-Info* | M |  |  |  | – |  |
| >>>*FDD* |  |  |  |  |  |  |
| >>>>**FDD Info** |  | *1* |  |  | – |  |
| >>>>>UL ARFCNFreqInfo | M |  | NR ARFCN Frequency Info  9.2.106 | This IE is ignored for NR operating bands for which uplink range of NREF is not defined in section 5.4.2.3 of TS 38.104 [37]. | – |  |
| >>>>>DL ARFCNFreqInfo | M |  | NR ARFCN Frequency Info  9.2.106 |  | – |  |
| >>>*TDD* |  |  |  |  |  |  |
| >>>>**TDD Info** |  | *1* |  |  | – |  |
| >>>>>ARFCNNRFreqInfo | M |  | NR ARFCN Frequency Info  9.2.106 |  | – |  |
| >>>>>Intended TDD DL-UL Configuration NR | O |  | OCTET STRING | Contains the *Intended TDD DL-UL Configuration NR* IE as defined in TS 38.423 [49]. | YES | ignore |
| >>CSI-RS Transmission Indication | O |  | ENUMERATED {activated, deactivated, ...} | This IE indicates the CSI-RS transmission status of the given cell. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofNRNeighbours | Maximum no. of neighbour NR cells associated to a given served cell. Value is 1024. |

### 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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Extended Bit Rate |  |  | INTEGER (10,000,000,001..4,000,000,000,000,...) | The unit is: bit/s |

### 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].

NOTE: If X2-C signalling transport is shared among multiple interface instances, the value of the en-gNB UE X2AP ID is allocated so that it can be associated with an X2-C interface instance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| en-gNB UE X2AP ID | M |  | INTEGER (0.. 232 -1) |  |

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SgNB Security Key | M |  | BIT STRING (SIZE(256)) | The S-KgNB which is provided by the MeNB, see TS 33.401 [18]. |

### 9.2.102 Target SgNB ID Information

This IE contains the target SgNB ID used by MeNB to find the target en-gNB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Target SgNB ID | M |  | Global en-gNB ID  9.2.112 |  |

### 9.2.103 SCG Configuration Query

The *SCG Configuration Query* IE is used to request the en-gNB to provide current SCG configuration.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SCG Configuration Query | M |  | ENUMERATED (True, …) |  |

### 9.2.104 Delivery Status

This IE defines the Delivery Status IE of RRC Transfer message.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Highest successfully delivered NR PDCP Sequence Number | M | 0..212-1 | INTEGER (0..212-1) | Highest successfully delivered NR PDCP SN, as defined in 38.323 [33]. | – |  |

### 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.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| NRARFCN | M |  | INTEGER (0..maxNRARFCN) | 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. | – |  |
| **Frequency Band List** |  | *1* |  |  | – |  |
| **>Frequency Band Item** |  | *1..<maxnoofNrCellBands>* |  |  |  |  |
| >>NR Frequency Band | M |  | INTEGER (1.. 1024, ...) | 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. | – |  |
| **>>Supported SUL band List** |  | *0..<maxnoofNrCellBands>* |  |  | – |  |
| >>>Supported SUL band Item | M |  | INTEGER (1.. 1024, ...) | 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. | – |  |
| SUL Information | O |  | 9.2.123 |  | – |  |
| Frequency Shift 7p5khz | O |  | ENUMERATED (false, true, ...) | Indicate whether the value of Δshift is 0kHz or 7.5kHz when calculating FREF,shift as defined in Section 5.4.2.1 of TS 38.104 [37]. | YES | ignore |

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

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| NR Encryption Algorithms | M |  | BIT STRING (SIZE(16, …)) | Each position in the bitmap represents an encryption algorithm:  "all bits equal to 0" – UE supports no other NR algorithm than NEA0,  "first bit" – 128-NEA1,  "second bit" – 128-NEA2,  "third bit" – 128-NEA3,  other bits reserved for future use. Value '1' indicates support and value '0' indicates no support of the algorithm.  Algorithms are defined in TS 33.401 [18]. |
| NR Integrity Protection Algorithms | M |  | BIT STRING (SIZE(16, …)) | Each position in the bitmap represents an integrity protection algorithm:  "all bits equal to 0" – UE supports no other NR algorithm than NIA0,  "first bit" – 128-NIA1,  "second bit" – 128-NIA2,  "third bit" – 128-NIA3,  other bits reserved for future use.  Value '1' indicates support and value '0' indicates no support of the algorithm.  Algorithms are 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.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| PDCP at SgNB | M |  | ENUMERATED (present, not present) |  | – |  |
| MCG resources | M |  | ENUMERATED (present, not present) |  | – |  |
| SCG resources | M |  | ENUMERATED (present, not present) |  | – |  |

### 9.2.109 PDCP Change Indication

The *PDCP Change Indication* IEis 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]).

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| PDCP Change Indication | M |  | ENUMERATED (S-KgNB update required, PDCP data recovery required, …) | The value of S-KgNB update required indicates that the security key in en-gNB needs to be updated.  The value of PDCP data recovery required indicates that MeNB needs to perform PDCP data recovery. |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| NR-PCI | M |  | INTEGER (0..1007) | NR Physical Cell ID | – |  |
| Cell ID | M |  | NR CGI 9.2.111 |  | – |  |
| 5GS-TAC | O |  | OCTET STRING (3) | Broadcast 5GS Tracking Area Code.  If this IE is included, the receiving node may assume that the NR cell provides 5GS service and is eligible as inter-system HO target candidate. | – |  |
| Configured TAC | O |  | OCTET STRING (2) | 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]. | – |  |
| **Served PLMNs** |  | *1..<maxnoofBPLMNs>* |  | Broadcast PLMNs in SIB1 associated to the NR Cell Identity in the *Cell ID* IE. If more than maxnoofBPLMNs are needed for NR, they are provided by the *Additional PLMNs* IE. | – |  |
| >PLMN Identity | M |  | 9.2.4 |  | – |  |
| CHOICE *NR-Mode-Info* | M |  |  |  | – |  |
| *>FDD* |  |  |  |  |  |  |
| **>>FDD Info** |  | *1* |  |  | – |  |
| >>>UL FreqInfo | M |  | NR Frequency Info  9.2.106 | This IE is ignored for NR operating bands for which uplink range of NREF is not defined in section 5.4.2.3 of TS 38.104 [37]. | – |  |
| >>>DL FreqInfo | M |  | NR Frequency Info  9.2.106 |  | – |  |
| >>>UL Transmission Bandwidth | M |  | NR Transmission Bandwidth  9.2.114 | This IE is ignored for NR operating bands for which uplink range of NREF is not defined in section 5.4.2.3 of TS 38.104 [37]. | – |  |
| >>>DL Transmission Bandwidth | M |  | NR Transmission Bandwidth  9.2.114 |  | – |  |
| >>>UL Carrier List | O |  | NR Carrier List  9.2.168 | If included, the *UL Transmission Bandwidth* IE shall be ignored. | YES | ignore |
| >>>DL Carrier List | O |  | NR Carrier List  9.2.168 | If included, the *DL Transmission Bandwidth* IE shall be ignored. | YES | ignore |
| *>TDD* |  |  |  |  |  |  |
| **>>TDD Info** |  | *1* |  |  | – |  |
| >>>NRFreqInfo | M |  | NR Frequency Info  9.2.106 |  | – |  |
| >>>Transmission Bandwidth | M |  | NR Transmission Bandwidth  9.2.114 |  | – |  |
| >>>TDD UL-DL Configuration Common NR | O |  | OCTET STRING | The *tdd-UL-DL-ConfigurationCommon* IE in TS 38.331 [31] | YES | ignore |
| >>>Carrier List | O |  | NR Carrier List  9.2.168 | If included, the *Transmission Bandwidth* IE shall be ignored. | YES | ignore |
| >>>Intended TDD DL-UL Configuration NR | O |  | OCTET STRING | Contains the *Intended TDD DL-UL Configuration NR* IE as defined in TS 38.423 [49]. | YES | ignore |
| Measurement Timing Configuration | M |  | OCTET STRING | Contains the *MeasurementTimingConfiguration* inter-node message for the served cell, as defined in TS 38.331 [31]. | – |  |
| **Additional PLMNs** |  | *0..<maxnoofAdditionalPLMNs>* |  | Additional PLMNs in addition to the Served PLMNs | YES | reject |
| >PLMN Identity | M |  | 9.2.4 |  | – |  |
| **Broadcast PLMN Identity Info List NR** |  | *0..<maxnoofextBPLMNs>* |  | This IE corresponds to the *PLMN-IdentityInfoList* IE in *SIB1* as specified in TS 38.331 [31]. All PLMN Identities and associated information contained in the *PLMN-IdentityInfoList* IE are included and provided in the same order as broadcast in SIB1. | YES | ignore |
| **>Broadcast PLMNs** |  | *1..<maxnoofextBPLMNs>* |  | Broadcast PLMN IDs in SIB1 associated to the *NR Cell Identity* IE | – |  |
| >>PLMN Identity | M |  | 9.2.4 |  | – |  |
| >5GS-TAC | O |  | OCTET STRING (3) |  | – |  |
| >NR Cell Identity | M |  | BIT STRING (SIZE(36)) |  | – |  |
| SSB Positions In Burst | O |  | 9.2.169 |  | YES | ignore |
| NR Cell PRACH Configuration | O |  | OCTET STRING | Containing 9.3.1.139 NR Cell PRACH Configuration as of TS 38.473 [44]. | YES | ignore |
| CSI-RS Transmission Indication | O |  | ENUMERATED {activated, deactivated, ...} | This IE indicates the CSI-RS transmission status of the given cell. | YES | ignore |
| SFN Offset | O |  | 9.2.175 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofBPLMNs | Maximum no. of broadcast PLMN Ids. Value is 6. |
| maxnoofAdditionalPLMNs | Maximum no. additional PLMN Ids. Value is 6. |
| maxnoofextBPLMNs | Maximum no. of extended broadcast PLMN Ids. Value is 12. |

### 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]).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| PLMN Identity | M |  | 9.2.4 |  |
| NR Cell Identity | M |  | BIT STRING (36) | 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. |

### 9.2.112 Global en-gNB ID

This IE is used to globally identify an en-gNB (see TS 37.340 [32]).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| PLMN Identity | M |  | 9.2.4 |  |
| CHOICE *en-gNB ID* | M |  |  |  |
| *>en-gNB ID* |  |  |  |  |
| >>en-gNB ID | M |  | BIT STRING (SIZE(22..32)) | Equal to the leftmost bits of the *NR Cell Identity* IE contained in the *NR CGI* IE of each cell served by the en-gNB. |

### 9.2.113 Void

### 9.2.114 NR Transmission Bandwidth

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| NR SCS | M |  | ENUMERATED (scs15, scs30, scs60, scs120, …) | The values scs15, scs30, scs60 and scs120 corresponds to the sub carrier spacing in TS 38.104 [37]. |
| NR NRB | M |  | ENUMERATED (nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121, nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...) | This IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "NRB" (TS 38.104 [37]). The values nrb11, nrb18, etc. correspond to the number of resource blocks "NRB" 11, 18, etc. |

### 9.2.115 Cell Assistance Information

The *Cell Assistance Information* IE is used by the eNB to request information about NR cells.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| CHOICE Cell Assistance Type | M |  |  | This IE may be refined. |
| >*Limited List* |  |  |  |  |
| **>>List of Requested NR Cells** |  | *1 .. < maxCellinengNB >* |  | Included when the eNB requests a limited list of served NR cells. |
| >>>NR CGI | M |  | 9.2.111 | NR cell for which served NR cell information is requested. |
| >*Full List* |  |  |  |  |
| >>Complete Information Request Indicator | M |  | ENUMERATED (allServedNRCells, …) | Included when the eNB requests the complete list of served NR cells. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellinengNB | Maximum no. cells that can be served by an en-gNB. Value is 16384. |

### 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 or sidelink resource utilisation between the MeNB and the en-gNB.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| EUTRA Cell ID | M |  | ECGI  9.2.14 | This IE indicates the PCell. | – |  |
| UL Coordination Information | M |  | BIT STRING (6..4400, …) | Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "PCell resource not intended to be used for transmission by the sending node", value "1" indicates "PCell resource intended to be used for transmission by the sending node". 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 or SL subframes for sidelink transmission.  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 .  is defined in TS 36.211 [10].  The UL Coordination Information is continuously repeated. | – |  |
| DL Coordination Information | O |  | BIT STRING (6..4400, …) | Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "PCell resource not intended to be used for transmission by the sending node", value "1" indicates "PCell resource intended to be used for transmission by the sending node". 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 .  is defined in TS 36.211 [10].  The DL Coordination Information is continuously repeated. | – |  |
| NR CGI | O |  | 9.2.111 | This IE indicates the assumed PSCell. | YES | ignore |
| MeNB Coordination Assistance Information | O |  | 9.2.139 |  | YES | reject |

### 9.2.117 SgNB Resource Coordination Information

The *SgNB Resource Coordination Information* IE indicates resources within the bandwidth of the PCell which are not available for use by the MeNB and is used at the MeNB to coordinate resource utilisation between the en-gNB and the MeNB.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| NR CGI | M |  | 9.2.111 | This IE indicates the PSCell. | – |  |
| UL Coordination Information | M |  | BIT STRING (6..4400, …) | Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "PCell resource not intended to be used for transmission by the sending node", value "1" indicates "PCell resource intended to be used for transmission by the sending node". 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  . is defined in TS 36.211 [10].  The UL Coordination Information is continuously repeated. | – |  |
| DL Coordination Information | O |  | BIT STRING (6..4400, …) | Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "PCell resource not intended to be used for transmission by the sending node", value "1" indicates "PCell resource intended to be used for transmission by the sending node". 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 .  is defined in TS 36.211 [10].  The DL Coordination Information is continuously repeated. | – |  |
| EUTRA Cell ID | O |  | ECGI  9.2.14 | Reference cell for *UL Coordination Information* IE and *DL Coordination Information* IE. | YES | ignore |
| SgNB Coordination Assistance Information | O |  | 9.2.140 |  | YES | reject |

### 9.2.118 UL Configuration

This IE indicates how the UL PDCP is configured for the assisting node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| UL UE Configuration | M |  | ENUMERATED (no-data, shared, only, ...) | Indicates how the UE uses the UL at the assisting node. |

### 9.2.119 RLC Mode

The *RLC Mode* IE indicates the RLC Mode used for an E-RAB.

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

### 9.2.120 Secondary RAT Usage Report List

This IE provides information on the NR resources used with EN-DC as specified in TS 37.340 [32].

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| **Secondary RAT usage report Item** |  | 1 .. < maxnoofbearers > |  |  | EACH | reject |
| >E-RAB ID | M |  | 9.2.23 |  | - |  |
| >Secondary RAT Type | M |  | ENUMERATED (nR, …, nR-unlicensed) |  | - |  |
| >**E-RAB Usage Report List** |  | 1 |  |  | - |  |
| >>**E-RAB Usage Report Item** |  | 1.. <maxnooftimeperiods> |  |  | EACH | ignore |
| >>>Start timestamp | M |  | OCTET STRING (SIZE(4)) | UTC time encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [35]. It indicates the start time of the collecting period of the included *Usage Count UL* IE and *Usage Count DL* IE. | - |  |
| >>>End timestamp | M |  | OCTET STRING (SIZE(4)) | UTC time encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [35]. It indicates the end time of the collecting period of the included *Usage Count UL* IE and *Usage Count DL* IE. | - |  |
| >>>Usage count UL | M |  | INTEGER (0..264-1) | The unit is: octets. | - |  |
| >>>Usage count DL | M |  | INTEGER (0..264-1) | The unit is: octets. | - |  |

| Range bound | Explanation |
| --- | --- |
| maxnoofbearers | Maximum no. of E-RABs. Value is 256. |
| maxnooftimeperiods | Maximum no. of time reporting periods. Value is 2. |

### 9.2.121 UE Application layer measurement configuration

The IE defines configuration information for the QoE Measurement Collection (QMC) function.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Container for application layer measurement configuration | M |  | Octet string (1..1000) | Indicates application layer measurement configuration, see Annex L in [36]. | - |  |
| CHOICE *Area Scope of QMC* | M |  |  |  | - |  |
| >*Cell based* |  |  |  |  |  |  |
| >>**Cell ID List for QMC** |  | *1 .. <maxnoofCellIDforQMC>* |  |  |  |  |
| >>>ECGI | M |  | 9.2.14 |  | - |  |
| >*TA based* |  |  |  |  |  |  |
| >>**TA List for QMC** |  | *1 .. <maxnoofTAforQMC>* |  |  |  |  |
| >>>TAC | M |  | OCTET STRING (2) | Tracking Area Code.The TAI is derived using the current serving PLMN. | - |  |
| >*TAI based* |  |  |  |  | - |  |
| >>**TAI List for QMC** |  | *1 .. <maxnoofTAforQMC>* |  |  | - |  |
| >>>TAC | M |  | OCTET STRING (2) | Tracking Area Code. |  |  |
| >>>PLMN Identity | M |  | 9.2.4 |  |  |  |
| >*PLMN area based* |  |  |  |  |  |  |
| >>**PLMN List for QMC** |  | *1 .. <maxnoofPLMNforQMC>* |  |  |  |  |
| >>>PLMN Identity | M |  | 9.2.4 |  | - |  |
| Service Type | M |  | ENUMERATED  (QMC for streaming service, QMC for MTSI service, ...) | This IE indicates the service type of UE application layer measurements. | - |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| 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].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| DRB ID | M |  | INTEGER (1.. 32) |  |

### 9.2.123 SUL Information

This IE provides information about the SUL carrier.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| SUL ARFCN | M |  | INTEGER (0..maxNRARFCN) | 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 SUL carrier. Its lowest subcarrier is also known as Point A. | – |  |
| SUL Transmission Bandwidth | M |  | NR Transmission Bandwidth  9.2.114 |  | – |  |
| Carrier List | O |  | NR Carrier List  9.2.168 | If included, the SUL Transmission Bandwidth IE shall be ignored. | YES | ignore |
| Frequency Shift 7p5khz | O |  | ENUMERATED (false, true, ...) | Indicate whether the value of Δshift is 0kHz or 7.5kHz when calculating FREF,shift as defined in Section 5.4.2.1 of TS 38.104 [37]. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxNRARFCN | Maximum value of NRARFCNs. Value is 3279165. |

### 9.2.124 Packet Loss Rate

This IE indicates the packet loss rate.

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

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Activation SFN | M |  | INTEGER (0..1023) | Indicates from which SFN of the receiving node the resource allocation is valid. |  |  |
| **Protected Resource List** |  | *1* |  | 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. | YES | ignore |
| **>Protected Resource List Item** |  | *1..<maxnoofProtectedResourcePatterns>* |  | Each item describes one transmission pattern. A pattern may comprise several control signals. | - |  |
| >>Resource Type | M |  | ENUMERATED (downlinknonCRS,CRS,uplink…) | Indicates whether the protected resource is E-UTRA DL non-CRS, E-UTRA CRS or E-UTRA UL. | - |  |
| >>Intra-PRB Protected Resource Footprint | M |  | BIT STRING (84, ...) | The bitmap of REs occupied by the protected signal within one PRB. Each position in the bitmap represents an RE in one PRB; value “0” indicates "resource not protected", value “1” indicates "resource protected ". 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 and the length of PRB in time dimension, measured in REs. is defined in TS 36.211 [10]. The intra-PRB pattern consisting of all "1"s is equivalent to PRB-level granularity. |  |  |
| >>Protected Footprint Frequency Pattern | M |  | BIT STRING(6..110, ...) | 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 "0" indicates " Intra-PRB Protected Resource Footprint does not appear in PRB", value "1" indicates "Intra-PRB Protected Resource Footprint appears in PRB". The length of the bit string equals the number of PRBs in the carrier bandwidth. | - |  |
| **>>Protected Footprint Time Pattern** | M |  |  | The description of time periodicity of the Intra-PRB Protected Resource Footprint. |  |  |
| >>>Protected Footprint Time-periodicity | M |  | INTEGER(1..320, ...) | Periodicity with which the periodic Intra-PRB Protected Resource Footprint repeats in time-dimension (1= every PRB (i.e. slot), 2=every other PRB (i.e. slot) etc. | - |  |
| >>>Protected Footprint Start Time | M |  | INTEGER(1..20, ...) | The time-position of the PRB inside the frame in which the periodic Intra-PRB Protected Resource Footprint appears for the first time. The value "1" corresponds to the receiving node’s slot 0 in subframe 0 in the receiving node’s radio frame where SFN = Activation SFN. | - |  |
| MBSFN Control Region Length | O |  | INTEGER(0..3) | Length of control region in MBSFN subframes. Expressed in REs, in the time dimension. |  |  |
| PDCCH Region Length | M |  | INTEGER(1..3) | Length of PDCCH region in regular subframes. Expressed in REs, in the time dimension. |  |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofProtectedResourcePatterns | Maximum no. protected resource patterns. Value is 16. |

### 9.2.126 Data Traffic Resource Indication

This IE indicates the intended data traffic resource allocation for E-UTRA - NR Cell Resource Coordination.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Activation SFN | M |  | INTEGER (0..1023) | Indicates from which SFN of the receiving node the agreement is valid. |  |  |
| CHOICE *Shared Resource Type* | M |  |  |  | - |  |
| >*UL Only Sharing* |  |  |  |  |  |  |
| >>UL Resource Bitmap | M |  | Data Traffic Resources 9.2.127 |  | - |  |
| >*UL and DL Sharing* |  |  |  |  |  |  |
| >>CHOICE *UL Resources* | M |  |  |  |  |  |
| >>>*Unchanged* |  |  | NULL |  |  |  |
| >>>*Changed* |  |  |  |  |  |  |
| >>>>UL Resource Bitmap | M |  | Data Traffic Resources 9.2.127 |  |  |  |
| >>CHOICE *DL* Resources | M |  |  |  |  |  |
| >>>Unchanged |  |  | NULL |  |  |  |
| >>>Changed |  |  |  |  |  |  |
| >>>>DL Resource Bitmap | M |  | Data Traffic Resources 9.2.127 |  |  |  |
| Reserved Subframe Pattern | O |  | 9.2.128 | Indicates subframes in which the resource allocation does not hold. |  |  |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Data Traffic Resources | M |  | BIT STRING (6..17600) | The indication of resources allocated to E-UTRA PDSCH/PUSCH. Each position in the bit string 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 first bit of the bit string corresponds to the PRB pair 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. The first position of the Data Traffic Resources 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   or , defined in TS 36.211 [10].** |

### 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.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Subframe Type | M |  | ENUMERATED(MBSFN,non-MBSFN, …) | Indicates what type of non-regular subframes the *Reserved Subframe Pattern* refers to (e.g. MBSFN). |
| Reserved Subframe Pattern | M |  | BIT STRING (10..160) | Each position in the bitmap represents a subframe. Value ‘0’ indicates "regular subframe". Value '1' indicates "reserved subframe". For MBSFN subframes, the exception refers only to the non-control region of the subframe. The bit string may span across multiple contiguous subframes. 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. |
| MBSFN Control Region Length | O |  | INTEGER(0..3) | Length of control region in MBSFN subframes. Expressed in REs, in the time dimension. |

### 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].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Aerial UE subscription information | M |  | ENUMERATED (allowed, not allowed, ...) |  |

### 9.2.130 User plane traffic activity report

This IE is used to indicate user plane traffic activity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| User plane traffic activity report | M |  | ENUMERATED (inactive, re-activated, …) | "re-activated" shall be only set after "inactive" has been reported for the concerned reporting object |

### 9.2.131 RLC Status

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

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

### 9.2.132 RRC config indication

This IE is used to indicate the type of RRC configuration used at the en-gNB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| RRC config indication | M |  | ENUMERATED (full config, delta config, ...) |  |

### 9.2.133 PDCP SN Length

The *PDCP SN Length* IE is used to indicate the PDCP SN length configuration of the bearer.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| PDCP SN Length | M |  | ENUMERATED (12bits, 18bits, …) | This IE indicates the PDCP sequence number size. |

### 9.2.134 Bluetooth Measurement Configuration

This IE defines the parameters for Bluetooth measurement collection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Bluetooth Measurement Configuration | M |  | ENUMERATED (Setup, …) |  |
| **Bluetooth Measurement Configuration Name List** |  | *0..1* |  | This IE is present if the *Bluetooth Measurement Configuration* IE is set to "Setup". |
| **>Bluetooth Measurement Configuration Name Item** |  | *1 .. <maxnoofBluetoothName>* |  |  |
| >>Bluetooth Measurement Configuration Name | M |  | OCTET STRING (SIZE (1..248)) |  |
| BT RSSI | O |  | ENUMERATED (True, …) | In case of Immediate MDT, it corresponds to M8 measurement as defined in 37.320 [31]. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofBluetoothname | Maximum no. of Bluetooth local name used for Bluetooth measurement collection, the maximum value is 4. |

### 9.2.135 WLAN Measurement Configuration

This IE defines the parameters for WLAN measurement collection.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| WLAN Measurement Configuration | M |  | ENUMERATED (Setup, …) |  |
| **WLAN Measurement Configuration Name List** |  | *0..1* |  | This IE is present if the *WLAN Measurement Configuration* IE is set to "Setup". |
| **>WLAN Measurement Configuration Name Item** |  | *1 .. <maxnoofWLANName>* |  |  |
| >>WLAN Measurement Configuration Name | M |  | OCTET STRING (SIZE (1..32)) |  |
| WLAN RSSI | O |  | ENUMERATED (True, …) | In case of Immediate MDT, it corresponds to M8 as defined in 37.320 [31]. |
| WLAN RTT | O |  | ENUMERATED (True, …) | For Immediate MDT, it corresponds to M9 as defined in 37.320 [31]. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofWLANname | Maximum no. of WLAN SSID used for WLAN measurement collection, the maximum value is 4. |

### 9.2.136 Subscription Based UE Differentiation Information

This IE is generated by the MME based on the UE subscription information, it provides the Subscription Based UE differentiation Information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Periodic Communication Indicator | O |  | ENUMERATED(periodically, on demand, …) | This IE indicates whether the UE communicates periodically or not, e.g. only on demand. |
| Periodic Time | O |  | INTEGER (1..3600, …) | This IE indicates the interval time of periodic communication, the unit is: second |
| **Scheduled Communication Time** |  | *0..1* |  | This IE indicates the time zone and day of the week when the UE is available for communication. |
| >Day of Week | O |  | BIT STRING (SIZE(7)) | If Day-Of-Week is not provided this shall be interpreted as every day of the week.  Each position in the bitmap represents a day of the week:  first bit = Mon, second bit =Tue, third bit =Wed, and so on. Value ‘1’ indicates ‘scheduled. Value ‘0’ indicates ‘not scheduled’. |
| >Time of Day Start | O |  | INTEGER (0..86399, …) | This IE indicates the time to start of the day, each value represent the corresponding second since 00:00 of the day.  If Time-Of-Day-Start is not provided, starting time shall be set to start of the day(s) indicated by Day-Of-Week. |
| >Time of Day End | O |  | INTEGER (0..86399, …) | This IE indicates the time to start of the day, each value represent the corresponding second since 00:00 of the day. The value of this IE should be bigger than the value of *Time of Day Start* IE.  If Time-Of-Day-End is not provided, ending time is end of the day(s) indicated by Day-Of-Week. |
| Stationary Indication | O |  | ENUMERATED(stationary, mobile, …) |  |
| Traffic Profile | O |  | ENUMERATED(single packet, dual packets, multiple packets, …) | "single packet" indicates single packet transmission (UL or DL),  "dual packets" indicates dual packet transmission (UL with subsequent DL, or DL with subsequent UL),  "multiple packets" indicates multiple packets transmission. |
| Battery Indication | O |  | ENUMERATED(battery powered, battery powered not rechargeable or replaceable, not battery powered, …) | "battery powered" indicates that the UE is battery powered and the battery is rechargeable/replaceable, "battery powered not rechargeable or replaceable" indicates that the UE is battery powered but the battery is not rechargeable/replaceable, "not battery powered" indicates that the UE is not battery powered. |

### 9.2.137 Duplication activation

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

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

### 9.2.138 LCID

This IE uniquely identifies a LCID for the associated DRB.

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

### 9.2.139 MeNB Coordination Assistance Information

The *MeNB Coordination Assistance Information* IE is provided by the MeNB and used by the SgNB to determine further coordination of resource utilisation between the en-gNB and the MeNB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| MeNB Coordination Assistance Information | M |  | ENUMERATED(Coordination Not Required, …) | The absence of this IE indicates that the resource coordination is required. |

### 9.2.140 SgNB Coordination Assistance Information

The *SgNB Coordination Assistance Information* IE is provided by the SgNB and used by the MeNB to determine further coordination of resource utilisation between the en-gNB and the MeNB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SgNB Coordination Assistance Information | M |  | ENUMERATED(Coordination Not Required, …) | The absence of this IE indicates that the resource coordination is required. |

### 9.2.141 Desired Activity Notification Level

This IE contains information on which level activity notification shall be performed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Desired Activity Notification Level | O |  | ENUMERATED (None, E-RAB, UE-level, …) |  |

### 9.2.142 Location Information at SgNB

The *Location Information* *at SgNB* IE enables the SgNB to provide the MeNB with information that supports localisation of the UE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| PSCell ID | M |  | NR CGI 9.2.111 | PSCell of the UE | – |  |

### 9.2.143 Interface Instance Indication

The Interface Instance Indication identifies the interface instance the X2AP message is destined for.

NOTE: The Interface Instance Indication is allocated so that it can be associated with an X2-C interface instance. The Interface Instance Indication may identify more than one interface instance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Interface Instance Indication | M |  | INTEGER (0..255, ...) |  |

### 9.2.144 NB-IoT UL DL Alignment Offset

This IE is used to indicate the offset between the UL carrier frequency center with respect to DL carrier frequency center.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| NB-IoT UL DL Alignment Offset | M |  | ENUMERATED (-7.5, 0, 7.5, …) | Unit: kHz |

### 9.2.145 Lower Layer presence status change

This IE is used to indicate that lower layer resources’ presence status shall be changed. If the presence status is set to "release lower layers" or "suspend lower layers", PDCP entities, X2-U bearer resources, S1-U bearer resources and UE context information shall be kept.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Lower Layer presence status change | M |  | ENUMERATED (release lower layers, re-establish lower layers, suspend lower layers, resume lower layers ...) | "re-establish lower layers" shall be only set after "release lower layers" has been indicated.  “resume lower layers” shall restore SCG.  "resume lower layers" shall be only set after "suspend lower layers" has been indicated. |

### 9.2.146 Cell and Capacity Assistance Information

The *Cell and Capacity Assistance Information* IE is used by the eNB to request information about NR or E-UTRA cells and it includes information about cell list size capacity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Maximum Cell List Size | O |  | 9.2.147 |  |
| Cell Assistance Information | O |  | 9.2.115 |  |

### 9.2.147 Maximum Cell List Size

This IE indicates the maximum size the sending node can handle for a given list.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| Maximum Cell List Size | M |  | INTEGER (0..16384, …) |  |

### 9.2.148 Message Oversize Notification

This IE indicates the maximum number of cells that can be received in the *List of Served Cells* *NR* IE.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Maximum Cell List Size | M |  | 9.2.147 |  |  |  |

### 9.2.149 TNL Transport Layer Address Info

This IE is used for signalling IP addresses of IP-Sec endpoints used for establishment of IP-Sec tunnels.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **Transport UP Layer Addresses Info to Add List** |  | *0..1* |  |  |
| **>Transport UP Layer Addresses Info to Add Item** |  | *1..<maxnoofTLAs>* |  |  |
| >>IP-Sec Transport Layer Address | M |  | BIT STRING(1..160, ...) | Transport Layer Addresses for IP-Sec endpoint. |
| **>>GTP Transport Layer Addresses To Add List** |  | *0..1* |  |  |
| **>>>GTP Transport Layer Addresses To Add Item** |  | *1..<maxnoofGTPTLAs>* |  |  |
| >>>>GTP Transport Layer Address Info | M |  | BIT STRING (1..160, ...) | GTP Transport Layer Addresses for GTP end-points. |
| **Transport UP Layer Addresses Info to Remove List** |  | *0..1* |  |  |
| **>Transport UP Layer Addresses Info to Remove Item** |  | *1..<maxnoofTLAs>* |  |  |
| >>IP-Sec Transport Layer Address | M |  | BIT STRING (1..160, ...) | Transport Layer Addresses for IP-Sec endpoint. |
| **>>GTP Transport Layer Addresses To Remove List** |  | *0..1* |  |  |
| **>>>GTP Transport Layer Addresses To Remove Item** |  | *1..<maxnoofGTPTLAs>* |  |  |
| >>>>GTP Transport Layer Address Info | M |  | BIT STRING (1..160, ...) | GTP Transport Layer Addresses for GTP end-points. |

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

### 9.2.150 CP Transport Layer Information

This element is used to provide the transport layer information associated with EN-DC X2 control plane transport.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *CP Transport Layer Information* |  |  |  |  |
| >*Endpoint-IP-address* |  |  |  |  |
| >>Endpoint IP Address | M |  | BIT STRING (1..160, ...) |  |
| >*Endpoint-IP-address-and-port* |  |  |  |  |
| >>Endpoint IP Address | M |  | BIT STRING (1..160, ...) |  |
| >>Port Number | M |  | OCTET STRING (SIZE(2)) |  |

### 9.2.151 TNL Association Usage

This IE indicates the usage of the TNL association.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| TNL Association Usage | O |  | ENUMERATED (ue, non-ue, both, …) | Indicates whether the TNL association is only used for UE-associated signalling, or non-UE-associated signalling, or both. |

### 9.2.152 RAN UE NGAP ID

This IE uniquely identifies the UE association over the NG interface within the NG-RAN node, as specified in TS 38.413 [39].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| RAN UE NGAP ID | M |  | INTEGER (0..232 -1) |  |

### 9.2.153 EPC Handover Restriction List Container

This IE contains the *Handover Restriction List* IE specified in TS 36.413 [4] as received by the E-UTRAN from the EPC.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| EPC Handover Restriction List Container | M |  | OCTET STRING | The octets of the OCTET STRING are encoded according to the specifications of the Handover Restriction List IE specified in TS 36.413 [4]. |

### 9.2.154 DAPS Request Information

The *DAPS Indicator* IE indicates that the source eNB requests a DAPS HO for the concered E-RAB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DAPS Indicator | M |  | ENUMERATED (DAPS HO required, …) | Indicates that DAPS HO is requested |

### 9.2.155 DAPS Response Information

The *DAPS Response Indicator* IE indicates the response to a requested DAPS Handover for the concerned E-RAB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DAPS Response Indicator | M |  | ENUMERATED (DAPS HO accepted, DAPS HO not accepted, …) | Indicates that DAPS Handover is accepted or not. |

### 9.2.156 Maximum Number of CHO Preparations

This IE indicates the maximum number of concurrently prepared CHO candidate cells for a UE at a candidate target eNB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Maximum Number of CHO Preparations | M |  | INTEGER (1..8, ...) |  |

### 9.2.157 Ethernet Type

This IE is used to indicate that Ethernet data is expected.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Ethernet Type | M |  | ENUMERATED (True, …,) |  |

### 9.2.158 NR V2X Services Authorized

This IE provides information on the authorization status of the UE to use the NR sidelink for V2X services.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Vehicle UE | O |  | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Vehicle UE. |
| Pedestrian UE | O |  | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Pedestrian UE. |

### 9.2.159 NR UE Sidelink Aggregate Maximum Bit Rate

This IE provides information on the Aggregate Maximum Bitrate of the UE’s sidelink communication for NR V2X services.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| NR UE Sidelink Aggregate Maximum Bit Rate | M |  | Bit Rate 9.2.97 | Value 0 shall be considered as a logical error by the receiving eNB. |

### 9.2.160 PC5 QoS Parameters

This IE provides information on the PC5 QoS parameters of the UE’s sidelink communication for NR PC5.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **PC5 QoS Flow List** |  | *1* |  |  |
| **>PC5 QoS Flow Item** |  | *1..<maxnoofPC5QoSFlows>* |  |  |
| >>PQI | M |  | INTEGER (0..255, …) | PQI is a special 5QI as specified in TS 23.501 [9]. |
| >>**PC5 Flow Bit Rates** | O |  |  | Only applies for GBR QoS Flows. |
| >>>Guaranteed Flow Bit Rate | M |  | Bit Rate  9.2.11 | Guaranteed Bit Rate for the PC5 QoS flow. Details in TS 23.501 [9]. |
| >>>Maximum Flow Bit Rate | M |  | Bit Rate  9.2.11 | Maximum Bit Rate for the PC5 QoS flow. Details in TS 23.501 [9]. |
| >>Range | O |  | ENUMERATED (m50, m80, m180, m200, m350, m400, m500, m700, m1000, …) | Only applies for groupcast. |
| PC5 Link Aggregated Bit Rates | O |  | Bit Rate  9.2.11 | Only applies for non-GBR QoS Flows. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| *maxnoofPC5QoSFlows* | Maximum no. of PC5 QoS flows allowed towards one UE. Value is 2048. |

### 9.2.161 TNL Capacity Indicator

The *TNL Capacity Indicator* IE indicates the available capacity of the Transport Network experienced by the NR cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DL TNL Maximum Offered Capacity | M |  | INTEGER (1.. 16777216,...) | Maximum capacity offered by the transport portion of the cell in kbps |
| DL TNL Available Capacity | M |  | INTEGER (0.. 100,...) | Available capacity over the transport portion serving the cell in percentage relative to the *DL TNL Maximum Offered Capacity*.  Value 100 corresponds to the Maximum offered capacity. |
| UL TNL Maximum Offered Capacity | M |  | INTEGER (1.. 16777216…) | Maximum capacity offered by the transport portion of the cell in kbps |
| UL TNL Available Capacity | M |  | INTEGER (0.. 100,...) | Available capacity over the transport portion serving the cell in percentage relative to the *DL TNL Maximum Offered Capacity*.  Value 100 corresponds to the Maximum offered capacity. |

### 9.2.162 NR Radio Resource Status

The *NR Radio* *Resource Status* IE indicates the usage of the PRBs per cell and per SSB area for all traffic in Downlink and Uplink and the usage of PDCCH CCEs for Downlink and Uplink scheduling.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| **SSB Area Radio Resource Status List** |  | *1* |  |  |
| **>SSB Area Radio Resource Status Item** |  | *1..<maxnoofSSBAreas>* |  |  |
| >>SSB Index | M |  | 9.2.167 |  |
| >>SSB Area DL GBR PRB usage | M |  | INTEGER (0..100) | Per SSB area DL GBR PRB usage |
| >>SSB Area UL GBR PRB usage | M |  | INTEGER (0..100) | Per SSB area UL GBR PRB usage |
| >>SSB Area DL non-GBR PRB usage | M |  | INTEGER (0..100) | Per SSB area DL non-GBR PRB usage |
| >>SSB Area UL non-GBR PRB usage | M |  | INTEGER (0..100) | Per SSB area UL non-GBR PRB usage |
| >>SSB Area DL Total PRB usage | M |  | INTEGER (0..100) | Per SSB area DL Total PRB usage |
| >>SSB Area UL Total PRB usage | M |  | INTEGER (0..100) | Per SSB area UL Total PRB usage |
| >>DL scheduling PDCCH CCE usage | O |  | INTEGER (0..100) |  |
| >>UL scheduling PDCCH CCE usage | O |  | INTEGER (0..100) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| *maxnoofSSBAreas* | Maximum no. SSB Areas that can be served by a NG-RAN node cell. Value is 64. |

### 9.2.163 NR Composite Available Capacity Group

The *NR Composite Available Capacity Group* IE indicates the overall available resource level per cell and per SSB area in the cell in Downlink and Uplink.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Composite Available Capacity Downlink | M |  | NR Composite Available Capacity  9.2.164 | For the Downlink |
| Composite Available Capacity Uplink | M |  | NR Composite Available Capacity  9.2.164 | For the Uplink |

### 9.2.164 NR Composite Available Capacity

The *NR Composite Available Capacity* IE indicates the overall available resource level in the cell in either Downlink or Uplink.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Cell Capacity Class Value | O |  | NR Cell Capacity Class Value  9.2.165 |  |
| Capacity Value | M |  | NR Capacity Value  9.2.166 |  |

### 9.2.165 NR Cell Capacity Class Value

The *NR Cell Capacity Class Value* IE indicates the value that classifies the cell capacity with regards to the other cells. The *NR Cell Capacity Class Value* IEonly indicates resources that are configured for traffic purposes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| NR Capacity Class Value | M |  | INTEGER (1..100,...) | 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. |

### 9.2.166 NR Capacity Value

The *NR Capacity Value* IE indicates the amount of resources per cell and per SSB area that are available relative to the total en-gNB resources. The capacity value should be measured and reported so that the minimum en-gNB resource usage of existing services is reserved according to implementation. The *NR Capacity Value* IE can be weighted according to the ratio of cell capacity class values, if available.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Capacity Value | M |  | INTEGER (0..100) | Value 0 shall indicate no available capacity, and 100 shall indicate maximum available capacity with respect to the whole cell. Capacity Value should be measured on a linear scale. |
| **SSB Area Capacity Value List** |  | *0..1* |  |  |
| **>SSB Area Capacity Value Item** |  | *1..<maxnoofSSBAreas>* |  |  |
| >>SSB Index | M |  | 9.2.167 |  |
| >>SSB Area Capacity Value | M |  | INTEGER (0..100) | Value 0 shall indicate no available capacity, and 100 shall indicate maximum available capacity . SSB Area Capacity Value should be measured on a linear scale. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| *maxnoofSSBAreas* | Maximum no. SSB Areas that can be served by a NG-RAN node cell. Value is 64. |

### 9.2.167 SSB Index

The *SSB Index* IE identify an SSB area of an NR cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| SSB Index | M |  | INTEGER (0..63) |  |

### 9.2.168 NR Carrier List

This IE indicates the SCS-specific carriers per TDD, per DL, per UL or per SUL of an NR cell.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **NR Carrier Item** |  | *1..<maxnoofNRSCSs>* |  |  |
| >NR SCS | M |  | ENUMERATED (scs15, scs30, scs60, scs120, …) | SCS for the corresponding carrier. |
| >Offset to Carrier | M |  | INTEGER (0.. 2199, ...) | Offset in frequency domain between Point A (lowest subcarrier of common RB 0) and the lowest usable subcarrier on this carrier in number of PRBs (using the *NR SCS* IE defined for this carrier). The maximum value corresponds to 275×8−1. See TS 38.211 [42], clause 4.4.2. |
| >Carrier Bandwidth | M |  | INTEGER (1.. maxnoofNRPhysicalResourceBlocks, ...) | Width of this carrier in number of PRBs (using the *NR SCS* IE defined for this carrier). See TS 38.211 [42], clause 4.4.2. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofNRSCSs | Maximum no. of SCS-specific carriers per TDD, per DL, per UL or per SUL of an NR cell. Value is 5. |
| maxnoofNRPhysicalResourceBlocks | Maximum no. of Physical Resource Blocks of an NR Cell. Value is 275. |

### 9.2.169 SSB Positions In Burst

Indicates the time domain positions of the transmitted SS-blocks in a half frame with SS/PBCH blocks as defined in TS 38.213 [43], clause 4.1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE *ssb-PositionsInBurst* | M |  |  | The first/ leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not transmitted while value 1 indicates that the corresponding SS/PBCH block is transmitted. |
| >*ShortBitmap* |  |  |  |  |
| >>ShortBitmap | M |  | BIT STRING (SIZE(4)) |  |
| >*MediumBitmap* |  |  |  |  |
| >>MediumBitmap | M |  | BIT STRING (SIZE(8)) |  |
| >*LongBitmap* |  |  |  |  |
| >>LongBitmap | M |  | BIT STRING (SIZE(64)) |  |

### 9.2.170 NPRACH Configuration

This IE indicates the NPRACH Configuration.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| CHOICE *FDDorTDD* | M |  |  |  |
| >*FDD* |  |  |  |  |
| >>NPRACH-CP-Length | M | ENUMERATED {us66dot7, us266dot7, …} |  |  |
| >>Anchor Carrier NPRACH Configuration | M |  | OCTET STRING | Includes the *NPRACH-ParametersList-NB-r13* IE as defined in 6.7.3.2 ofTS 36.331 [9]. |
| >>Anchor Carrier EDT NPRACH Configuration | O |  | OCTET STRING | Includes the *NPRACH-ParametersList-NB-r14* IE as defined in 6.7.3.2 ofTS 36.331 [9]. |
| >>Anchor Carrier Format 2 NPRACH Configuration | O |  | OCTET STRING | Includes the *NPRACH-ParametersListFmt2-NB-r15* IE as defined in 6.7.3.2 ofTS 36.331 [9] |
| >>Anchor Carrier Format 2 EDT NPRACH Configuration | O |  | OCTET STRING | Includes the *NPRACH-ParametersListFmt2-NB-r15* IE as defined in 6.7.3.2 ofTS 36.331 [9] |
| >>Non Anchor Carrier NPRACH Configuration | O |  | OCTET STRING | Includes the *UL-ConfigCommonList-NB-r14* IE as defined in 6.7.3.1 ofTS 36.331 [9]. |
| >>Non Anchor Carrier Format 2 NPRACH Configuration | O |  | OCTET STRING | Includes the *UL-ConfigCommonList-NB-v1530* IE as defined in 6.7.3.1 ofTS 36.331 [9]. |
| >*TDD* |  |  |  |  |
| >>nprach-PreambleFormat | M | ENUMERATED {fmt0, fmt1, fmt2, fmt0-a, fmt1-a, …} |  |  |
| >>Anchor Carrier NPRACH Configuration TDD | M |  | OCTET STRING | Includes the *NPRACH-ParametersListTDD-NB-r15* IE as defined in 6.7.3.2 ofTS 36.331 [9] |
| **>>Non Anchor Carrier Frequency Configuration list** |  | *0..< maxnoofNonAnchorCarrierFreqConfig*> |  |  |
| >>> Non Anchor Carrier Frequency | M |  | OCTET STRING | Includes the *DL-CarrierConfigCommon-NB-r14* IE as defined in 6.7.3.2 ofTS 36.331 [9] |
| >>Non Anchor Carrier NPRACH Configuration TDD | O |  | OCTET STRING | Includes the *UL-ConfigCommonListTDD-NB-r15* IE as defined in 6.7.3.1 ofTS 36.331 [9]. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofNonAnchorCarrierFreqConfig | Maximum no. of non-Anchor Carrier Frequency Configurations. Value is 15. |

### 9.2.171 UE Radio Capability ID

This IE contains the UE Capability ID as defined in TS 23.003[29].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| UE Radio Capability ID | M |  | OCTET STRING |  |

### 9.2.172 QoS Mapping Information

This IE indicates the DSCP and/or IPv6 Flow Label field(s) of IP packets sent in the corresponding GTP-U tunnel for IAB.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DSCP | O |  | BIT STRING (SIZE(6)) |  |
| Flow label | O |  | BIT STRING (SIZE(20)) |  |

### 9.2.173 UE Radio Capability

This IE contains UE Radio Capability information.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| UE Radio Capability | M |  | OCTET STRING | Includes the *UERadioAccessCapabilityInformation* message as defined in 10.2.2 ofTS 36.331 [9]. |

### 9.2.174 URI

This IE is a URI.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| URI | M |  | VisibleString | String representing URI (Uniform Resource Identifier) |

### 9.2.175 SFN Offset

This IE contains the time offset between an absolute time reference and the SFN0 start. The IE is calculated assuming that the SFN transmission started at the absolute time reference. The absolute time reference chosen is 1980-01-06 T00:00:19 International Atomic Time (TAI).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| SFN Time Offset | M |  | BIT STRING (SIZE(24)) | Time offset in microseconds between the absolute time reference "1980-01-06 T00:00:19 International Atomic Time (TAI)” and the SFN0 start. The maximum usable value is (1024\*10^4-1). Values higher than the maximum are discarded. |  |  |

### 9.2.176 Global RAN Node ID

This IE is used to globally identify an NG-RAN node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *NG-RAN node* | M |  |  |  |
| *>gNB* |  |  |  |  |
| >>Global gNB ID | M |  | Global en-gNB ID  9.2.112 |  |

### 9.2.177 (void)

### 9.2.178 (void)

### 9.2.179 (void)

### 9.2.180 (void)

### 9.2.181 (void)

### 9.2.182 (void)

### 9.2.183 (void)

### 9.2.184 IAB Authorized

This IE provides information about the authorization status of the IAB-node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| IAB Authorized | M |  | ENUMERATED (authorized, not authorized, ...) | Indicates the IAB-node authorization status. |

## 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 inter-operability.

- 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

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Elementary Procedure definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

X2AP-PDU-Descriptions {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

eps-Access (21) modules (3) x2ap (2) version1 (1) x2ap-PDU-Descriptions (0) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IE parameter types from other modules.

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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,

ENDCPartialResetRequired,

ENDCPartialResetConfirm,

EUTRANRCellResourceCoordinationRequest,

EUTRANRCellResourceCoordinationResponse,

SgNBActivityNotification,

ENDCX2RemovalRequest,

ENDCX2RemovalResponse,

ENDCX2RemovalFailure,

DataForwardingAddressIndication,

GNBStatusIndication,

ENDCConfigurationTransfer,

DeactivateTrace,

TraceStart,

HandoverSuccess,

EarlyStatusTransfer,

ConditionalHandoverCancel,

ENDCResourceStatusRequest,

ENDCResourceStatusResponse,

ENDCResourceStatusFailure,

ENDCResourceStatusUpdate,

CellTrafficTrace,

F1CTrafficTransfer,

UERadioCapabilityIDMappingRequest,

UERadioCapabilityIDMappingResponse

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-seNBReconfigurationCompletion,

id-meNBinitiatedSeNBModificationPreparation,

id-seNBinitiatedSeNBModification,

id-meNBinitiatedSeNBRelease,

id-seNBinitiatedSeNBRelease,

id-seNBCounterCheck,

id-x2Removal,

id-retrieveUEContext,

id-sgNBAdditionPreparation,

id-sgNBReconfigurationCompletion,

id-meNBinitiatedSgNBModificationPreparation,

id-sgNBinitiatedSgNBModification,

id-meNBinitiatedSgNBRelease,

id-sgNBinitiatedSgNBRelease,

id-sgNBChange,

id-sgNBCounterCheck,

id-rRCTransfer,

id-endcX2Setup,

id-endcConfigurationUpdate,

id-secondaryRATDataUsageReport,

id-endcCellActivation,

id-endcPartialReset,

id-eUTRANRCellResourceCoordination,

id-SgNBActivityNotification,

id-endcX2Removal,

id-dataForwardingAddressIndication,

id-gNBStatusIndication,

id-endcConfigurationTransfer,

id-deactivateTrace,

id-traceStart,

id-handoverSuccess,

id-earlyStatusTransfer,

id-conditionalHandoverCancel,

id-endcresourceStatusReporting,

id-endcresourceStatusReportingInitiation,

id-cellTrafficTrace,

id-f1CTrafficTransfer,

id-UERadioCapabilityIDMapping

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})

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Interface Elementary Procedure List

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

X2AP-ELEMENTARY-PROCEDURES X2AP-ELEMENTARY-PROCEDURE ::= {

X2AP-ELEMENTARY-PROCEDURES-CLASS-1 |

X2AP-ELEMENTARY-PROCEDURES-CLASS-2 ,

...

}

X2AP-ELEMENTARY-PROCEDURES-CLASS-1 X2AP-ELEMENTARY-PROCEDURE ::= {

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 |

endcresourceStatusReportingInitiation |

uERadioCapabilityIDMapping ,

...

}

X2AP-ELEMENTARY-PROCEDURES-CLASS-2 X2AP-ELEMENTARY-PROCEDURE ::= {

snStatusTransfer |

uEContextRelease |

handoverCancel |

errorIndication |

resourceStatusReporting |

loadIndication |

privateMessage |

rLFIndication |

handoverReport |

x2Release |

x2APMessageTransfer |

seNBReconfigurationCompletion |

meNBinitiatedSeNBRelease |

seNBCounterCheck |

sgNBReconfigurationCompletion |

sgNBCounterCheck |

rRCTransfer |

secondaryRATDataUsageReport |

sgNBActivityNotification |

dataForwardingAddressIndication |

gNBStatusIndication |

endcConfigurationTransfer |

deactivateTrace |

traceStart |

handoverSuccess |

earlyStatusTransfer |

conditionalHandoverCancel |

endcresourceStatusReporting |

cellTrafficTrace |

f1CTrafficTransfer ,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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

PROCEDURE CODE id-errorIndication

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

}

loadIndication X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE LoadInformation

PROCEDURE CODE id-loadIndication

CRITICALITY ignore

}

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

}

endcCellActivation X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ENDCCellActivationRequest

SUCCESSFUL OUTCOME ENDCCellActivationResponse

UNSUCCESSFUL OUTCOME ENDCCellActivationFailure

PROCEDURE CODE id-endcCellActivation

CRITICALITY reject

}

endcPartialReset 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

}

dataForwardingAddressIndication X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE DataForwardingAddressIndication

PROCEDURE CODE id-dataForwardingAddressIndication

CRITICALITY ignore

}

gNBStatusIndication X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE GNBStatusIndication

PROCEDURE CODE id-gNBStatusIndication

CRITICALITY ignore

}

endcConfigurationTransfer X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ENDCConfigurationTransfer

PROCEDURE CODE id-endcConfigurationTransfer

CRITICALITY ignore

}

deactivateTrace X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE DeactivateTrace

PROCEDURE CODE id-deactivateTrace

CRITICALITY ignore

}

traceStart X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE TraceStart

PROCEDURE CODE id-traceStart

CRITICALITY ignore

}

handoverSuccess X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE HandoverSuccess

PROCEDURE CODE id-handoverSuccess

CRITICALITY ignore

}

earlyStatusTransfer X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE EarlyStatusTransfer

PROCEDURE CODE id-earlyStatusTransfer

CRITICALITY ignore

}

conditionalHandoverCancel X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ConditionalHandoverCancel

PROCEDURE CODE id-conditionalHandoverCancel

CRITICALITY ignore

}

endcresourceStatusReportingInitiation X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ENDCResourceStatusRequest

SUCCESSFUL OUTCOME ENDCResourceStatusResponse

UNSUCCESSFUL OUTCOME ENDCResourceStatusFailure

PROCEDURE CODE id-endcresourceStatusReportingInitiation

CRITICALITY reject

}

endcresourceStatusReporting X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ENDCResourceStatusUpdate

PROCEDURE CODE id-endcresourceStatusReporting

CRITICALITY ignore

}

cellTrafficTrace X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE CellTrafficTrace

PROCEDURE CODE id-cellTrafficTrace

CRITICALITY ignore

}

f1CTrafficTransfer X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE F1CTrafficTransfer

PROCEDURE CODE id-f1CTrafficTransfer

CRITICALITY ignore

}

uERadioCapabilityIDMapping X2AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE UERadioCapabilityIDMappingRequest

SUCCESSFUL OUTCOME UERadioCapabilityIDMappingResponse

PROCEDURE CODE id-UERadioCapabilityIDMapping

CRITICALITY reject

}

END

-- ASN1STOP

### 9.3.4 PDU Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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,

E-RABsSubjectToDLDiscarding-List,

E-RABsSubjectToEarlyStatusTransfer-List,

ECGI,

E-RAB-ID,

E-RAB-Level-QoS-Parameters,

E-RAB-List,

EUTRANTraceID,

GlobalENB-ID,

GTPtunnelEndpoint,

GUGroupIDList,

GUMMEI,

HandoverReportType,

HandoverRestrictionList,

Masked-IMEISV,

InvokeIndication,

LocationReportingInformation,

LowerLayerPresenceStatusChange,

MDT-Configuration,

ManagementBasedMDTallowed,

MDTPLMNList,

Neighbour-Information,

PCI,

PDCP-SN,

PLMN-Identity,

ReceiveStatusofULPDCPSDUs,

Registration-Request,

RelativeNarrowbandTxPower,

RadioResourceStatus,

RLC-Status,

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,

S1TNLLoadIndicator,

Measurement-ID,

ReportCharacteristics,

MobilityParametersInformation,

MobilityParametersModificationRange,

ReceiveStatusOfULPDCPSDUsExtended,

COUNTValueExtended,

SubframeAssignment,

ExtendedULInterferenceOverloadInfo,

ExpectedUEBehaviour,

SeNBSecurityKey,

MeNBtoSeNBContainer,

SeNBtoMeNBContainer,

SCGChangeIndication,

CoMPInformation,

ReportingPeriodicityRSRPMR,

RSRPMRList,

UE-RLF-Report-Container-for-extended-bands,

ProSeAuthorized,

CoverageModificationList,

ReportingPeriodicityCSIR,

CSIReportList,

ReceiveStatusOfULPDCPSDUsPDCP-SNlength18,

COUNTvaluePDCP-SNlength18,

LHN-ID,

UE-ContextKeptIndicator,

UE-X2AP-ID-Extension,

SIPTOBearerDeactivationIndication,

TunnelInformation,

V2XServicesAuthorized,

X2BenefitValue,

ResumeID,

EUTRANCellIdentifier,

MakeBeforeBreakIndicator,

WTID,

WT-UE-XwAP-ID,

UESidelinkAggregateMaximumBitRate,

SgNBSecurityKey,

MeNBtoSgNBContainer,

SgNBtoMeNBContainer,

SplitSRBs,

RRCContainer,

SRBType,

GlobalGNB-ID,

GNB-ID,

SCGConfigurationQuery,

SplitSRB,

NRUeReport,

EN-DC-ResourceConfiguration,

TAC,

NRFreqInfo,

NRCGI,

NRPCI,

NRUESecurityCapabilities,

PDCPChangeIndication,

ULConfiguration,

SgNB-UE-X2AP-ID,

SecondaryRATUsageReportList,

ActivationID,

MeNBResourceCoordinationInformation,

SgNBResourceCoordinationInformation,

NR-TxBW,

BroadcastPLMNs-Item,

AdditionalPLMNs-Item,

RLCMode,

GBR-QosInformation,

DRB-ID,

FiveGS-TAC,

SULInformation,

Packet-LossRate,

ResourceType,

DataTrafficResourceIndication,

SpectrumSharingGroupID,

RRC-Config-Ind,

SGNB-Addition-Trigger-Ind,

UserPlaneTrafficActivityReport,

ERABActivityNotifyItemList,

PDCPSnLength,

Subscription-Based-UE-DifferentiationInfo,

LCID,

DuplicationActivation,

GNBOverloadInformation,

NewDRBIDrequest,

DesiredActNotificationLevel,

LocationInformationSgNB,

LocationInformationSgNBReporting,

EndcSONConfigurationTransfer,

NRNeighbour-Information,

InterfaceInstanceIndication,

BPLMN-ID-Info-NR,

SNtriggered,

EPCHandoverRestrictionListContainer,

AdditionalRRMPriorityIndex,

RequestedFastMCGRecoveryViaSRB3,

AvailableFastMCGRecoveryViaSRB3,

RequestedFastMCGRecoveryViaSRB3Release,

ReleaseFastMCGRecoveryViaSRB3,

FastMCGRecovery,

PartialListIndicator,

MaximumCellListSize,

MessageOversizeNotification,

TNLConfigurationInfo,

TNLA-To-Add-List,

TNLA-To-Update-List,

TNLA-To-Remove-List,

TNLA-Setup-List,

TNLA-Failed-To-Setup-List,

RAN-UE-NGAP-ID,

CHOinformation-REQ,

CHOinformation-ACK,

DAPSRequestInfo,

DAPSResponseInfo,

CandidateCellsToBeCancelledList,

CHO-DC-EarlyDataForwarding,

CHO-DC-Indicator,

Ethernet-Type,

NRV2XServicesAuthorized,

NRUESidelinkAggregateMaximumBitRate,

PC5QoSParameters,

TargetCellInNGRAN,

Measurement-ID-ENDC,

Registration-Request-ENDC,

ReportCharacteristics-ENDC,

NRRadioResourceStatus,

TNLCapacityIndicator,

NRCompositeAvailableCapacityGroup,

SSBIndex,

TDDULDLConfigurationCommonNR,

NRCarrierList,

SSB-PositionsInBurst,

NRCellPRACHConfig,

NBIoT-RLF-Report-Container,

PrivacyIndicator,

UERadioCapabilityID,

CSI-RSTransmissionIndication,

IABNodeIndication,

F1CTrafficContainer,

IntendedTDD-DL-ULConfiguration-NR,

UERadioCapability,

SFN-Offset,

IMSvoiceEPSfallbackfrom5G,

Global-RAN-NODE-ID,

DirectForwardingPathAvailability,

TraceCollectionEntityIPAddress,

IABAuthorized

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-NR-ENDC,

id-CellMeasurementResult-Item,

id-CellMeasurementResult-NR-ENDC-Item,

id-CellMeasurementResult-E-UTRA-ENDC,

id-CellMeasurementResult-E-UTRA-ENDC-Item,

id-CellToReport,

id-CellToReport-E-UTRA-ENDC,

id-CellToReport-NR-ENDC,

id-CellToReport-Item,

id-CellToReport-E-UTRA-ENDC-Item,

id-CellToReport-NR-ENDC-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-IMSvoiceEPSfallbackfrom5G,

id-InvokeIndication,

id-New-eNB-UE-X2AP-ID,

id-Old-eNB-UE-X2AP-ID,

id-Registration-Request,

id-ReportingPeriodicity,

id-RLC-Status,

id-ServedCells,

id-ServedCellsToActivate,

id-ServedCellsToAdd,

id-ServedCellsToModify,

id-ServedCellsToDelete,

id-SRVCCOperationPossible,

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-I,

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-SourceCellCRNTI,

id-ManagementBasedMDTPLMNList,

id-ReceiveStatusOfULPDCPSDUsExtended,

id-ULCOUNTValueExtended,

id-DLCOUNTValueExtended,

id-IntendedULDLConfiguration,

id-ExtendedULInterferenceOverloadInfo,

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-SCGChangeIndication,

id-E-RABs-ToBeReleased-ModReqd,

id-E-RABs-ToBeReleased-ModReqdItem,

id-E-RABs-ToBeReleased-List-RelReq,

id-E-RABs-ToBeReleased-RelReqItem,

id-E-RABs-ToBeReleased-List-RelConf,

id-E-RABs-ToBeReleased-RelConfItem,

id-E-RABs-SubjectToCounterCheck-List,

id-E-RABs-SubjectToCounterCheckItem,

id-CoMPInformation,

id-ReportingPeriodicityRSRPMR,

id-RSRPMRList,

id-UE-RLF-Report-Container-for-extended-bands,

id-ProSeAuthorized,

id-CoverageModificationList,

id-ReportingPeriodicityCSIR,

id-CSIReportList,

id-ReceiveStatusOfULPDCPSDUsPDCP-SNlength18,

id-ULCOUNTValuePDCP-SNlength18,

id-DLCOUNTValuePDCP-SNlength18,

id-LHN-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-Admitted-ToBeReleased-SgNBRelReqAckList,

id-E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-Item,

id-E-RABs-ToBeReleased-SgNBModReqdList,

id-E-RABs-ToBeModified-SgNBModReqdList,

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-SgNBRelReqList,

id-E-RABs-ToBeReleased-SgNBRelReq-Item,

id-E-RABs-ToBeReleased-SgNBRelConfList,

id-E-RABs-ToBeReleased-SgNBRelConf-Item,

id-E-RABs-ToBeReleased-SgNBRelReqdList,

id-E-RABs-ToBeReleased-SgNBRelReqd-Item,

id-E-RABs-SubjectToSgNBCounterCheck-List,

id-E-RABs-SubjectToSgNBCounterCheck-Item,

id-Target-SgNB-ID,

id-RRCContainer,

id-SRBType,

id-HandoverRestrictionList,

id-SCGConfigurationQuery,

id-SplitSRB,

id-NRUeReport,

id-InitiatingNodeType-EndcX2Setup,

id-InitiatingNodeType-EndcConfigUpdate,

id-RespondingNodeType-EndcX2Setup,

id-RespondingNodeType-EndcConfigUpdate,

id-NRUESecurityCapabilities,

id-PDCPChangeIndication,

id-ServedEUTRAcellsENDCX2ManagementList,

id-ServedEUTRAcellsToModifyListENDCConfUpd,

id-ServedEUTRAcellsToDeleteListENDCConfUpd,

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-ListofEUTRACellsinNRCoordinationReq,

id-ListofNRCellsinNRCoordinationReq,

id-ListofNRCellsinNRCoordinationResp,

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,

id-uLpDCPSnLength,

id-dL-Forwarding,

id-E-RABs-DataForwardingAddress-List,

id-E-RABs-DataForwardingAddress-Item,

id-Subscription-Based-UE-DifferentiationInfo,

id-RLCMode-transferred,

id-dLPDCPSnLength,

id-secondarysgNBDLGTPTEIDatPDCP,

id-secondarymeNBULGTPTEIDatPDCP,

id-lCID,

id-duplicationActivation,

id-GNBOverloadInformation,

id-new-drb-ID-req,

id-NRNeighbourInfoToModify,

id-DesiredActNotificationLevel,

id-LocationInformationSgNB,

id-LocationInformationSgNBReporting,

id-endcSONConfigurationTransfer,

id-EUTRANTraceID,

id-additionalPLMNs-Item,

id-InterfaceInstanceIndication,

id-BPLMN-ID-Info-NR,

id-SNtriggered,

id-EPCHandoverRestrictionListContainer,

id-ERABs-transferred-to-MeNB,

id-AdditionalRRMPriorityIndex,

id-LowerLayerPresenceStatusChange,

id-FastMCGRecovery-SN-to-MN,

id-FastMCGRecovery-MN-to-SN,

id-RequestedFastMCGRecoveryViaSRB3,

id-AvailableFastMCGRecoveryViaSRB3,

id-RequestedFastMCGRecoveryViaSRB3Release,

id-ReleaseFastMCGRecoveryViaSRB3,

id-PartialListIndicator,

id-MaximumCellListSize,

id-MessageOversizeNotification,

id-CellandCapacityAssistInfo,

id-TNLConfigurationInfo,

id-TNLA-To-Add-List,

id-TNLA-To-Update-List,

id-TNLA-To-Remove-List,

id-TNLA-Setup-List,

id-TNLA-Failed-To-Setup-List,

id-UEContextReferenceatSourceNGRAN,

id-CHOinformation-REQ,

id-CHOinformation-ACK,

id-DAPSRequestInfo,

id-RequestedTargetCellID,

id-CandidateCellsToBeCancelledList,

id-DAPSResponseInfo,

id-ProcedureStage,

id-CHO-DC-EarlyDataForwarding,

id-CHO-DC-Indicator,

id-Ethernet-Type,

id-NRV2XServicesAuthorized,

id-NRUESidelinkAggregateMaximumBitRate,

id-PC5QoSParameters,

id-TargetCellInNGRAN,

id-E-UTRAN-Node1-Measurement-ID,

id-E-UTRAN-Node2-Measurement-ID,

id-TDDULDLConfigurationCommonNR,

id-CarrierList,

id-ULCarrierList,

id-SSB-PositionsInBurst,

id-NRCellPRACHConfig,

id-NBIoT-RLF-Report-Container,

id-MDTConfigurationNR,

id-PrivacyIndicator,

id-TraceCollectionEntityIPAddress,

id-UERadioCapabilityID,

id-CSI-RSTransmissionIndication,

id-DLCarrierList,

id-IABNodeIndication,

id-F1CTrafficContainer,

id-IntendedTDD-DL-ULConfiguration-NR,

id-UERadioCapability,

id-SFN-Offset,

id-DirectForwardingPathAvailability,

id-sourceNG-RAN-node-id,

id-SourceDLForwardingIPAddress,

id-SourceNodeDLForwardingIPAddress,

id-IABAuthorized,

maxCellineNB,

maxnoofBearers,

maxnoofPDCP-SN,

maxFailedMeasObjects,

maxnoofCellIDforMDT,

maxnoofTAforMDT,

maxCellinengNB,

maxnoofCellIDforQMC,

maxnoofTAforQMC,

maxnoofPLMNforQMC,

maxnoofProtectedResourcePatterns,

maxnoNRcellsSpectrumSharingWithE-UTRA,

maxnoofNrCellBands,

maxnoofSSBAreas

FROM X2AP-Constants;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- HANDOVER REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-UE-HistoryInformation CRITICALITY ignore TYPE UE-HistoryInformation PRESENCE mandatory}|

{ ID id-TraceActivation CRITICALITY ignore TYPE TraceActivation PRESENCE optional}|

{ ID id-SRVCCOperationPossible CRITICALITY ignore TYPE SRVCCOperationPossible PRESENCE optional}|

{ ID id-CSGMembershipStatus CRITICALITY reject TYPE CSGMembershipStatus PRESENCE optional}|

{ ID id-MobilityInformation CRITICALITY ignore TYPE MobilityInformation PRESENCE optional}|

{ ID id-Masked-IMEISV CRITICALITY ignore TYPE Masked-IMEISV PRESENCE optional}|

{ ID id-UE-HistoryInformationFromTheUE CRITICALITY ignore TYPE UE-HistoryInformationFromTheUE PRESENCE optional}|

{ ID id-ExpectedUEBehaviour CRITICALITY ignore TYPE ExpectedUEBehaviour PRESENCE optional}|

{ ID id-ProSeAuthorized CRITICALITY ignore TYPE ProSeAuthorized PRESENCE optional}|

{ ID id-UE-ContextReferenceAtSeNB CRITICALITY ignore TYPE UE-ContextReferenceAtSeNB PRESENCE optional}|

{ ID id-Old-eNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional}|

{ ID id-V2XServicesAuthorized CRITICALITY ignore TYPE V2XServicesAuthorized PRESENCE optional}|

{ ID id-UE-ContextReferenceAtWT CRITICALITY ignore TYPE UE-ContextReferenceAtWT PRESENCE optional}|

{ ID id-NRUESecurityCapabilities CRITICALITY ignore TYPE NRUESecurityCapabilities PRESENCE optional}|

{ ID id-UE-ContextReferenceAtSgNB CRITICALITY ignore TYPE UE-ContextReferenceAtSgNB PRESENCE optional}|

{ ID id-AerialUEsubscriptionInformation CRITICALITY ignore TYPE AerialUEsubscriptionInformation PRESENCE optional}|

{ ID id-Subscription-Based-UE-DifferentiationInfo CRITICALITY ignore TYPE Subscription-Based-UE-DifferentiationInfo PRESENCE optional}|

{ ID id-CHOinformation-REQ CRITICALITY reject TYPE CHOinformation-REQ PRESENCE optional}|

{ ID id-NRV2XServicesAuthorized CRITICALITY ignore TYPE NRV2XServicesAuthorized PRESENCE optional}|

{ ID id-PC5QoSParameters CRITICALITY ignore TYPE PC5QoSParameters PRESENCE optional }|

{ ID id-IABNodeIndication CRITICALITY reject TYPE IABNodeIndication 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 }|

{ ID id-EPCHandoverRestrictionListContainer CRITICALITY ignore EXTENSION EPCHandoverRestrictionListContainer PRESENCE optional }|

{ ID id-AdditionalRRMPriorityIndex CRITICALITY ignore EXTENSION AdditionalRRMPriorityIndex PRESENCE optional}|

{ ID id-NRUESidelinkAggregateMaximumBitRate CRITICALITY ignore EXTENSION NRUESidelinkAggregateMaximumBitRate PRESENCE optional}|

{ ID id-UERadioCapabilityID CRITICALITY reject EXTENSION UERadioCapabilityID PRESENCE optional }|

{ ID id-IMSvoiceEPSfallbackfrom5G CRITICALITY ignore EXTENSION IMSvoiceEPSfallbackfrom5G 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}|

{ ID id-DAPSRequestInfo CRITICALITY ignore EXTENSION DAPSRequestInfo PRESENCE optional}|

{ ID id-Ethernet-Type CRITICALITY ignore EXTENSION Ethernet-Type PRESENCE optional}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

MobilityInformation ::= BIT STRING (SIZE(32))

SourceDLForwardingIPAddress ::= BIT STRING (SIZE(1..160, ...))

UE-ContextReferenceAtSeNB ::= SEQUENCE {

source-GlobalSeNB-ID GlobalENB-ID,

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 ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- HANDOVER REQUEST ACKNOWLEDGE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-RAB-List PRESENCE optional}|

{ ID id-TargeteNBtoSource-eNBTransparentContainer CRITICALITY ignore TYPE TargeteNBtoSource-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}-- The id-SeNB-UE-X2AP-ID-Extension shall not be sent and shall be ignored, if received.--|

{ 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}|

{ ID id-WT-UE-ContextKeptIndicator CRITICALITY ignore TYPE UE-ContextKeptIndicator PRESENCE optional}|

{ ID id-ERABs-transferred-to-MeNB CRITICALITY ignore TYPE E-RAB-List PRESENCE optional}|

{ ID id-CHOinformation-ACK CRITICALITY ignore TYPE CHOinformation-ACK PRESENCE optional},

...

}

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 GTPtunnelEndpoint OPTIONAL,

dL-GTP-TunnelEndpoint GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-Item-ExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-DAPSResponseInfo CRITICALITY reject EXTENSION DAPSResponseInfo PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- HANDOVER PREPARATION FAILURE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-RequestedTargetCellID CRITICALITY reject TYPE ECGI PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- HANDOVER REPORT

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

HandoverReport ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{HandoverReport-IEs}},

...

}

HandoverReport-IEs X2AP-PROTOCOL-IES ::= {

{ 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}|

{ ID id-TargetCellInNGRAN CRITICALITY ignore TYPE TargetCellInNGRAN PRESENCE conditional} -- The IE shall be present if the Handover Report Type IE is set to "interSystemPingpong" --,

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- EARLY STATUS TRANSFER

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EarlyStatusTransfer ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ EarlyStatusTransfer-IEs}},

...

}

EarlyStatusTransfer-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-ProcedureStage CRITICALITY reject TYPE ProcedureStageChoice PRESENCE mandatory}|

{ ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE optional},

...

}

ProcedureStageChoice ::= CHOICE {

first-dl-count FirstDLCount,

dl-discarding DLDiscarding,

choice-extension ProtocolIE-Single-Container { {ProcedureStageChoice-ExtIEs} }

}

ProcedureStageChoice-ExtIEs X2AP-PROTOCOL-IES ::= {

...

}

FirstDLCount ::= SEQUENCE {

e-RABsSubjectToEarlyStatusTransfer E-RABsSubjectToEarlyStatusTransfer-List,

iE-Extension ProtocolExtensionContainer { {FirstDLCount-ExtIEs} } OPTIONAL,

...

}

FirstDLCount-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

DLDiscarding ::= SEQUENCE {

e-RABsSubjectToDLDiscarding-List E-RABsSubjectToDLDiscarding-List,

iE-Extension ProtocolExtensionContainer { {DLDiscarding-ExtIEs} } OPTIONAL,

...

}

DLDiscarding-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SN STATUS TRANSFER

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-Cause CRITICALITY ignore TYPE Cause 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 ignore TYPE UE-X2AP-ID-Extension PRESENCE optional}|

{ ID id-CandidateCellsToBeCancelledList CRITICALITY reject TYPE CandidateCellsToBeCancelledList PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- HANDOVER SUCCESS

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

HandoverSuccess ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{HandoverSuccess-IEs}},

...

}

HandoverSuccess-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 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-TargetCell-ID CRITICALITY reject TYPE ECGI PRESENCE mandatory},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- CONDITIONAL HANDOVER CANCEL

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ConditionalHandoverCancel ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ConditionalHandoverCancel-IEs}},

...

}

ConditionalHandoverCancel-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-Cause CRITICALITY ignore TYPE Cause 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 ignore TYPE UE-X2AP-ID-Extension PRESENCE optional}|

{ ID id-CandidateCellsToBeCancelledList CRITICALITY reject TYPE CandidateCellsToBeCancelledList PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RESET REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ResetRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ResetRequest-IEs}},

...

}

ResetRequest-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RESET RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ResetResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ResetResponse-IEs}},

...

}

ResetResponse-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication 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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- X2 SETUP RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- X2 SETUP FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-ECGIs 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 }|

{ ID id-NRNeighbourInfoToModify CRITICALITY ignore EXTENSION NRNeighbour-Information 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}|-- The IE shall be present if the *Registration Request* IE is set to “Stop”, “Partial stop” or to “Add”--

{ 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}|

{ ID id-MeasurementInitiationResult-List CRITICALITY ignore TYPE MeasurementInitiationResult-List 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,

...

}

MeasurementFailureCause-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RESOURCE STATUS FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RESOURCE STATUS UPDATE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-RSRPMRList CRITICALITY ignore EXTENSION RSRPMRList PRESENCE optional}|

{ ID id-CSIReportList CRITICALITY ignore EXTENSION CSIReportList PRESENCE optional}|

{ ID id-CellReportingIndicator CRITICALITY ignore EXTENSION CellReportingIndicator PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- PRIVATE MESSAGE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-NBIoT-RLF-Report-Container CRITICALITY ignore TYPE NBIoT-RLF-Report-Container PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- CELL ACTIVATION REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- X2 RELEASE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

X2Release ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{X2Release-IEs}},

...

}

X2Release-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-GlobalENB-ID CRITICALITY reject TYPE GlobalENB-ID PRESENCE mandatory},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- X2AP MESSAGE TRANSFER

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SENB ADDITION REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SeNBAdditionRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SeNBAdditionRequest-IEs}},

...

}

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 UESecurityCapabilities 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}|

{ ID id-BearerType CRITICALITY ignore EXTENSION BearerType PRESENCE optional}|

{ ID id-Ethernet-Type CRITICALITY ignore EXTENSION Ethernet-Type PRESENCE optional}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress 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-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SENB ADDITION REQUEST ACKNOWLEDGE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-RAB-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 UE-X2AP-ID-Extension PRESENCE optional}|

{ ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension 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 ::= {

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

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 ::= {

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SENB ADDITION REQUEST REJECT

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-SeNB-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-ResponseInformationSeNBReconfComp CRITICALITY ignore TYPE ResponseInformationSeNBReconfComp 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-SuccessItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

ResponseInformationSeNBReconfComp-RejectByMeNBItem ::= SEQUENCE {

cause Cause,

meNBtoSeNBContainer MeNBtoSeNBContainer OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {ResponseInformationSeNBReconfComp-RejectByMeNBItemExtIEs} } OPTIONAL,

...

}

ResponseInformationSeNBReconfComp-RejectByMeNBItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SENB MODIFICATION REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SeNBModificationRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ SeNBModificationRequest-IEs}},

...

}

SeNBModificationRequest-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-ServingPLMN CRITICALITY ignore TYPE PLMN-Identity PRESENCE optional}|

{ ID id-UE-ContextInformationSeNBModReq CRITICALITY reject TYPE UE-ContextInformationSeNBModReq PRESENCE optional}|

{ ID id-MeNBtoSeNBContainer CRITICALITY ignore TYPE MeNBtoSeNBContainer PRESENCE optional}|

{ ID id-CSGMembershipStatus CRITICALITY reject TYPE CSGMembershipStatus 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},

...

}

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}|

{ ID id-BearerType CRITICALITY ignore EXTENSION BearerType PRESENCE optional}|

{ ID id-Ethernet-Type CRITICALITY ignore EXTENSION Ethernet-Type PRESENCE optional}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress 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 ::= {

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

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 ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SENB MODIFICATION REQUEST ACKNOWLEDGE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SeNBModificationRequestAcknowledge ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SeNBModificationRequestAcknowledge-IEs}},

...

}

SeNBModificationRequestAcknowledge-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-Admitted-ToBeAdded-ModAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-ModAckList PRESENCE optional}|

{ ID id-E-RABs-Admitted-ToBeModified-ModAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeModified-ModAckList PRESENCE optional}|

{ ID id-E-RABs-Admitted-ToBeReleased-ModAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeReleased-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}|

{ ID id-SeNB-UE-X2AP-ID-Extension CRITICALITY ignore TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

E-RABs-Admitted-ToBeAdded-ModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-Admitted-ToBeAdded-ModAckItemIEs} }

E-RABs-Admitted-ToBeAdded-ModAckItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-RABs-Admitted-ToBeAdded-ModAckItem CRITICALITY ignore TYPE E-RABs-Admitted-ToBeAdded-ModAckItem PRESENCE mandatory}

}

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 ::= {

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

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 ::= {

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

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-ModAckItem 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,

seNB-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeModified-ModAckItem-Split-BearerExtIEs} } OPTIONAL,

...

}

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-E-RABs-Admitted-ToBeReleased-ModAckItem CRITICALITY ignore TYPE E-RABs-Admitted-ToReleased-ModAckItem PRESENCE mandatory}

}

E-RABs-Admitted-ToReleased-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-SCG-BearerExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

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 ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SENB MODIFICATION REQUEST REJECT

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SeNBModificationRequestReject ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SeNBModificationRequestReject-IEs}},

...

}

SeNBModificationRequestReject-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-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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SENB MODIFICATION REQUIRED

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SENB MODIFICATION REFUSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SENB RELEASE REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SENB RELEASE REQUIRED

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SeNBReleaseRequired ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SeNBReleaseRequired-IEs}},

...

}

SeNBReleaseRequired-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-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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SENB RELEASE CONFIRM

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SeNBReleaseConfirm ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SeNBReleaseConfirm-IEs}},

...

}

SeNBReleaseConfirm-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-ToBeReleased-List-RelConf CRITICALITY ignore TYPE E-RABs-ToBeReleased-List-RelConf 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},

...

}

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 ::= {

...

}

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 ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SENB COUNTER CHECK REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SeNBCounterCheckRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SeNBCounterCheckRequest-IEs}},

...

}

SeNBCounterCheckRequest-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-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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RETRIEVE UE CONTEXT REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

-- Allocated at the new eNB.   
-- This IE contains an Extended eNB UE X2AP ID, which, together with the *New eNB UE X2AP ID* IE   
-- represents the eNB UE X2AP ID allocated at the new eNB.

{ 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 mandatory}|

{ID id-FailureCellCRNTI CRITICALITY reject TYPE CRNTI PRESENCE optional}|

{ID id-FailureCellPCI CRITICALITY reject TYPE PCI PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- RETRIEVE UE CONTEXT RESPONSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}|

{ ID id-V2XServicesAuthorized CRITICALITY ignore TYPE V2XServicesAuthorized PRESENCE optional}|

{ ID id-AerialUEsubscriptionInformation CRITICALITY ignore TYPE AerialUEsubscriptionInformation PRESENCE optional}|

{ ID id-Subscription-Based-UE-DifferentiationInfo CRITICALITY ignore TYPE Subscription-Based-UE-DifferentiationInfo PRESENCE optional}|

{ ID id-NRV2XServicesAuthorized CRITICALITY ignore TYPE NRV2XServicesAuthorized PRESENCE optional}|

{ ID id-PC5QoSParameters CRITICALITY ignore TYPE PC5QoSParameters PRESENCE optional },

...

}

UE-ContextInformationRetrieve ::= SEQUENCE {

mME-UE-S1AP-ID UE-S1AP-ID,

uESecurityCapabilities UESecurityCapabilities,

aS-SecurityInformation AS-SecurityInformation,

uEaggregateMaximumBitRate UEAggregateMaximumBitRate,

subscriberProfileIDforRFP SubscriberProfileIDforRFP OPTIONAL,

e-RABs-ToBeSetup-ListRetrieve E-RABs-ToBeSetup-ListRetrieve,

rRC-Context RRC-Context,

handoverRestrictionList HandoverRestrictionList OPTIONAL,

locationReportingInformation LocationReportingInformation OPTIONAL,

managBasedMDTallowed ManagementBasedMDTallowed 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 }|

{ ID id-AdditionalRRMPriorityIndex CRITICALITY ignore EXTENSION AdditionalRRMPriorityIndex PRESENCE optional }|

{ ID id-EPCHandoverRestrictionListContainer CRITICALITY ignore EXTENSION EPCHandoverRestrictionListContainer PRESENCE optional }|

{ ID id-NRUESidelinkAggregateMaximumBitRate CRITICALITY ignore EXTENSION NRUESidelinkAggregateMaximumBitRate PRESENCE optional}|

{ ID id-UERadioCapabilityID CRITICALITY reject EXTENSION UERadioCapabilityID PRESENCE optional }|

{ ID id-IMSvoiceEPSfallbackfrom5G CRITICALITY ignore EXTENSION IMSvoiceEPSfallbackfrom5G 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}|

{ ID id-dL-Forwarding CRITICALITY ignore EXTENSION DL-Forwarding PRESENCE optional}|

{ ID id-Ethernet-Type CRITICALITY ignore EXTENSION Ethernet-Type PRESENCE optional

}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RETRIEVE UE CONTEXT FAILURE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB ADDITION REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-NRUESecurityCapabilities CRITICALITY reject TYPE NRUESecurityCapabilities PRESENCE mandatory}|

{ ID id-SgNBSecurityKey CRITICALITY reject TYPE SgNBSecurityKey PRESENCE mandatory}|

{ ID id-SgNBUEAggregateMaximumBitRate CRITICALITY reject TYPE UEAggregateMaximumBitRate PRESENCE mandatory}|

{ ID id-SelectedPLMN CRITICALITY ignore TYPE PLMN-Identity PRESENCE optional}|

{ ID id-HandoverRestrictionList CRITICALITY ignore TYPE HandoverRestrictionList PRESENCE optional}|

{ ID id-E-RABs-ToBeAdded-SgNBAddReqList CRITICALITY reject TYPE E-RABs-ToBeAdded-SgNBAddReqList PRESENCE mandatory}|

{ ID id-MeNBtoSgNBContainer CRITICALITY reject TYPE MeNBtoSgNBContainer PRESENCE mandatory}|

{ ID id-SgNB-UE-X2AP-ID CRITICALITY reject TYPE SgNB-UE-X2AP-ID 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}|

{ ID id-RequestedSplitSRBs CRITICALITY reject TYPE SplitSRBs PRESENCE optional}|

{ ID id-MeNBResourceCoordinationInformation CRITICALITY ignore TYPE MeNBResourceCoordinationInformation PRESENCE optional}|

{ ID id-SGNB-Addition-Trigger-Ind CRITICALITY reject TYPE SGNB-Addition-Trigger-Ind PRESENCE optional}|

{ ID id-SubscriberProfileIDforRFP CRITICALITY ignore TYPE SubscriberProfileIDforRFP PRESENCE optional}|

{ ID id-MeNBCell-ID CRITICALITY reject TYPE ECGI PRESENCE mandatory}|

{ ID id-DesiredActNotificationLevel CRITICALITY ignore TYPE DesiredActNotificationLevel PRESENCE optional}|

{ ID id-TraceActivation CRITICALITY ignore TYPE TraceActivation PRESENCE optional}|

{ ID id-LocationInformationSgNBReporting CRITICALITY ignore TYPE LocationInformationSgNBReporting PRESENCE optional}|

{ ID id-Masked-IMEISV CRITICALITY ignore TYPE Masked-IMEISV PRESENCE optional}|

{ ID id-AdditionalRRMPriorityIndex CRITICALITY ignore TYPE AdditionalRRMPriorityIndex PRESENCE optional}|

{ ID id-RequestedFastMCGRecoveryViaSRB3 CRITICALITY ignore TYPE RequestedFastMCGRecoveryViaSRB3 PRESENCE optional}|

{ ID id-UEContextReferenceatSourceNGRAN CRITICALITY ignore TYPE RAN-UE-NGAP-ID PRESENCE optional}|

{ ID id-ManagementBasedMDTallowed CRITICALITY ignore TYPE ManagementBasedMDTallowed PRESENCE optional }|

{ ID id-ManagementBasedMDTPLMNList CRITICALITY ignore TYPE MDTPLMNList PRESENCE optional }|

{ ID id-UERadioCapabilityID CRITICALITY reject TYPE UERadioCapabilityID PRESENCE optional}|

{ ID id-IABNodeIndication CRITICALITY reject TYPE IABNodeIndication PRESENCE optional}|

{ ID id-sourceNG-RAN-node-id CRITICALITY ignore TYPE Global-RAN-NODE-ID PRESENCE optional}|

{ ID id-IABAuthorized CRITICALITY ignore TYPE IABAuthorized PRESENCE optional},

...

}

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-RABs-ToBeAdded-SgNBAddReq-Item CRITICALITY reject TYPE E-RABs-ToBeAdded-SgNBAddReq-Item 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 {

sgNBPDCPpresent E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBAddReq-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeAdded-SgNBAddReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCPpresent ::= 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 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 EN-DC Resource Configuration IE is set to “present” --

s1-UL-GTPtunnelEndpoint GTPtunnelEndpoint,

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-RLCMode-transferred CRITICALITY ignore EXTENSION RLCMode PRESENCE optional}|

{ ID id-BearerType CRITICALITY ignore EXTENSION BearerType PRESENCE optional}|

{ ID id-Ethernet-Type CRITICALITY ignore EXTENSION Ethernet-Type PRESENCE optional}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional}|

{ ID id-SourceNodeDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

E-RABs-ToBeAdded-SgNBAddReq-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 EN-DC Resource Configuration IE are set to “present” --

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeAdded-SgNBAddReq-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-duplicationActivation CRITICALITY ignore EXTENSION DuplicationActivation PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SGNB ADDITION REQUEST ACKNOWLEDGE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ 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-SgNBResourceCoordinationInformation CRITICALITY ignore TYPE SgNBResourceCoordinationInformation PRESENCE optional}|

{ ID id-RRCConfigIndication CRITICALITY reject TYPE RRC-Config-Ind PRESENCE optional}|

{ ID id-LocationInformationSgNB CRITICALITY ignore TYPE LocationInformationSgNB PRESENCE optional}|

{ ID id-AvailableFastMCGRecoveryViaSRB3 CRITICALITY ignore TYPE AvailableFastMCGRecoveryViaSRB3 PRESENCE optional }|

{ ID id-DirectForwardingPathAvailability CRITICALITY ignore TYPE DirectForwardingPathAvailability 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 {

sgNBPDCPpresent E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBAddReqAck-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeAdded-SgNBAddReqAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPpresent ::= SEQUENCE {

s1-DL-GTPtunnelEndpoint GTPtunnelEndpoint,

sgNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL,

-- This IE shall be present if MCG resource IE in 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 *EN-DC Resource Configuration* IE is 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 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 EN-DC Resource Configuration IE are set to “present” --

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPnotpresent ::= SEQUENCE {

sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint,

secondary-sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeAdded-SgNBAddReqAck-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-lCID CRITICALITY ignore EXTENSION LCID PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB ADDITION REQUEST REJECT

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 optional}|

{ 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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|

{ ID id-SelectedPLMN CRITICALITY ignore TYPE PLMN-Identity PRESENCE optional}|

{ 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 reject TYPE MeNBtoSgNBContainer PRESENCE optional}|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional}|

{ ID id-MeNBResourceCoordinationInformation CRITICALITY ignore TYPE MeNBResourceCoordinationInformation PRESENCE optional}|

{ ID id-RequestedSplitSRBs CRITICALITY ignore TYPE SplitSRBs PRESENCE optional}|

{ ID id-RequestedSplitSRBsrelease CRITICALITY ignore TYPE SplitSRBs PRESENCE optional}|

{ ID id-DesiredActNotificationLevel CRITICALITY ignore TYPE DesiredActNotificationLevel PRESENCE optional}|

{ ID id-LocationInformationSgNBReporting CRITICALITY ignore TYPE LocationInformationSgNBReporting PRESENCE optional}|

{ ID id-MeNBCell-ID CRITICALITY ignore TYPE ECGI PRESENCE optional}|

{ ID id-RequestedFastMCGRecoveryViaSRB3 CRITICALITY ignore TYPE RequestedFastMCGRecoveryViaSRB3 PRESENCE optional}|

{ ID id-RequestedFastMCGRecoveryViaSRB3Release CRITICALITY ignore TYPE RequestedFastMCGRecoveryViaSRB3Release PRESENCE optional}|

{ ID id-SNtriggered CRITICALITY ignore TYPE SNtriggered PRESENCE optional}|

{ ID id-IABNodeIndication CRITICALITY reject TYPE IABNodeIndication PRESENCE optional}|

{ ID id-IABAuthorized CRITICALITY ignore TYPE IABAuthorized 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}|

{ ID id-AdditionalRRMPriorityIndex CRITICALITY ignore EXTENSION AdditionalRRMPriorityIndex PRESENCE optional}|

{ID id-LowerLayerPresenceStatusChange CRITICALITY ignore EXTENSION LowerLayerPresenceStatusChange 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 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 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 ::= {

{ ID id-RLCMode-transferred CRITICALITY ignore EXTENSION RLCMode PRESENCE optional}|

{ ID id-BearerType CRITICALITY ignore EXTENSION BearerType PRESENCE optional}|

{ ID id-Ethernet-Type CRITICALITY ignore EXTENSION Ethernet-Type PRESENCE optional}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

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 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 ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-duplicationActivation CRITICALITY ignore EXTENSION DuplicationActivation PRESENCE optional},

...

}

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 GBR-QosInformation OPTIONAL,

meNB-DL-GTP-TEIDatMCG GTPtunnelEndpoint OPTIONAL,

s1-UL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeModified-SgNBModReq-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-RLC-Status CRITICALITY ignore EXTENSION RLC-Status PRESENCE optional },

...

}

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 ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-secondarymeNBULGTPTEIDatPDCP CRITICALITY ignore EXTENSION GTPtunnelEndpoint PRESENCE optional},

...

}

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 {

sgNBPDCPpresent E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModReq-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBModReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPpresent ::= SEQUENCE {

dL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

uL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPnotpresent ::= SEQUENCE {

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBModReq-Item-SgNBPDCPnotpresentExtIEs 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-Admitted-ToBeReleased-SgNBModAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeReleased-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 SplitSRBs PRESENCE optional}|

{ ID id-RRCConfigIndication CRITICALITY reject TYPE RRC-Config-Ind PRESENCE optional}|

{ ID id-LocationInformationSgNB CRITICALITY ignore TYPE LocationInformationSgNB PRESENCE optional}|

{ ID id-AvailableFastMCGRecoveryViaSRB3 CRITICALITY ignore TYPE AvailableFastMCGRecoveryViaSRB3 PRESENCE optional}|

{ ID id-ReleaseFastMCGRecoveryViaSRB3 CRITICALITY ignore TYPE ReleaseFastMCGRecoveryViaSRB3 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}

}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item ::= SEQUENCE {

e-RAB-ID E-RAB-ID,

en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,

resource-configuration CHOICE {

sgNBPDCPpresent E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-SgNBModAck-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeAdded-SgNBModAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPpresent ::= SEQUENCE {

s1-DL-GTPtunnelEndpoint GTPtunnelEndpoint,

sgNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL,

-- This IE shall be present if *MCG* resource IE in 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 *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 *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 *EN-DC Resource Configuration* IE are set to “present” --

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-SourceDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},

...

}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPnotpresent ::= SEQUENCE {

sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint,

secondary-sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeAdded-SgNBModAck-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ID id-lCID CRITICALITY ignore EXTENSION LCID PRESENCE optional},

...

}

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 {

sgNBPDCPpresent E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeAdded-SgNBModAck-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeAdded-SgNBModAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDCPpresent ::= 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-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional},

...

}

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDCPnotpresent ::= SEQUENCE {

sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeModified-SgNBModAck-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-secondarysgNBDLGTPTEIDatPDCP CRITICALITY ignore EXTENSION GTPtunnelEndpoint PRESENCE optional}|

{ ID id-RLC-Status CRITICALITY ignore EXTENSION RLC-Status PRESENCE optional },

...

}

E-RABs-Admitted-ToBeReleased-SgNBModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-Admitted-ToBeReleased-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-ToReleased-SgNBModAck-Item PRESENCE mandatory}

}

E-RABs-Admitted-ToReleased-SgNBModAck-Item ::= SEQUENCE {

e-RAB-ID E-RAB-ID,

en-DC-ResourceConfiguration EN-DC-ResourceConfiguration,

resource-configuration CHOICE {

sgNBPDCPpresent E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBModAck-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBModAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPpresent ::= SEQUENCE {

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPnotpresent ::= SEQUENCE {

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeReleased-SgNBModAck-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB MODIFICATION REQUEST REJECT

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBModificationRequestReject ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBModificationRequestReject-IEs}},

...

}

SgNBModificationRequestReject-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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBModificationRequired ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBModificationRequired-IEs}},

...

}

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 optional}|

{ 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-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension 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}|

{ ID id-RRCConfigIndication CRITICALITY reject TYPE RRC-Config-Ind PRESENCE optional}|

{ ID id-LocationInformationSgNB CRITICALITY ignore TYPE LocationInformationSgNB 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 ::= {

{ ID id-RLCMode-transferred CRITICALITY ignore EXTENSION RLCMode PRESENCE optional},

...

}

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 {

sgNBPDCPpresent E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-SgNBModReqd-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeModified-SgNBModReqd-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCPpresent ::= 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-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-new-drb-ID-req CRITICALITY ignore EXTENSION NewDRBIDrequest PRESENCE optional},

...

}

E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCPnotpresent ::= SEQUENCE {

sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,

secondary-sgNB-DL-GTP-TEIDatSCG GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeModified-SgNBModReqd-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-RLC-Status CRITICALITY ignore EXTENSION RLC-Status PRESENCE optional}|

{ ID id-lCID CRITICALITY ignore EXTENSION LCID PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB MODIFICATION CONFIRM

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-MeNBtoSgNBContainer CRITICALITY ignore TYPE MeNBtoSgNBContainer 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-MeNBResourceCoordinationInformation CRITICALITY ignore TYPE MeNBResourceCoordinationInformation 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 {

sgNBPDCPpresent E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-AdmittedToBeModified-SgNBModConf-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-AdmittedToBeModified-SgNBModConf-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPpresent ::= SEQUENCE {

iE-Extensions ProtocolExtensionContainer { {E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPnotpresent ::= SEQUENCE {

secondary-meNB-UL-GTP-TEIDatPDCP GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-AdmittedToBeModified-SgNBModConf-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-uLpDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional}|

{ ID id-dLPDCPSnLength CRITICALITY ignore EXTENSION PDCPSnLength PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB MODIFICATION REFUSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBModificationRefuse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBModificationRefuse-IEs}},

...

}

SgNBModificationRefuse-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-MeNBtoSgNBContainer CRITICALITY ignore TYPE MeNBtoSgNBContainer 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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB RELEASE REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-ERABs-transferred-to-MeNB CRITICALITY ignore TYPE E-RAB-List 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 {

sgNBPDCPpresent E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelReq-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBRelReq-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPpresent ::= SEQUENCE {

uL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

dL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPnotpresent ::= SEQUENCE {

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBRelReq-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB RELEASE REQUEST ACKNOWLEDGE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBReleaseRequestAcknowledge ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBReleaseRequestAcknowledge-IEs}},

...

}

SgNBReleaseRequestAcknowledge-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 reject TYPE UE-X2AP-ID-Extension PRESENCE optional }|

{ ID id-E-RABs-Admitted-ToBeReleased-SgNBRelReqAckList CRITICALITY ignore TYPE E-RABs-Admitted-ToBeReleased-SgNBRelReqAckList PRESENCE optional },

...

}

E-RABs-Admitted-ToBeReleased-SgNBRelReqAckList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF

ProtocolIE-Single-Container { {E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-ItemIEs} }

E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-ItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-Item CRITICALITY ignore TYPE E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-Item PRESENCE mandatory},

...

}

E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-Item ::= SEQUENCE {

e-RAB-ID E-RAB-ID,

rlc-Mode-transferred RLCMode,

iE-Extensions ProtocolExtensionContainer { {E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB RELEASE REQUEST REJECT

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBReleaseRequestReject ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBReleaseRequestReject-IEs}},

...

}

SgNBReleaseRequestReject-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},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SGNB RELEASE REQUIRED

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 }|

{ ID id-E-RABs-ToBeReleased-SgNBRelReqdList CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBRelReqdList PRESENCE optional }|

{ ID id-SgNBtoMeNBContainer CRITICALITY ignore TYPE SgNBtoMeNBContainer PRESENCE optional },

...

}

E-RABs-ToBeReleased-SgNBRelReqdList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-ToBeReleased-SgNBRelReqd-ItemIEs} }

E-RABs-ToBeReleased-SgNBRelReqd-ItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-RABs-ToBeReleased-SgNBRelReqd-Item CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBRelReqd-Item PRESENCE mandatory},

...

}

E-RABs-ToBeReleased-SgNBRelReqd-Item ::= SEQUENCE {

e-RAB-ID E-RAB-ID,

rlc-Mode-transferred RLCMode,

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelReqd-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBRelReqd-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SGNB RELEASE CONFIRM

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-E-RABs-ToBeReleased-SgNBRelConfList CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBRelConfList 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-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 {

sgNBPDCPpresent E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPpresent,

sgNBPDCPnotpresent E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPnotpresent,

...

},

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelConf-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBRelConf-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPpresent ::= SEQUENCE {

uL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

dL-GTPtunnelEndpoint GTPtunnelEndpoint OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPnotpresent ::= SEQUENCE {

iE-Extensions ProtocolExtensionContainer { {E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPnotpresentExtIEs} } OPTIONAL,

...

}

E-RABs-ToBeReleased-SgNBRelConf-Item-SgNBPDCPnotpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SGNB COUNTER CHECK REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBCounterCheckRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBCounterCheckRequest-IEs}},

...

}

SgNBCounterCheckRequest-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-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},

...

}

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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBChangeRequired ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBChangeRequired-IEs}},

...

}

SgNBChangeRequired-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-Target-SgNB-ID CRITICALITY reject TYPE GlobalGNB-ID PRESENCE mandatory}|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|

{ ID id-SgNBtoMeNBContainer CRITICALITY reject TYPE SgNBtoMeNBContainer PRESENCE optional}|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB CHANGE CONFIRM

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SgNBChangeConfirm ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{SgNBChangeConfirm-IEs}},

...

}

SgNBChangeConfirm-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-ToBeReleased-SgNBChaConfList CRITICALITY ignore TYPE E-RABs-ToBeReleased-SgNBChaConfList 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-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-SgNBPDCPpresentExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

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 ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- RRC TRANSFER

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-NRUeReport CRITICALITY reject TYPE NRUeReport PRESENCE optional}|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional}|

{ ID id-FastMCGRecovery-SN-to-MN CRITICALITY ignore TYPE FastMCGRecovery PRESENCE optional}|

{ ID id-FastMCGRecovery-MN-to-SN CRITICALITY ignore TYPE FastMCGRecovery PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB CHANGE REFUSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCX2SetupRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCX2SetupRequest-IEs}},

...

}

ENDCX2SetupRequest-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-InitiatingNodeType-EndcX2Setup CRITICALITY reject TYPE InitiatingNodeType-EndcX2Setup PRESENCE mandatory}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional}|

{ ID id-TNLConfigurationInfo CRITICALITY ignore TYPE TNLConfigurationInfo PRESENCE optional},

...

}

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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|

-- NOTE: In the current version of this specification the *Interface Instance Indication* IE is not included in the *Initiating NodeType* IE --

{ ID id-CellandCapacityAssistInfo CRITICALITY ignore TYPE CellandCapacityAssistInfo PRESENCE optional },

...

}

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}|

{ ID id-PartialListIndicator CRITICALITY ignore TYPE PartialListIndicator PRESENCE optional },

...

}

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 OPTIONAL,

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 ::= {

{ ID id-additionalPLMNs-Item CRITICALITY ignore EXTENSION AdditionalPLMNs-Item PRESENCE optional}|

{ ID id-BPLMN-ID-Info-NR CRITICALITY ignore EXTENSION BPLMN-ID-Info-NR PRESENCE optional}|

{ ID id-SSB-PositionsInBurst CRITICALITY ignore EXTENSION SSB-PositionsInBurst PRESENCE optional}|

{ ID id-NRCellPRACHConfig CRITICALITY ignore EXTENSION NRCellPRACHConfig PRESENCE optional}|

{ ID id-CSI-RSTransmissionIndication CRITICALITY ignore EXTENSION CSI-RSTransmissionIndication PRESENCE optional}|

{ ID id-SFN-Offset CRITICALITY ignore EXTENSION SFN-Offset PRESENCE optional},

...

}

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 ::= {

{ ID id-ULCarrierList CRITICALITY ignore EXTENSION NRCarrierList PRESENCE optional }|

{ ID id-DLCarrierList CRITICALITY ignore EXTENSION NRCarrierList PRESENCE optional },

...

}

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 ::= {

{ ID id-TDDULDLConfigurationCommonNR CRITICALITY ignore EXTENSION TDDULDLConfigurationCommonNR PRESENCE optional}|

{ ID id-CarrierList CRITICALITY ignore EXTENSION NRCarrierList PRESENCE optional}|

{ ID id-IntendedTDD-DL-ULConfiguration-NR CRITICALITY ignore EXTENSION IntendedTDD-DL-ULConfiguration-NR PRESENCE optional},

...

}

CellandCapacityAssistInfo::= SEQUENCE {

maximumCellListSize MaximumCellListSize OPTIONAL,

cellAssistanceInformation CellAssistanceInformation OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {CellandCapacityAssistInfo-ExtIEs} } OPTIONAL,

...

}

CellandCapacityAssistInfo-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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCX2SetupResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCX2SetupResponse-IEs}},

...

}

ENDCX2SetupResponse-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-RespondingNodeType-EndcX2Setup CRITICALITY reject TYPE RespondingNodeType-EndcX2Setup PRESENCE mandatory}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|

{ ID id-TNLConfigurationInfo CRITICALITY ignore TYPE TNLConfigurationInfo PRESENCE optional },

...

}

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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|

-- NOTE: In the current version of this specification the *Interface Instance Indication* IE is not included in the *Responding NodeType* IE --

{ ID id-CellandCapacityAssistInfo CRITICALITY ignore TYPE CellandCapacityAssistInfo PRESENCE optional },

...

}

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}|

{ ID id-PartialListIndicator CRITICALITY ignore TYPE PartialListIndicator PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC X2 SETUP FAILURE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 } |

{ ID id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional } |

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|

{ ID id-MessageOversizeNotification CRITICALITY ignore TYPE MessageOversizeNotification PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC CONFIGURATION UPDATE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCConfigurationUpdate ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCConfigurationUpdate-IEs}},

...

}

ENDCConfigurationUpdate-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-InitiatingNodeType-EndcConfigUpdate CRITICALITY reject TYPE InitiatingNodeType-EndcConfigUpdate PRESENCE mandatory}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional}|

{ ID id-TNLConfigurationInfo CRITICALITY ignore TYPE TNLConfigurationInfo PRESENCE optional }|

{ ID id-TNLA-To-Add-List CRITICALITY ignore TYPE TNLA-To-Add-List PRESENCE optional }|

{ ID id-TNLA-To-Update-List CRITICALITY ignore TYPE TNLA-To-Update-List PRESENCE optional }|

{ ID id-TNLA-To-Remove-List CRITICALITY ignore TYPE TNLA-To-Remove-List PRESENCE optional },

...

}

InitiatingNodeType-EndcConfigUpdate::= CHOICE {

init-eNB ProtocolIE-Container {{ENB-ENDCConfigUpdateIEs}},

init-en-gNB  ProtocolIE-Container {{En-gNB-ENDCConfigUpdateIEs}},

...

}

ENB-ENDCConfigUpdateIEs X2AP-PROTOCOL-IES ::= {

{ ID id-CellAssistanceInformation CRITICALITY reject TYPE CellAssistanceInformation PRESENCE optional }|

{ ID id-ServedEUTRAcellsENDCX2ManagementList CRITICALITY reject TYPE ServedEUTRAcellsENDCX2ManagementList 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,

...

}

ServedEUTRAcellsToModifyListENDCConfUpd-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

ServedEUTRAcellsToDeleteListENDCConfUpd ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ECGI

En-gNB-ENDCConfigUpdateIEs X2AP-PROTOCOL-IES ::= {

{ ID id-ServedNRcellsENDCX2ManagementList CRITICALITY reject TYPE ServedNRcellsENDCX2ManagementList PRESENCE optional }|

{ ID id-ServedNRcellsToModifyListENDCConfUpd CRITICALITY reject TYPE ServedNRcellsToModifyENDCConfUpdList PRESENCE optional }|

{ ID id-ServedNRcellsToDeleteListENDCConfUpd 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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCConfigurationUpdateAcknowledge ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCConfigurationUpdateAcknowledge-IEs}},

...

}

ENDCConfigurationUpdateAcknowledge-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-RespondingNodeType-EndcConfigUpdate CRITICALITY reject TYPE RespondingNodeType-EndcConfigUpdate PRESENCE mandatory}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }|

{ ID id-TNLConfigurationInfo CRITICALITY ignore TYPE TNLConfigurationInfo PRESENCE optional }|

{ ID id-TNLA-Setup-List CRITICALITY ignore TYPE TNLA-Setup-List PRESENCE optional }|

{ ID id-TNLA-Failed-To-Setup-List CRITICALITY ignore TYPE TNLA-Failed-To-Setup-List PRESENCE optional },

...

}

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

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 }|

{ ID id-TimeToWait CRITICALITY ignore TYPE TimeToWait PRESENCE optional }|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- EN-DC CELL ACTIVATION REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

ServedNRCellsToActivate::= SEQUENCE (SIZE (1.. maxCellinengNB)) OF ServedNRCellsToActivate-Item

ServedNRCellsToActivate-Item::= SEQUENCE {

nrCellID NRCGI,

iE-Extensions ProtocolExtensionContainer { {ServedNRCellsToActivate-Item-ExtIEs} } OPTIONAL,

...

}

ServedNRCellsToActivate-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- EN-DC CELL ACTIVATION RESPONSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 }|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

ActivatedNRCellList ::= SEQUENCE (SIZE (1.. maxCellinengNB)) OF ActivatedNRCellList-Item

ActivatedNRCellList-Item::= SEQUENCE {

nrCellID NRCGI,

iE-Extensions ProtocolExtensionContainer { {ActivatedNRCellList-Item-ExtIEs} } OPTIONAL,

...

}

ActivatedNRCellList-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

--\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC CELL ACTIVATION FAILURE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCCellActivationFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCCellActivationFailure-IEs}},

...

}

ENDCCellActivationFailure-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 }|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC RESOURCE STATUS REQUEST

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCResourceStatusRequest-IEs}},

...

}

ENDCResourceStatusRequest-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-UTRAN-Node1-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory }|

{ ID id-E-UTRAN-Node2-Measurement-ID CRITICALITY ignore TYPE Measurement-ID-ENDC PRESENCE conditional}| -- The IE shall be present if the *Registration Request EN-DC* IE is set to “Stop” or to “Add”

{ ID id-Registration-Request CRITICALITY reject TYPE Registration-Request-ENDC PRESENCE mandatory }|

{ ID id-ReportingPeriodicity CRITICALITY ignore TYPE ReportingPeriodicity-ENDC PRESENCE optional }|

{ ID id-ReportCharacteristics CRITICALITY ignore TYPE ReportCharacteristics-ENDC PRESENCE conditional}| -- The IE shall be present if the *Registration Request EN-DC* IE is set to “Start”

{ ID id-CellToReport-NR-ENDC CRITICALITY ignore TYPE CellToReport-NR-ENDC-List PRESENCE optional } |

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|

{ ID id-CellToReport-E-UTRA-ENDC CRITICALITY ignore TYPE CellToReport-E-UTRA-ENDC-List PRESENCE optional},

...

}

ReportingPeriodicity-ENDC ::= ENUMERATED {ms500, ms1000, ms2000, ms5000, ms10000, ...}

CellToReport-NR-ENDC-List ::= SEQUENCE (SIZE (1..maxCellinengNB)) OF ProtocolIE-Single-Container { {CellToReport-NR-ENDC-ItemIEs} }

CellToReport-NR-ENDC-ItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-CellToReport-NR-ENDC-Item CRITICALITY ignore TYPE CellToReport-NR-ENDC-Item PRESENCE mandatory}

}

CellToReport-NR-ENDC-Item ::= SEQUENCE {

nr-cell-ID NRCGI,

ssbToReport-List SSBToReport-List OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {CellToReport-NR-ENDC-Item-ExtIEs} } OPTIONAL,

...

}

CellToReport-NR-ENDC-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

CellToReport-E-UTRA-ENDC-List ::= SEQUENCE (SIZE (1..maxCellineNB)) OF ProtocolIE-Single-Container { {CellToReport-E-UTRA-ENDC-Item-IEs} }

CellToReport-E-UTRA-ENDC-Item-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-CellToReport-E-UTRA-ENDC-Item CRITICALITY ignore TYPE CellToReport-E-UTRA-ENDC-Item PRESENCE mandatory}

}

CellToReport-E-UTRA-ENDC-Item ::= SEQUENCE {

e-utra-cell-ID ECGI,

iE-Extensions ProtocolExtensionContainer { {CellToReport-E-UTRA-ENDC-Item-ExtIEs} } OPTIONAL,

...

}

CellToReport-E-UTRA-ENDC-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

SSBToReport-List ::= SEQUENCE (SIZE (1.. maxnoofSSBAreas)) OF SSBToReport-Item

SSBToReport-Item ::= SEQUENCE {

ssbIndex SSBIndex,

iE-Extensions ProtocolExtensionContainer { {SSBToReport-Item-ExtIEs} } OPTIONAL,

...

}

SSBToReport-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- EN-DC RESOURCE STATUS RESPONSE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCResourceStatusResponse-IEs}},

...

}

ENDCResourceStatusResponse-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-UTRAN-Node1-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

{ ID id-E-UTRAN-Node2-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional } |

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC RESOURCE STATUS FAILURE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCResourceStatusFailure-IEs}},

...

}

ENDCResourceStatusFailure-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-UTRAN-Node1-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

{ ID id-E-UTRAN-Node2-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

{ ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC RESOURCE STATUS UPDATE

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusUpdate ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCResourceStatusUpdate-IEs}},

...

}

ENDCResourceStatusUpdate-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-UTRAN-Node1-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

{ ID id-E-UTRAN-Node2-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

{ ID id-CellMeasurementResult-NR-ENDC CRITICALITY ignore TYPE CellMeasurementResult-NR-ENDC-List PRESENCE optional }|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|

{ ID id-CellMeasurementResult-E-UTRA-ENDC CRITICALITY ignore TYPE CellMeasurementResult-E-UTRA-ENDC-List PRESENCE optional},

...

}

CellMeasurementResult-NR-ENDC-List ::= SEQUENCE (SIZE (1..maxCellinengNB)) OF ProtocolIE-Single-Container { {CellMeasurementResult-NR-ENDC-ItemIEs} }

CellMeasurementResult-NR-ENDC-ItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-CellMeasurementResult-NR-ENDC-Item CRITICALITY ignore TYPE CellMeasurementResult-NR-ENDC-Item PRESENCE mandatory}

}

CellMeasurementResult-NR-ENDC-Item ::= SEQUENCE {

nr-cell-ID NRCGI,

nr-radioResourceStatus NRRadioResourceStatus OPTIONAL,

tnlCapacityIndicator TNLCapacityIndicator OPTIONAL,

nr-compositeAvailableCapacityGroup NRCompositeAvailableCapacityGroup OPTIONAL,

numberofActiveUEs INTEGER (0..16777215, ...) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {CellMeasurementResult-NR-ENDC-Item-ExtIEs} } OPTIONAL,

...

}

CellMeasurementResult-NR-ENDC-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

CellMeasurementResult-E-UTRA-ENDC-List ::= SEQUENCE (SIZE (1..maxCellineNB))   
 OF ProtocolIE-Single-Container { {CellMeasurementResult-E-UTRA-ENDC-ItemIEs} }

CellMeasurementResult-E-UTRA-ENDC-ItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-CellMeasurementResult-E-UTRA-ENDC-Item CRITICALITY ignore TYPE CellMeasurementResult-E-UTRA-ENDC-Item PRESENCE mandatory}

}

CellMeasurementResult-E-UTRA-ENDC-Item ::= SEQUENCE {

e-utra-cell-ID ECGI,

hWLoadIndicator HWLoadIndicator OPTIONAL,

s1TNLLoadIndicator S1TNLLoadIndicator OPTIONAL,

radioResourceStatus RadioResourceStatus OPTIONAL,

compositeAvailableCapacityGroup CompositeAvailableCapacityGroup OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {CellMeasurementResult-E-UTRA-ENDC-Item-ExtIEs} } OPTIONAL,

...

}

CellMeasurementResult-E-UTRA-ENDC-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- SECONDARY RAT DATA USAGE REPORT

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- SGNB ACTIVITY NOTIFICATION

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 ignore TYPE UserPlaneTrafficActivityReport PRESENCE optional}|

{ ID id-ERABActivityNotifyItemList CRITICALITY ignore TYPE ERABActivityNotifyItemList PRESENCE optional}|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- EN-DC PARTIAL RESET REQUIRED

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC PARTIAL RESET CONFIRM

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCPartialResetConfirm ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCPartialResetConfirm-IEs}},

...

}

ENDCPartialResetConfirm-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-UEs-Admitted-ToBeReset CRITICALITY reject TYPE UEsToBeResetList PRESENCE mandatory}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

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 (0..maxCellineNB)) OF ECGI

ListofNRCellsinNRCoordinationResp ::= SEQUENCE (SIZE (0..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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

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}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

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 }|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- DATA FORWARDING ADDRESS INDICATION

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

DataForwardingAddressIndication ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{DataForwardingAddressIndication-IEs}},

...

}

DataForwardingAddressIndication-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-E-RABs-DataForwardingAddress-List CRITICALITY ignore TYPE E-RABs-DataForwardingAddress-List PRESENCE mandatory}|

{ ID id-CHO-DC-Indicator CRITICALITY reject TYPE CHO-DC-Indicator PRESENCE optional}|

{ ID id-CHO-DC-EarlyDataForwarding CRITICALITY ignore TYPE CHO-DC-EarlyDataForwarding PRESENCE optional}|

{ ID id-SgNB-UE-X2AP-ID CRITICALITY ignore TYPE SgNB-UE-X2AP-ID PRESENCE optional},

...

}

E-RABs-DataForwardingAddress-List ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-Single-Container { {E-RABs-DataForwardingAddress-ItemIEs} }

E-RABs-DataForwardingAddress-ItemIEs X2AP-PROTOCOL-IES ::= {

{ ID id-E-RABs-DataForwardingAddress-Item CRITICALITY ignore TYPE E-RABs-DataForwardingAddress-Item PRESENCE mandatory},

...

}

E-RABs-DataForwardingAddress-Item ::= SEQUENCE {

e-RAB-ID E-RAB-ID,

dl-GTPtunnelEndpoint GTPtunnelEndpoint,

iE-Extensions ProtocolExtensionContainer { {E-RABs-DataForwardingAddress-ItemExtIEs} } OPTIONAL,

...

}

E-RABs-DataForwardingAddress-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- GNB STATUS INDICATION

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GNBStatusIndication ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { GNBStatusIndicationIEs} },

...

}

GNBStatusIndicationIEs X2AP-PROTOCOL-IES ::= {

{ ID id-GNBOverloadInformation CRITICALITY ignore TYPE GNBOverloadInformation PRESENCE mandatory}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC CONFIGURATION TRANSFER

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCConfigurationTransfer ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ENDCConfigurationTransfer-IEs}},

...

}

ENDCConfigurationTransfer-IEs X2AP-PROTOCOL-IES ::= {

{ ID id-endcSONConfigurationTransfer CRITICALITY ignore TYPE EndcSONConfigurationTransfer PRESENCE optional}|

{ ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- TRACE START

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

TraceStart ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {TraceStartIEs} },

...

}

TraceStartIEs 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-TraceActivation CRITICALITY ignore TYPE TraceActivation PRESENCE mandatory }|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- DEACTIVATE TRACE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

DeactivateTrace ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {DeactivateTraceIEs} },

...

}

DeactivateTraceIEs 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-EUTRANTraceID CRITICALITY ignore TYPE EUTRANTraceID PRESENCE mandatory }|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- CELL TRAFFIC TRACE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

CellTrafficTrace ::= SEQUENCE {

protocolIEs ProtocolIE-Container { {CellTrafficTraceIEs} },

...

}

CellTrafficTraceIEs 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-EUTRANTraceID CRITICALITY ignore TYPE EUTRANTraceID PRESENCE mandatory }|

{ ID id-TraceCollectionEntityIPAddress CRITICALITY ignore TYPE TraceCollectionEntityIPAddress PRESENCE mandatory }|

{ ID id-PrivacyIndicator CRITICALITY ignore TYPE PrivacyIndicator PRESENCE optional }|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- F1-C TRAFFIC TRANSFER

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

F1CTrafficTransfer ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{ F1CTrafficTransfer-IEs}},

...

}

F1CTrafficTransfer-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-F1CTrafficContainer CRITICALITY reject TYPE F1CTrafficContainer PRESENCE mandatory}|

{ ID id-MeNB-UE-X2AP-ID-Extension CRITICALITY reject TYPE UE-X2AP-ID-Extension PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- UE RADIO CAPABILITY ID MAPPING REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

UERadioCapabilityIDMappingRequest::= SEQUENCE {

protocolIEs ProtocolIE-Container { { UERadioCapabilityIDMappingRequestIEs} },

...

}

UERadioCapabilityIDMappingRequestIEs X2AP-PROTOCOL-IES ::= {

{ ID id-UERadioCapabilityID CRITICALITY reject TYPE UERadioCapabilityID PRESENCE mandatory },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- UE RADIO CAPABILITY ID MAPPING RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

UERadioCapabilityIDMappingResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { UERadioCapabilityIDMappingResponseIEs} },

...

}

UERadioCapabilityIDMappingResponseIEs X2AP-PROTOCOL-IES ::= {

{ ID id-UERadioCapabilityID CRITICALITY reject TYPE UERadioCapabilityID PRESENCE mandatory }|

{ ID id-UERadioCapability CRITICALITY ignore TYPE UERadioCapability PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

END

-- ASN1STOP

### 9.3.5 Information Element definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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-PRACH-Configuration,

id-CSG-Id,

id-MDTConfiguration,

id-SignallingBasedMDTPLMNList,

id-MultibandInfoList,

id-FreqBandIndicatorPriority,

id-NeighbourTAC,

id-Time-UE-StayedInCell-EnhancedGranularity,

id-MBMS-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-NRrestrictioninEPSasSecondaryRAT,

id-NRrestrictionin5GS,

id-AdditionalSpecialSubframe-Info,

id-UEID,

id-enhancedRNTP,

id-ProSeUEtoNetworkRelaying,

id-M6Configuration,

id-M7Configuration,

id-OffsetOfNbiotChannelNumberToDL-EARFCN,

id-OffsetOfNbiotChannelNumberToUL-EARFCN,

id-AdditionalSpecialSubframeExtension-Info,

id-BandwidthReducedSI,

id-extended-e-RAB-MaximumBitrateDL,

id-extended-e-RAB-MaximumBitrateUL,

id-extended-e-RAB-GuaranteedBitrateDL,

id-extended-e-RAB-GuaranteedBitrateUL,

id-extended-uEaggregateMaximumBitRateDownlink,

id-extended-uEaggregateMaximumBitRateUplink,

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,

id-CNTypeRestrictions,

id-BluetoothMeasurementConfiguration,

id-WLANMeasurementConfiguration,

id-ECGI,

id-NRCGI,

id-MeNBCoordinationAssistanceInformation,

id-SgNBCoordinationAssistanceInformation,

id-NRNeighbourInfoToAdd,

id-LastNG-RANPLMNIdentity,

id-BPLMN-ID-Info-EUTRA,

id-NBIoT-UL-DL-AlignmentOffset,

id-UnlicensedSpectrumRestriction,

id-CarrierList,

id-FrequencyShift7p5khz,

id-NPRACHConfiguration,

id-MDTConfigurationNR,

id-CSI-RSTransmissionIndication,

id-QoS-Mapping-Information,

id-IntendedTDD-DL-ULConfiguration-NR,

id-TraceCollectionEntityURI,

id-SFN-Offset,

id-AdditionLocationInformation,

maxnoofBearers,

maxCellineNB,

maxEARFCN,

maxEARFCNPlusOne,

newmaxEARFCN,

maxInterfaces,

maxnoofBands,

maxnoofBPLMNs,

maxnoofAdditionalPLMNs,

maxnoofCells,

maxnoofEPLMNs,

maxnoofEPLMNsPlusOne,

maxnoofForbLACs,

maxnoofForbTACs,

maxnoofNeighbours,

maxnoofPRBs,

maxNrOfErrors,

maxPools,

maxnoofMBSFN,

maxnoofTAforMDT,

maxnoofCellIDforMDT,

maxnoofMBMSServiceAreaIdentities,

maxnoofMDTPLMNs,

maxnoofCoMPHypothesisSet,

maxnoofCoMPCells,

maxUEReport,

maxCellReport,

maxnoofPA,

maxCSIProcess,

maxCSIReport,

maxSubband,

maxnooftimeperiods,

maxnoofCellIDforQMC,

maxnoofTAforQMC,

maxnoofPLMNforQMC,

maxUEsinengNBDU,

maxnoofProtectedResourcePatterns,

maxnoNRcellsSpectrumSharingWithE-UTRA,

maxnoofNrCellBands,

maxnoofBluetoothName,

maxnoofWLANName,

maxofNRNeighbours,

maxnoofextBPLMNs,

maxnoofTLAs,

maxnoofGTPTLAs,

maxnoofTNLAssociations,

maxnoofCellsinCHO, maxnoofPC5QoSFlows,

maxnoofSSBAreas,

maxnoofNRSCSs,

maxnoofNRPhysicalResourceBlocks,

maxnoofNonAnchorCarrierFreqConfig

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,

...

}

ABSInformationFDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

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,

...

}

ABSInformationTDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

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)

AdditionLocationInformation ::= ENUMERATED {

includePSCell,

...

}

AdditionalRRMPriorityIndex ::= BIT STRING (SIZE(32))

AdditionalSpecialSubframe-Info ::= SEQUENCE {

additionalspecialSubframePatterns AdditionalSpecialSubframePatterns,

cyclicPrefixDL CyclicPrefixDL,

cyclicPrefixUL CyclicPrefixUL,

iE-Extensions ProtocolExtensionContainer { {AdditionalSpecialSubframe-Info-ExtIEs} } OPTIONAL,

...

}

AdditionalSpecialSubframe-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

AdditionalSpecialSubframePatterns ::= ENUMERATED {

ssp0,

ssp1,

ssp2,

ssp3,

ssp4,

ssp5,

ssp6,

ssp7,

ssp8,

ssp9,

...

}

AdditionalSpecialSubframeExtension-Info ::= SEQUENCE {

additionalspecialSubframePatternsExtension AdditionalSpecialSubframePatternsExtension,

cyclicPrefixDL CyclicPrefixDL,

cyclicPrefixUL CyclicPrefixUL,

iE-Extensions ProtocolExtensionContainer { {AdditionalSpecialSubframeExtension-Info-ExtIEs} } OPTIONAL,

...

}

AdditionalSpecialSubframeExtension-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

AdditionalSpecialSubframePatternsExtension ::= ENUMERATED {

ssp10,

...

}

AvailableFastMCGRecoveryViaSRB3 ::= ENUMERATED {true,...}

AerialUEsubscriptionInformation ::= ENUMERATED {

allowed,

not-allowed,

...

}

AllocationAndRetentionPriority ::= SEQUENCE {

priorityLevel PriorityLevel,

pre-emptionCapability Pre-emptionCapability,

pre-emptionVulnerability Pre-emptionVulnerability,

iE-Extensions ProtocolExtensionContainer { {AllocationAndRetentionPriority-ExtIEs} } OPTIONAL,

...

}

AllocationAndRetentionPriority-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

AreaScopeOfMDT ::= CHOICE {

cellBased CellBasedMDT,

tABased TABasedMDT,

pLMNWide NULL,

...,

tAIBased TAIBasedMDT

}

AreaScopeOfQMC ::= CHOICE {

cellBased CellBasedQMC,

tABased TABasedQMC,

tAIBased 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 ::= {

...

}

AdditionalPLMNs-Item ::= SEQUENCE (SIZE(1..maxnoofAdditionalPLMNs)) OF PLMN-Identity

-- 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

BluetoothMeasurementConfiguration ::= SEQUENCE {

bluetoothMeasConfig BluetoothMeasConfig,

bluetoothMeasConfigNameList BluetoothMeasConfigNameList OPTIONAL,

bt-rssi ENUMERATED {true, ...} OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {BluetoothMeasurementConfiguration-ExtIEs} } OPTIONAL,

...

}

BluetoothMeasurementConfiguration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

BluetoothMeasConfigNameList ::= SEQUENCE (SIZE(1..maxnoofBluetoothName)) OF BluetoothName

BluetoothMeasConfig::= ENUMERATED {setup,...}

BluetoothName ::= OCTET STRING (SIZE (1..248))

BPLMN-ID-Info-EUTRA ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF BPLMN-ID-Info-EUTRA-Item

BPLMN-ID-Info-EUTRA-Item ::= SEQUENCE {

broadcastPLMNs BroadcastPLMNs-Item,

tac TAC,

e-utraCI EUTRANCellIdentifier,

iE-Extension ProtocolExtensionContainer { {BPLMN-ID-Info-EUTRA-Item-ExtIEs} } OPTIONAL,

...

}

BPLMN-ID-Info-EUTRA-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

BPLMN-ID-Info-NR ::= SEQUENCE (SIZE(1..maxnoofextBPLMNs)) OF BPLMN-ID-Info-NR-Item

BPLMN-ID-Info-NR-Item ::= SEQUENCE {

broadcastPLMNs BroadcastextPLMNs,

fiveGS-TAC FiveGS-TAC OPTIONAL,

nr-CI NRCellIdentifier,

iE-Extension ProtocolExtensionContainer { {BPLMN-ID-Info-NR-Item-ExtIEs} } OPTIONAL,

...

}

BPLMN-ID-Info-NR-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

BroadcastextPLMNs ::= SEQUENCE (SIZE(1..maxnoofextBPLMNs)) 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,

om-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,

no-radio-resources-available,

invalid-QoS-combination,

encryption-algorithms-not-supported,

procedure-cancelled,

rRM-purpose,

improve-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,

cho-cpc-resources-tobechanged,

ue-power-saving,

insufficient-ue-capabilities,

normal-release,

unknown-E-UTRAN-Node-Measurement-ID

}

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 ::= {

...

}

CHO-DC-EarlyDataForwarding ::= ENUMERATED {stop, ...}

CHO-DC-Indicator ::= ENUMERATED {true, ...}

CNTypeRestrictions ::= SEQUENCE (SIZE(1.. maxnoofEPLMNsPlusOne)) OF CNTypeRestrictionsItem

CNTypeRestrictionsItem ::= SEQUENCE {

plmn-Id PLMN-Identity,

cn-type ENUMERATED {fiveGC-forbidden, ... , epc-forbidden},

iE-Extensions ProtocolExtensionContainer { {CNTypeRestrictionsItem-ExtIEs} } OPTIONAL,

...

}

CNTypeRestrictionsItem-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 CoMPHypothesisSet,

benefitMetric 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

...

}

CPTransportLayerInformation ::= CHOICE {

endpointIPAddress TransportLayerAddress,

endpointIPAddressAndPort TransportLayerAddressAndPort,

...

}

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,

...

}

CHOtrigger ::= ENUMERATED {

cho-initiation,

cho-replace,

...

}

CHOinformation-REQ ::= SEQUENCE {

cho-trigger CHOtrigger,

new-eNB-UE-X2AP-ID UE-X2AP-ID OPTIONAL

-- This IE shall be present if the cho-trigger IE is present and set to "CHO-replace" --,

new-eNB-UE-X2AP-ID-Extension UE-X2AP-ID-Extension OPTIONAL,

cHO-EstimatedArrivalProbability CHO-Probability OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { CHOinformation-REQ-ExtIEs} } OPTIONAL,

...

}

CHOinformation-REQ-ExtIEs X2AP-PROTOCOL-EXTENSION ::={

...

}

CHOinformation-ACK ::= SEQUENCE {

requestedTargetCellID ECGI,

maxCHOpreparations MaxCHOpreparations OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { CHOinformation-ACK-ExtIEs} } OPTIONAL,

...

}

CHOinformation-ACK-ExtIEs X2AP-PROTOCOL-EXTENSION ::={

...

}

CandidateCellsToBeCancelledList ::= SEQUENCE (SIZE (1..maxnoofCellsinCHO)) OF ECGI

CHO-Probability ::= INTEGER (1..100)

CSI-RSTransmissionIndication ::= ENUMERATED {

activated,

deactivated,

...

}

-- D

DataTrafficResources ::= BIT STRING (SIZE(6..17600))

DataTrafficResourceIndication ::= SEQUENCE {

activationSFN INTEGER (0..1023),

sharedResourceType SharedResourceType,

reservedSubframePattern ReservedSubframePattern OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {DataTrafficResourceIndication-ExtIEs} } OPTIONAL,

...

}

DataTrafficResourceIndication-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

DAPSRequestInfo ::= SEQUENCE {

dAPSIndicator ENUMERATED {daps-HO-required, ...},

iE-Extensions ProtocolExtensionContainer { {DAPSRequestInfo-ExtIEs} } OPTIONAL,

...

}

DAPSRequestInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

DAPSResponseInfo ::= SEQUENCE {

dAPSResponseIndicator ENUMERATED { daps-HO-accepted, daps-HO-not-accepted,...},

iE-Extensions ProtocolExtensionContainer { { DAPSResponseInfo-ExtIEs} } OPTIONAL,

...

}

DAPSResponseInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

DeactivationIndication::= ENUMERATED {

deactivated,

...

}

DeliveryStatus ::= SEQUENCE {

highestSuccessDeliveredPDCPSN INTEGER (0..4095),

iE-Extensions ProtocolExtensionContainer { {DeliveryStatus-ExtIEs} } OPTIONAL,

...

}

DeliveryStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

DesiredActNotificationLevel ::= ENUMERATED {none, e-rab, ue-level, ...}

DirectForwardingPathAvailability ::= ENUMERATED {direct-path-available, ...}

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)

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

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 ::= {

...

}

EndcSONConfigurationTransfer ::= OCTET STRING

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 ::= {

...

}

EPCHandoverRestrictionListContainer ::= OCTET STRING

-- This octets of the OCTET STRING contain the Handover Restriction List IE as specified in TS 36.413 [4]. --

EPLMNs ::= SEQUENCE (SIZE(1..maxnoofEPLMNs)) OF PLMN-Identity

ERABActivityNotifyItemList ::= SEQUENCE (SIZE (0..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-RABsSubjectToEarlyStatusTransfer-List ::= SEQUENCE (SIZE (1.. maxnoofBearers)) OF E-RABsSubjectToEarlyStatusTransfer-Item

E-RABsSubjectToEarlyStatusTransfer-Item ::= SEQUENCE {

e-RAB-ID E-RAB-ID,

fIRST-DL-COUNTValue COUNTvalue,

fIRST-DL-COUNTValueExtended COUNTValueExtended OPTIONAL,

fIRST-DL-COUNTValueforPDCPSNLength18 COUNTvaluePDCP-SNlength18 OPTIONAL,

iE-Extension ProtocolExtensionContainer { { E-RABsSubjectToEarlyStatusTransfer-Item-ExtIEs} } OPTIONAL,

...

}

E-RABsSubjectToEarlyStatusTransfer-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

E-RABsSubjectToDLDiscarding-List ::= SEQUENCE (SIZE (1.. maxnoofBearers)) OF E-RABsSubjectToDLDiscarding-Item

E-RABsSubjectToDLDiscarding-Item ::= SEQUENCE {

e-RAB-ID E-RAB-ID,

dISCARD-DL-COUNTValue COUNTvalue,

dISCARD-DL-COUNTValueExtended COUNTValueExtended OPTIONAL,

dISCARD-DL-COUNTValueforPDCPSNLength18 COUNTvaluePDCP-SNlength18 OPTIONAL,

iE-Extension ProtocolExtensionContainer { { E-RABsSubjectToDLDiscarding-Item-ExtIEs} } OPTIONAL,

...

}

E-RABsSubjectToDLDiscarding-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 ::= {

...

}

Ethernet-Type ::= ENUMERATED {

true,

...

}

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

F1CTrafficContainer ::= OCTET STRING

FastMCGRecovery ::= SEQUENCE {

rrcContainer RRCContainer OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {FastMCGRecovery-ExtIEs} } OPTIONAL,

...

}

FastMCGRecovery-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

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},

...

}

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 ::= {

...

}

FiveQI ::= INTEGER (0..255, ...)

ForbiddenInterRATs ::= ENUMERATED {

all,

geran,

utran,

cdma2000,

...,

geranandutran,

cdma2000andutran

}

ForbiddenTAs ::= SEQUENCE (SIZE(1.. maxnoofEPLMNsPlusOne)) 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..maxnoofEPLMNsPlusOne)) 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 ::= {

...

}

FrequencyShift7p5khz ::= ENUMERATED {false, true, ...}

-- 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}|

{ ID id-extended-e-RAB-GuaranteedBitrateDL CRITICALITY ignore EXTENSION ExtendedBitRate PRESENCE optional}|

{ ID id-extended-e-RAB-GuaranteedBitrateUL 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 ::= {

...

}

Global-RAN-NODE-ID ::= CHOICE {

gNB GlobalGNB-ID,

choice-extension ProtocolIE-Single-Container { { Global-RAN-NODE-ID-ExtIEs} }

}

Global-RAN-NODE-ID-ExtIEs X2AP-PROTOCOL-IES ::= {

...

}

GNBOverloadInformation ::= ENUMERATED {overloaded, not-overloaded, ...}

GTPTLAs ::= SEQUENCE (SIZE(1.. maxnoofGTPTLAs)) OF GTPTLA-Item

GTPTLA-Item ::= SEQUENCE {

gTPTransportLayerAddresses TransportLayerAddress,

iE-Extensions ProtocolExtensionContainer { { GTPTLA-Item-ExtIEs } } OPTIONAL,

...

}

GTPTLA-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

GTPtunnelEndpoint ::= SEQUENCE {

transportLayerAddress TransportLayerAddress,

gTP-TEID GTP-TEI,

iE-Extensions ProtocolExtensionContainer { {GTPtunnelEndpoint-ExtIEs} } OPTIONAL,

...

}

GTPtunnelEndpoint-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ID id-QoS-Mapping-Information CRITICALITY reject EXTENSION QoS-Mapping-Information PRESENCE optional},

...

}

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,

interSystemPingpong

}

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-NRrestrictioninEPSasSecondaryRAT CRITICALITY ignore EXTENSION NRrestrictioninEPSasSecondaryRAT PRESENCE optional}|

{ ID id-CNTypeRestrictions CRITICALITY ignore EXTENSION CNTypeRestrictions PRESENCE optional}|

{ ID id-NRrestrictionin5GS CRITICALITY ignore EXTENSION NRrestrictionin5GS PRESENCE optional}|

{ ID id-LastNG-RANPLMNIdentity CRITICALITY ignore EXTENSION PLMN-Identity PRESENCE optional}|

{ ID id-UnlicensedSpectrumRestriction CRITICALITY ignore EXTENSION UnlicensedSpectrumRestriction 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

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

IABAuthorized ::= ENUMERATED {

authorized,

not-authorized,

...

}

IMSvoiceEPSfallbackfrom5G ::= ENUMERATED {

true,

...

}

IntegrityProtectionAlgorithms ::= BIT STRING (SIZE (16, ...))

IntendedTDD-DL-ULConfiguration-NR ::= OCTET STRING

InterfaceInstanceIndication ::= INTEGER (0..255, ...)

InterfacesToTrace ::= BIT STRING (SIZE (8))

InvokeIndication ::= ENUMERATED{

abs-information,

...,

naics-information-start,

naics-information-stop

}

-- J

-- 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,

...,

nG-RAN-Cell LastVisitedNGRANCellInformation

}

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,

...

}

LastVisitedNGRANCellInformation ::= OCTET STRING

LastVisitedUTRANCellInformation ::= OCTET STRING

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

LHN-ID ::= OCTET STRING(SIZE (32..256))

Links-to-log ::= ENUMERATED {uplink, downlink, both-uplink-and-downlink, ...}

LoadIndicator ::= ENUMERATED {

lowLoad,

mediumLoad,

highLoad,

overLoad,

...

}

LocationInformationSgNB ::= SEQUENCE {

pSCell-id NRCGI,

iE-Extensions ProtocolExtensionContainer { {LocationInformationSgNB-ExtIEs} } OPTIONAL,

...

}

LocationInformationSgNB-ExtIEs X2AP-PROTOCOL-EXTENSION ::={

...

}

LocationInformationSgNBReporting ::= ENUMERATED {

pSCell,

...

}

LocationReportingInformation ::= SEQUENCE {

eventType EventType,

reportArea ReportArea,

iE-Extensions ProtocolExtensionContainer { {LocationReportingInformation-ExtIEs} } OPTIONAL,

...

}

LocationReportingInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::={

{ ID id-AdditionLocationInformation CRITICALITY ignore EXTENSION AdditionLocationInformation PRESENCE optional},

...

}

LowerLayerPresenceStatusChange ::= ENUMERATED {

release-lower-layers,

re-establish-lower-layers,

suspend-lower-layers,

resume-lower-layers,

...

}

-- M

M1PeriodicReporting ::= SEQUENCE {

reportInterval ReportIntervalMDT,

reportAmount ReportAmountMDT,

iE-Extensions ProtocolExtensionContainer { {M1PeriodicReporting-ExtIEs} } OPTIONAL,

...

}

M1PeriodicReporting-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

M1ReportingTrigger::= ENUMERATED{

periodic,

a2eventtriggered,

...,

a2eventtriggered-periodic

}

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))

MaxCHOpreparations ::= INTEGER(1..8, ...)

MDT-Activation ::= ENUMERATED {

immediate-MDT-only,

immediate-MDT-and-Trace,

...

}

MDT-Configuration ::= SEQUENCE {

mdt-Activation MDT-Activation,

areaScopeOfMDT AreaScopeOfMDT,

measurementsToActivate MeasurementsToActivate,

m1reportingTrigger M1ReportingTrigger,

m1thresholdeventA2 M1ThresholdEventA2 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}|

{ ID id-BluetoothMeasurementConfiguration CRITICALITY ignore EXTENSION BluetoothMeasurementConfiguration PRESENCE optional}|

{ ID id-WLANMeasurementConfiguration CRITICALITY ignore EXTENSION WLANMeasurementConfiguration PRESENCE optional},

...

}

MDTPLMNList ::= SEQUENCE (SIZE(1..maxnoofMDTPLMNs)) OF PLMN-Identity

MDT-Location-Info ::= BIT STRING (SIZE (8))

Measurement-ID ::= INTEGER (1..4095, ...)

Measurement-ID-ENDC ::= INTEGER (1..4095, ...)

MeasurementsToActivate::= BIT STRING (SIZE (8))

MeasurementThresholdA2 ::= CHOICE {

threshold-RSRP Threshold-RSRP,

threshold-RSRQ Threshold-RSRQ,

...

}

MeNBCoordinationAssistanceInformation ::= ENUMERATED{

coordination-not-required,

...

}

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 ::= {

{ ID id-NRCGI CRITICALITY ignore EXTENSION NRCGI PRESENCE optional}|

{ ID id-MeNBCoordinationAssistanceInformation CRITICALITY reject EXTENSION MeNBCoordinationAssistanceInformation PRESENCE optional},

...

}

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,

radioframeAllocationOffset RadioframeAllocationOffset,

subframeAllocation SubframeAllocation,

iE-Extensions ProtocolExtensionContainer { {MBSFN-Subframe-Info-ExtIEs} } OPTIONAL,

...

}

MBSFN-Subframe-Info-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

MDT-ConfigurationNR ::= OCTET STRING

MobilityParametersModificationRange ::= SEQUENCE {

handoverTriggerChangeLowerLimit INTEGER (-20..20),

handoverTriggerChangeUpperLimit INTEGER (-20..20),

...

}

MobilityParametersInformation ::= SEQUENCE {

handoverTriggerChange INTEGER (-20..20),

...

}

MultibandInfoList ::= SEQUENCE (SIZE(1..maxnoofBands)) OF BandInfo

MessageOversizeNotification ::= SEQUENCE {

maximumCellListSize MaximumCellListSize,

iE-Extensions ProtocolExtensionContainer { {MessageOversizeNotification-ExtIEs} } OPTIONAL,

...

}

MessageOversizeNotification-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

MaximumCellListSize ::= INTEGER(1..16384, ...)

BandInfo ::= SEQUENCE {

freqBandIndicator FreqBandIndicator,

iE-Extensions ProtocolExtensionContainer { {BandInfo-ExtIEs} } OPTIONAL,

...

}

BandInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

MeNBtoSgNBContainer ::= OCTET STRING

SplitSRBs ::= ENUMERATED {srb1, srb2, srb1and2, ...}

SplitSRB ::= SEQUENCE {

rrcContainer RRCContainer OPTIONAL,

srbType SRBType,

deliveryStatus DeliveryStatus OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {SplitSRB-ExtIEs} } OPTIONAL,

...

}

SplitSRB-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- N

NBIoT-UL-DL-AlignmentOffset ::= ENUMERATED {

khz-7dot5,

khz0,

khz7dot5,

...

}

NBIoT-RLF-Report-Container ::= OCTET STRING

Neighbour-Information ::= SEQUENCE (SIZE (0..maxnoofNeighbours)) OF SEQUENCE {

eCGI ECGI,

pCI PCI,

eARFCN EARFCN,

iE-Extensions ProtocolExtensionContainer { {Neighbour-Information-ExtIEs} } OPTIONAL,

...

}

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)

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

Number-of-Antennaports ::= ENUMERATED {

an1,

an2,

an4,

...

}

NRCapacityValue ::= SEQUENCE {

capacityValue INTEGER (0..100),

ssbAreaCapacityValue-List SSBAreaCapacityValue-List OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { NRCapacityValue-ExtIEs} } OPTIONAL,

...

}

NRCapacityValue-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRCarrierList ::= SEQUENCE (SIZE(1..maxnoofNRSCSs)) OF NRCarrierItem

NRCarrierItem ::= SEQUENCE {

carrierSCS NRSCS,

offsetToCarrier INTEGER (0..2199, ...),

carrierBandwidth INTEGER (0..maxnoofNRPhysicalResourceBlocks, ...),

iE-Extension ProtocolExtensionContainer { {NRCarrierItem-ExtIEs} } OPTIONAL,

...

}

NRCarrierItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRCellCapacityClassValue ::= INTEGER (1..100, ...)

NRCellPRACHConfig ::= OCTET STRING

NRCompositeAvailableCapacityGroup ::= SEQUENCE {

compositeAvailableCapacityDL NRCompositeAvailableCapacity,

compositeAvailableCapacityUL NRCompositeAvailableCapacity,

iE-Extensions ProtocolExtensionContainer { {NRCompositeAvailableCapacityGroup-ExtIEs} } OPTIONAL,

...

}

NRCompositeAvailableCapacityGroup-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRCompositeAvailableCapacity ::= SEQUENCE {

cellCapacityClassValue NRCellCapacityClassValue OPTIONAL,

capacityValue NRCapacityValue,

iE-Extensions ProtocolExtensionContainer { {NRCompositeAvailableCapacity-ExtIEs} } OPTIONAL,

...

}

NRCompositeAvailableCapacity-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRFreqInfo ::= SEQUENCE{

nRARFCN INTEGER (0.. 3279165),

freqBandListNr SEQUENCE (SIZE(1..maxnoofNrCellBands)) OF FreqBandNrItem,

sULInformation SULInformation OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {NRFreqInfo-ExtIEs} } OPTIONAL,

...

}

NRFreqInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-FrequencyShift7p5khz CRITICALITY ignore EXTENSION FrequencyShift7p5khz PRESENCE optional},

...

}

NRCellIdentifier ::= BIT STRING (SIZE (36))

NRCGI ::= SEQUENCE {

pLMN-Identity PLMN-Identity,

nRcellIdentifier NRCellIdentifier,

iE-Extensions ProtocolExtensionContainer { {NRCGI-ExtIEs} } OPTIONAL,

...

}

NRCGI-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRNeighbour-Information ::= SEQUENCE (SIZE (1.. maxofNRNeighbours))OF SEQUENCE {

nrpCI NRPCI,

nrCellID NRCGI,

fiveGS-TAC FiveGS-TAC OPTIONAL,

configured-TAC TAC OPTIONAL,

measurementTimingConfiguration OCTET STRING,

nRNeighbourModeInfo CHOICE {

fdd FDD-InfoNeighbourServedNRCell-Information,

tdd TDD-InfoNeighbourServedNRCell-Information,

...

},

iE-Extensions ProtocolExtensionContainer { {NRNeighbour-Information-ExtIEs} } OPTIONAL,

...

}

NRNeighbour-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ID id-CSI-RSTransmissionIndication CRITICALITY ignore EXTENSION CSI-RSTransmissionIndication PRESENCE optional},

...

}

NPRACHConfiguration::= SEQUENCE {

fdd-or-tdd CHOICE {

fdd NPRACHConfiguration-FDD,

tdd NPRACHConfiguration-TDD,

...

}, iE-Extensions ProtocolExtensionContainer { { NPRACHConfiguration-ExtIEs} } OPTIONAL,

...

}

NPRACHConfiguration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NPRACHConfiguration-FDD::= SEQUENCE {

nprach-CP-length NPRACH-CP-Length,

anchorCarrier-NPRACHConfig OCTET STRING,

anchorCarrier-EDT-NPRACHConfig OCTET STRING OPTIONAL,

anchorCarrier-Format2-NPRACHConfig OCTET STRING OPTIONAL,

anchorCarrier-Format2-EDT-NPRACHConfig OCTET STRING OPTIONAL,

non-anchorCarrier-NPRACHConfig OCTET STRING OPTIONAL,

non-anchorCarrier-Format2-NPRACHConfig OCTET STRING OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { NPRACHConfiguration-FDD-ExtIEs} } OPTIONAL,

...

}

NPRACHConfiguration-FDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NPRACHConfiguration-TDD::= SEQUENCE {

nprach-preambleFormat NPRACH-preambleFormat,

anchorCarrier-NPRACHConfigTDD OCTET STRING,

non-anchorCarrierFequencyConfiglist Non-AnchorCarrierFrequencylist OPTIONAL,

non-anchorCarrier-NPRACHConfigTDD OCTET STRING OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { NPRACHConfiguration-TDD-ExtIEs} } OPTIONAL,

...

}

NPRACHConfiguration-TDD-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NPRACH-CP-Length::= ENUMERATED {

us66dot7,

us266dot7,

...

}

NPRACH-preambleFormat::= ENUMERATED {fmt0,fmt1,fmt2,fmt0a,fmt1a,...}

Non-AnchorCarrierFrequencylist ::= SEQUENCE (SIZE(1..maxnoofNonAnchorCarrierFreqConfig)) OF

SEQUENCE {

non-anchorCarrioerFrquency OCTET STRING,

iE-Extensions ProtocolExtensionContainer { { Non-AnchorCarrierFrequencylist-ExtIEs} } OPTIONAL,

...

}

Non-AnchorCarrierFrequencylist-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRPCI ::= INTEGER (0..1007)

NRrestrictioninEPSasSecondaryRAT ::= ENUMERATED {

nRrestrictedinEPSasSecondaryRAT,

...

}

NRRadioResourceStatus ::= SEQUENCE {

ssbAreaRadioResourceStatus-List SSBAreaRadioResourceStatus-List,

iE-Extensions ProtocolExtensionContainer { {NRRadioResourceStatus-ExtIEs} } OPTIONAL,

...

}

NRRadioResourceStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRrestrictionin5GS ::= ENUMERATED {

nRrestrictedin5GS,

...

}

NRencryptionAlgorithms ::= BIT STRING (SIZE (16,...))

NRintegrityProtectionAlgorithms ::= BIT STRING (SIZE (16,...))

NR-TxBW ::= SEQUENCE {

nRSCS NRSCS,

nRNRB NRNRB,

iE-Extensions ProtocolExtensionContainer { {NR-TxBW-ExtIEs} } OPTIONAL,

...

}

NR-TxBW-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRNRB ::= ENUMERATED { nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121, nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...}

NRSCS ::= ENUMERATED { scs15, scs30, scs60, scs120, ...}

NRS-NSSS-PowerOffset ::= ENUMERATED { minusThree, zero, three, ...}

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

NRUeReport ::= SEQUENCE {

uENRMeasurements RRCContainer,

iE-Extensions ProtocolExtensionContainer { { NRUeReport-ExtIEs} } OPTIONAL,

...

}

NRUeReport-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRUESidelinkAggregateMaximumBitRate ::= SEQUENCE {

uESidelinkAggregateMaximumBitRate BitRate,

iE-Extensions ProtocolExtensionContainer { { NRUESidelinkAggregateMaximumBitRate-ExtIEs} } OPTIONAL,

...

}

NRUESidelinkAggregateMaximumBitRate-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NRUESecurityCapabilities ::= SEQUENCE {

nRencryptionAlgorithms NRencryptionAlgorithms,

nRintegrityProtectionAlgorithms NRintegrityProtectionAlgorithms,

iE-Extensions ProtocolExtensionContainer { {NRUESecurityCapabilities-ExtIEs} } OPTIONAL,

...

}

NRUESecurityCapabilities-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

NSSS-NumOccasionDifferentPrecoder ::= ENUMERATED { two, four, eight, ...}

NRV2XServicesAuthorized ::= SEQUENCE {

vehicleUE VehicleUE OPTIONAL,

pedestrianUE PedestrianUE OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {NRV2XServicesAuthorized-ExtIEs} } OPTIONAL,

...

}

NRV2XServicesAuthorized-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- O

OffsetOfNbiotChannelNumberToEARFCN ::= ENUMERATED {

minusTen,

minusNine,

minusEight,

minusSeven,

minusSix,

minusFive,

minusFour,

minusThree,

minusTwo,

minusOne,

minusZeroDotFive,

zero,

one,

two,

three,

four,

five,

six,

seven,

eight,

nine,

...,

minusEightDotFive,

minusFourDotFive,

threeDotFive,

sevenDotFive

}

Oneframe ::= BIT STRING (SIZE (6))

-- P

Packet-LossRate ::= INTEGER(0..1000)

PA-Values ::= ENUMERATED {

dB-6,

dB-4dot77,

dB-3,

dB-1dot77,

dB0,

dB1,

dB2,

dB3,

...

}

PC5QoSParameters ::= SEQUENCE {

pc5QoSFlowList PC5QoSFlowList,

pc5LinkAggregatedBitRates BitRate OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { PC5QoSParameters-ExtIEs} } OPTIONAL,

...

}

PC5QoSParameters-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

    ...

}

PC5QoSFlowList ::= SEQUENCE (SIZE(1..maxnoofPC5QoSFlows)) OF PC5QoSFlowItem

PC5QoSFlowItem::= SEQUENCE {

pQI FiveQI,

pc5FlowBitRates PC5FlowBitRates OPTIONAL,

range Range OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { PC5QoSFlowItem-ExtIEs} } OPTIONAL,

...

}

PC5QoSFlowItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

             ...

}

PC5FlowBitRates ::= SEQUENCE {

guaranteedFlowBitRate BitRate,

maximumFlowBitRate BitRate,

iE-Extensions ProtocolExtensionContainer { { PC5FlowBitRates-ExtIEs} } OPTIONAL,

...

}

PC5FlowBitRates-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

             ...

}

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)

PDCPSnLength ::= ENUMERATED {twelve-bits,eighteen-bits,...}

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 ProtectedResourceList,

mBSFNControlRegionLength INTEGER (0..3) OPTIONAL,

pDCCHRegionLength INTEGER (1..3) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {ProtectedEUTRAResourceIndication-ExtIEs} } OPTIONAL,

...

}

ProtectedEUTRAResourceIndication-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

} -- Rapporteur: missing extension --

ProtectedFootprintTimePattern ::= SEQUENCE {

protectedFootprintTimePeriodicity INTEGER (1..320, ...),

protectedFootprintStartTime INTEGER (1..20, ...),

iE-Extensions ProtocolExtensionContainer { {ProtectedFootprintTimePattern-ExtIEs} } OPTIONAL,

...

}

ProtectedFootprintTimePattern-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

ProtectedResourceList ::= SEQUENCE (SIZE(1.. maxnoofProtectedResourcePatterns)) OF ProtectedResourceList-Item

ProtectedResourceList-Item ::= SEQUENCE {

resourceType ResourceType,

intraPRBProtectedResourceFootprint BIT STRING (SIZE(84, ...)),

protectedFootprintFrequencyPattern BIT STRING (SIZE(6..110, ...)),

protectedFootprintTimePattern ProtectedFootprintTimePattern,

iE-Extensions ProtocolExtensionContainer { {ProtectedResourceList-Item-ExtIEs} } OPTIONAL,

...

}

ProtectedResourceList-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

PartialListIndicator ::= ENUMERATED {partial, ...}

PrivacyIndicator ::= ENUMERATED {

immediate-MDT,

logged-MDT,

...

}

-- Q

QCI ::= INTEGER (0..255)

QoS-Mapping-Information ::= SEQUENCE {

dscp BIT STRING (SIZE(6)) OPTIONAL,

flow-label BIT STRING (SIZE(20)) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {QoS-Mapping-Information-ExtIEs} } OPTIONAL,

...

}

QoS-Mapping-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- R

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,

iE-Extensions ProtocolExtensionContainer { {RadioResourceStatus-ExtIEs} } OPTIONAL,

...

}

RadioResourceStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ID id-DL-scheduling-PDCCH-CCE-usage CRITICALITY ignore EXTENSION DL-scheduling-PDCCH-CCE-usage PRESENCE optional}|

{ID id-UL-scheduling-PDCCH-CCE-usage CRITICALITY ignore EXTENSION UL-scheduling-PDCCH-CCE-usage PRESENCE optional},

...

}

Range ::= ENUMERATED {m50, m80, m180, m200, m350, m400, m500, m700, m1000, ...}

RAN-UE-NGAP-ID ::= INTEGER (0..4294967295)

ReceiveStatusofULPDCPSDUs ::= BIT STRING (SIZE(4096))

ReceiveStatusOfULPDCPSDUsExtended ::= BIT STRING (SIZE(1..16384))

ReceiveStatusOfULPDCPSDUsPDCP-SNlength18 ::= BIT STRING (SIZE(1..131072))

ReleaseFastMCGRecoveryViaSRB3 ::= ENUMERATED {true,...}

Reestablishment-Indication ::= ENUMERATED {

reestablished,

...

}

Registration-Request ::= ENUMERATED {

start,

stop,

...,

partial-stop,

add

}

Registration-Request-ENDC ::= ENUMERATED {

start,

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,

ms10,

ms20,

ms40,

ms80,

...

}

ReportCharacteristics-ENDC ::= BIT STRING (SIZE (32))

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}

RequestedFastMCGRecoveryViaSRB3 ::= ENUMERATED {true,...}

RequestedFastMCGRecoveryViaSRB3Release ::= ENUMERATED {true,...}

ReservedSubframePattern ::= SEQUENCE{

subframeType SubframeType,

reservedSubframePattern BIT STRING (SIZE(10..160)),

mBSFNControlRegionLength INTEGER (0..3),

iE-Extensions ProtocolExtensionContainer { {ReservedSubframePattern-ExtIEs} } OPTIONAL,

...

}

ReservedSubframePattern-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

ResourceType ::= ENUMERATED {

downlinknonCRS,

cRS,

uplink,

...

}

ResumeID ::= CHOICE {

non-truncated BIT STRING(SIZE(40)),

truncated BIT STRING(SIZE(24)),

...

}

RLCMode ::= ENUMERATED {

rlc-am,

rlc-um-bidirectional,

rlc-um-unidirectional-ul,

rlc-um-unidirectional-dl,

...

}

RLC-Status ::= SEQUENCE {

reestablishment-Indication Reestablishment-Indication,

iE-Extensions ProtocolExtensionContainer { {RLC-Status-ExtIEs} } OPTIONAL,

...

}

RLC-Status-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

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

-- S

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..maxnoofBearers)) 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, ..., nR-unlicensed },

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 ::= {

{ ID id-NRNeighbourInfoToAdd CRITICALITY ignore EXTENSION NRNeighbour-Information PRESENCE optional },

...

}

ServedCell-Information ::= SEQUENCE {

pCI PCI,

cellId ECGI,

tAC TAC,

broadcastPLMNs BroadcastPLMNs-Item,

eUTRA-Mode-Info EUTRA-Mode-Info,

iE-Extensions ProtocolExtensionContainer { {ServedCell-Information-ExtIEs} } OPTIONAL,

...

}

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-Id CRITICALITY ignore EXTENSION CSG-Id 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}|

{ ID id-BPLMN-ID-Info-EUTRA CRITICALITY ignore EXTENSION BPLMN-ID-Info-EUTRA PRESENCE optional}|

{ ID id-NPRACHConfiguration CRITICALITY ignore EXTENSION NPRACHConfiguration PRESENCE optional}|

{ ID id-SFN-Offset CRITICALITY ignore EXTENSION SFN-Offset PRESENCE optional},

...

}

ServiceType ::= ENUMERATED{

qMC-for-streaming-service,

qMC-for-MTSI-service,

...

}

SgNBCoordinationAssistanceInformation ::= ENUMERATED{

coordination-not-required,

...

}

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 ::= {

{ ID id-ECGI CRITICALITY ignore EXTENSION ECGI PRESENCE optional}|

{ ID id-SgNBCoordinationAssistanceInformation CRITICALITY reject EXTENSION SgNBCoordinationAssistanceInformation PRESENCE optional},

...

}

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,

inter-eNB-HO,

intra-eNB-HO,

...

}

SNtriggered ::=ENUMERATED{

true,

...

}

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,

...

}

Subscription-Based-UE-DifferentiationInfo ::= SEQUENCE {

periodicCommunicationIndicator ENUMERATED {periodically, ondemand, ...} OPTIONAL,

periodicTime INTEGER (1..3600, ...) OPTIONAL,

scheduledCommunicationTime ScheduledCommunicationTime OPTIONAL,

stationaryIndication ENUMERATED {stationary, mobile, ...} OPTIONAL,

trafficProfile ENUMERATED {single-packet, dual-packets, multiple-packets, ...} OPTIONAL,

batteryIndication ENUMERATED {battery-powered, battery-powered-not-rechargeable-or-replaceable, not-battery-powered, ...} OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { Subscription-Based-UE-DifferentiationInfo-ExtIEs} } OPTIONAL,

...

}

Subscription-Based-UE-DifferentiationInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

ScheduledCommunicationTime ::= SEQUENCE {

dayofWeek BIT STRING (SIZE(7)) OPTIONAL,

timeofDayStart INTEGER (0..86399, ...) OPTIONAL,

timeofDayEnd INTEGER (0..86399, ...) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ScheduledCommunicationTime-ExtIEs}} OPTIONAL,

...

}

ScheduledCommunicationTime-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

SRVCCOperationPossible ::= ENUMERATED {

possible,

...

}

SSBAreaCapacityValue-List ::= SEQUENCE (SIZE (1.. maxnoofSSBAreas)) OF SSBAreaCapacityValue-Item

SSBAreaCapacityValue-Item ::= SEQUENCE {

ssbIndex SSBIndex,

ssbAreaCapacityValue INTEGER (0..100),

iE-Extensions ProtocolExtensionContainer { {SSBAreaCapacityValue-ExtIEs} } OPTIONAL,

...

}

SSBAreaCapacityValue-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

SSBAreaRadioResourceStatus-List ::= SEQUENCE (SIZE (1.. maxnoofSSBAreas)) OF SSBAreaRadioResourceStatus-Item

SSBAreaRadioResourceStatus-Item ::= SEQUENCE {

ssbIndex SSBIndex,

ssbAreaDLGBRPRBUsage INTEGER (0..100),

ssbAreaULGBRPRBUsage INTEGER (0..100),

ssbAreaDLNonGBRPRBUsage INTEGER (0..100),

ssbAreaULNonGBRPRBUsage INTEGER (0..100),

ssbAreaDLTotalPRBUsage INTEGER (0..100),

ssbAreaULTotalPRBUsage INTEGER (0..100),

ssbAreaDLSchedulingPDCCHCCEUsage INTEGER (0..100) OPTIONAL,

ssbAreaULSchedulingPDCCHCCEUsage INTEGER (0..100) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {SSBAreaRadioResourceStatus-ExtIEs} } OPTIONAL,

...

}

SSBAreaRadioResourceStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

SSBIndex ::= INTEGER (0..63)

SSB-PositionsInBurst ::= CHOICE {

shortBitmap BIT STRING (SIZE (4)),

mediumBitmap BIT STRING (SIZE (8)),

longBitmap BIT STRING (SIZE (64)),

choice-extension ProtocolIE-Single-Container { {SSB-PositionsInBurst-ExtIEs} }

}

SSB-PositionsInBurst-ExtIEs X2AP-PROTOCOL-IES ::= {

...

}

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{mbsfn,nonmbsfn,...}

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,...),

iE-Extensions ProtocolExtensionContainer { {SupportedSULFreqBandItem-ExtIEs} } OPTIONAL,

...

}

SupportedSULFreqBandItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

SULInformation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-CarrierList CRITICALITY ignore EXTENSION NRCarrierList PRESENCE optional }|

{ ID id-FrequencyShift7p5khz CRITICALITY ignore EXTENSION FrequencyShift7p5khz PRESENCE optional },

...

}

SFN-Offset ::= SEQUENCE {

sFN-Time-Offset BIT STRING (SIZE(24)),

iE-Extensions ProtocolExtensionContainer { {SFN-Offset-ExtIEs} } OPTIONAL,

...

}

SFN-Offset-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

-- T

TABasedMDT::= SEQUENCE {

tAListforMDT TAListforMDT,

iE-Extensions ProtocolExtensionContainer { {TABasedMDT-ExtIEs} } OPTIONAL,

...

}

TABasedMDT-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TAC ::= OCTET STRING (SIZE (2))

TAIBasedMDT ::= SEQUENCE {

tAIListforMDT 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 ::= {

...

}

TAListforMDT ::= SEQUENCE (SIZE(1..maxnoofTAforMDT)) OF TAC

TABasedQMC ::= SEQUENCE {

tAListforQMC TAListforQMC,

iE-Extensions ProtocolExtensionContainer { {TABasedQMC-ExtIEs} } OPTIONAL,

...

}

TABasedQMC-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TAListforQMC ::= SEQUENCE (SIZE(1..maxnoofTAforQMC)) OF TAC

TAIBasedQMC ::= SEQUENCE {

tAIListforQMC TAIListforQMC,

iE-Extensions ProtocolExtensionContainer { {TAIBasedQMC-ExtIEs} } OPTIONAL,

...

}

TAIBasedQMC-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TAIListforQMC ::= SEQUENCE (SIZE(1..maxnoofTAforQMC)) OF TAI-Item

TargetCellInNGRAN ::= OCTET STRING

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 ::= {

{ ID id-AdditionalSpecialSubframe-Info CRITICALITY ignore EXTENSION AdditionalSpecialSubframe-Info PRESENCE optional}|

{ ID id-eARFCNExtension CRITICALITY reject EXTENSION EARFCNExtension PRESENCE optional}|

{ ID id-AdditionalSpecialSubframeExtension-Info CRITICALITY ignore EXTENSION AdditionalSpecialSubframeExtension-Info PRESENCE optional}|

{ ID id-OffsetOfNbiotChannelNumberToDL-EARFCN CRITICALITY reject EXTENSION OffsetOfNbiotChannelNumberToEARFCN PRESENCE optional}|

{ ID id-NBIoT-UL-DL-AlignmentOffset CRITICALITY reject EXTENSION NBIoT-UL-DL-AlignmentOffset PRESENCE optional},

...

}

TDD-InfoNeighbourServedNRCell-Information ::= SEQUENCE {

nRFreqInfo NRFreqInfo,

iE-Extensions ProtocolExtensionContainer { {TDD-InfoNeighbourServedNRCell-Information-ExtIEs} } OPTIONAL,

...

}

TDD-InfoNeighbourServedNRCell-Information-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ID id-IntendedTDD-DL-ULConfiguration-NR CRITICALITY ignore EXTENSION IntendedTDD-DL-ULConfiguration-NR PRESENCE optional},

...

}

TDDULDLConfigurationCommonNR ::= OCTET STRING

Threshold-RSRP ::= INTEGER(0..97)

Threshold-RSRQ ::= INTEGER(0..34)

TimeToWait ::= ENUMERATED {

v1s,

v2s,

v5s,

v10s,

v20s,

v60s,

...

}

Time-UE-StayedInCell ::= INTEGER (0..4095)

Time-UE-StayedInCell-EnhancedGranularity ::= INTEGER (0..40950)

TNLA-To-Add-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-To-Add-Item

TNLA-To-Add-Item ::= SEQUENCE {

tNLAssociationTransportLayerAddress CPTransportLayerInformation,

tNLAssociationUsage TNLAssociationUsage,

iE-Extensions ProtocolExtensionContainer { { TNLA-To-Add-Item-ExtIEs} } OPTIONAL

}

TNLA-To-Add-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TNLA-To-Update-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-To-Update-Item

TNLA-To-Update-Item::= SEQUENCE {

tNLAssociationTransportLayerAddress CPTransportLayerInformation,

tNLAssociationUsage TNLAssociationUsage OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { TNLA-To-Update-Item-ExtIEs} } OPTIONAL

}

TNLA-To-Update-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TNLA-To-Remove-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-To-Remove-Item

TNLA-To-Remove-Item::= SEQUENCE {

tNLAssociationTransportLayerAddress CPTransportLayerInformation,

iE-Extensions ProtocolExtensionContainer { { TNLA-To-Remove-Item-ExtIEs} } OPTIONAL

}

TNLA-To-Remove-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TNLA-Setup-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-Setup-Item

TNLA-Setup-Item ::= SEQUENCE {

tNLAssociationTransportLayerAddress CPTransportLayerInformation,

iE-Extensions ProtocolExtensionContainer { { TNLA-Setup-Item-ExtIEs} } OPTIONAL,

...

}

TNLA-Setup-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TNLA-Failed-To-Setup-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-Failed-To-Setup-Item

TNLA-Failed-To-Setup-Item ::= SEQUENCE {

tNLAssociationTransportLayerAddress CPTransportLayerInformation,

cause Cause,

iE-Extensions ProtocolExtensionContainer { { TNLA-Failed-To-Setup-Item-ExtIEs} } OPTIONAL

}

TNLA-Failed-To-Setup-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TNLAssociationUsage ::= ENUMERATED {

ue,

non-ue,

both,

...

}

TNLCapacityIndicator ::= SEQUENCE {

dlTNLMaximumOfferedCapacity INTEGER (1..16777216, ...),

dlTNLAvailableCapacity INTEGER (0..100, ...),

ulTNLMaximumOfferedCapacity INTEGER (1..16777216, ...),

ulTNLAvailableCapacity INTEGER (0..100, ...),

iE-Extensions ProtocolExtensionContainer { {TNLCapacityIndicator-ExtIEs} } OPTIONAL,

...

}

TNLCapacityIndicator-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

Transport-UP-Layer-Addresses-Info-To-Add-List ::= SEQUENCE (SIZE(1.. maxnoofTLAs)) OF Transport-UP-Layer-Addresses-Info-To-Add-Item

Transport-UP-Layer-Addresses-Info-To-Add-Item ::= SEQUENCE {

iP-SecTransportLayerAddress TransportLayerAddress,

gTPTransportLayerAddressesToAdd GTPTLAs OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { Transport-UP-Layer-Addresses-Info-To-Add-ItemExtIEs } } OPTIONAL,

...

}

Transport-UP-Layer-Addresses-Info-To-Add-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

Transport-UP-Layer-Addresses-Info-To-Remove-List ::= SEQUENCE (SIZE(1.. maxnoofTLAs)) OF Transport-UP-Layer-Addresses-Info-To-Remove-Item

Transport-UP-Layer-Addresses-Info-To-Remove-Item ::= SEQUENCE {

iP-SecTransportLayerAddress TransportLayerAddress,

gTPTransportLayerAddressesToRemove GTPTLAs OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { Transport-UP-Layer-Addresses-Info-To-Remove-ItemExtIEs } } OPTIONAL,

...

}

Transport-UP-Layer-Addresses-Info-To-Remove-ItemExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TNLConfigurationInfo ::= SEQUENCE {

transport-UP-Layer-Addresses-Info-To-Add-List Transport-UP-Layer-Addresses-Info-To-Add-List OPTIONAL,

transport-UP-Layer-Addresses-Info-To-Remove-List Transport-UP-Layer-Addresses-Info-To-Remove-List OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { TNLConfigurationInfo-ExtIEs } } OPTIONAL,

...

}

TNLConfigurationInfo-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

TraceActivation ::= SEQUENCE {

eUTRANTraceID EUTRANTraceID,

interfacesToTrace InterfacesToTrace,

traceDepth TraceDepth,

traceCollectionEntityIPAddress TraceCollectionEntityIPAddress,

iE-Extensions ProtocolExtensionContainer { {TraceActivation-ExtIEs} } OPTIONAL,

...

}

TraceActivation-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

{ ID id-MDTConfiguration CRITICALITY ignore EXTENSION MDT-Configuration PRESENCE optional}|

{ ID id-UEAppLayerMeasConfig CRITICALITY ignore EXTENSION UEAppLayerMeasConfig PRESENCE optional}|

{ ID id-MDTConfigurationNR CRITICALITY ignore EXTENSION MDT-ConfigurationNR PRESENCE optional}|

{ ID id-TraceCollectionEntityURI CRITICALITY ignore EXTENSION URI-Address PRESENCE optional},

...

}

TraceCollectionEntityIPAddress ::= BIT STRING (SIZE(1..160, ...))

TraceDepth ::= ENUMERATED {

minimum,

medium,

maximum,

minimumWithoutVendorSpecificExtension,

mediumWithoutVendorSpecificExtension,

maximumWithoutVendorSpecificExtension,

...

}

Transmission-Bandwidth ::= ENUMERATED {

bw6,

bw15,

bw25,

bw50,

bw75,

bw100,

...,

bw1

}

TransportLayerAddress ::= BIT STRING (SIZE(1..160, ...))

TransportLayerAddressAndPort ::= SEQUENCE {

endpointIPAddress TransportLayerAddress,

portnumber Port-Number

}

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,

...

}

-- U

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)),

areaScopeOfQMC AreaScopeOfQMC,

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, ...)

UERadioCapability ::= OCTET STRING

UERadioCapabilityID ::= OCTET STRING

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,

sgNB-ID SgNB-UE-X2AP-ID OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {UEsToBeResetList-Item-ExtIEs} } OPTIONAL,

...

}

UEsToBeResetList-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

ULandDLSharing ::= SEQUENCE{

uLResourcesULandDLSharing ULResourcesULandDLSharing,

dLResourcesULandDLSharing DLResourcesULandDLSharing,

iE-Extensions ProtocolExtensionContainer { {ULandDLSharing-ExtIEs} } OPTIONAL,

...

}

ULandDLSharing-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

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,

iE-Extensions ProtocolExtensionContainer { {ULOnlySharing-ExtIEs} } OPTIONAL,

...

}

ULOnlySharing-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

ULResourceBitmapULandDLSharing ::= DataTrafficResources

ULResourcesULandDLSharing ::= CHOICE {

unchanged NULL,

changed ULResourceBitmapULandDLSharing,

...

}

UL-scheduling-PDCCH-CCE-usage::= INTEGER (0..100)

UL-Total-PRB-usage::= INTEGER (0..100)

UnlicensedSpectrumRestriction ::= ENUMERATED {

unlicensed-restricted,

...

}

URI-Address ::= VisibleString

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 {

usaable-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, ...),

...

}

WLANMeasurementConfiguration ::= SEQUENCE {

wlanMeasConfig WLANMeasConfig,

wlanMeasConfigNameList WLANMeasConfigNameList OPTIONAL,

wlan-rssi ENUMERATED {true, ...} OPTIONAL,

wlan-rtt ENUMERATED {true, ...} OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {WLANMeasurementConfiguration-ExtIEs} } OPTIONAL,

...

}

WLANMeasurementConfiguration-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

...

}

WLANMeasConfigNameList ::= SEQUENCE (SIZE(1..maxnoofWLANName)) OF WLANName

WLANMeasConfig::= ENUMERATED {setup,...}

WLANName ::= OCTET STRING (SIZE (1..32))

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))

-- X

X2BenefitValue ::= INTEGER (1..8, ...)

-- Y

-- Z

END

-- ASN1STOP

### 9.3.6 Common definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Common definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Extension constants

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

maxPrivateIEs INTEGER ::= 65535

maxProtocolExtensions INTEGER ::= 65535

maxProtocolIEs INTEGER ::= 65535

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Common Data Types

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Criticality ::= ENUMERATED { reject, ignore, notify }

Presence ::= ENUMERATED { optional, conditional, mandatory }

PrivateIE-ID ::= CHOICE {

local INTEGER (0.. maxPrivateIEs),

global OBJECT IDENTIFIER

}

ProcedureCode ::= INTEGER (0..255)

ProtocolIE-ID ::= INTEGER (0..maxProtocolIEs)

TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome}

END

-- ASN1STOP

### 9.3.7 Constant definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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-meNBinitiatedSeNBModificationPreparation ProcedureCode ::= 21

id-seNBinitiatedSeNBModification ProcedureCode ::= 22

id-meNBinitiatedSeNBRelease ProcedureCode ::= 23

id-seNBinitiatedSeNBRelease ProcedureCode ::= 24

id-seNBCounterCheck ProcedureCode ::= 25

id-retrieveUEContext ProcedureCode ::= 26

id-sgNBAdditionPreparation ProcedureCode ::= 27

id-sgNBReconfigurationCompletion ProcedureCode ::= 28

id-meNBinitiatedSgNBModificationPreparation ProcedureCode ::= 29

id-sgNBinitiatedSgNBModification ProcedureCode ::= 30

id-meNBinitiatedSgNBRelease ProcedureCode ::= 31

id-sgNBinitiatedSgNBRelease ProcedureCode ::= 32

id-sgNBCounterCheck ProcedureCode ::= 33

id-sgNBChange ProcedureCode ::= 34

id-rRCTransfer 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

id-dataForwardingAddressIndication ProcedureCode ::= 44

id-gNBStatusIndication ProcedureCode ::= 45

id-deactivateTrace ProcedureCode ::= 46

id-traceStart ProcedureCode ::= 47

id-endcConfigurationTransfer ProcedureCode ::= 48

id-handoverSuccess ProcedureCode ::= 49

id-conditionalHandoverCancel ProcedureCode ::= 50

id-earlyStatusTransfer ProcedureCode ::= 51

id-cellTrafficTrace ProcedureCode ::= 52

id-endcresourceStatusReporting ProcedureCode ::= 53

id-endcresourceStatusReportingInitiation ProcedureCode ::= 54

id-f1CTrafficTransfer ProcedureCode ::= 55

id-UERadioCapabilityIDMapping ProcedureCode ::= 56

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Lists

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

maxEARFCN INTEGER ::= 65535

maxEARFCNPlusOne INTEGER ::= 65536

newmaxEARFCN INTEGER ::= 262143

maxInterfaces INTEGER ::= 16

maxCellineNB INTEGER ::= 256

maxnoofBands INTEGER ::= 16

maxnoofBearers INTEGER ::= 256

maxNrOfErrors INTEGER ::= 256

maxnoofPDCP-SN INTEGER ::= 16

maxnoofEPLMNs INTEGER ::= 15

maxnoofEPLMNsPlusOne INTEGER ::= 16

maxnoofForbLACs INTEGER ::= 4096

maxnoofForbTACs INTEGER ::= 4096

maxnoofBPLMNs INTEGER ::= 6

maxnoofAdditionalPLMNs INTEGER ::= 6

maxnoofNeighbours INTEGER ::= 512

maxnoofPRBs INTEGER ::= 110

maxPools INTEGER ::= 16

maxnoofCells INTEGER ::= 16

maxnoofMBSFN INTEGER ::= 8

maxFailedMeasObjects INTEGER ::= 32

maxnoofCellIDforMDT INTEGER ::= 32

maxnoofTAforMDT INTEGER ::= 8

maxnoofMBMSServiceAreaIdentities INTEGER ::= 256

maxnoofMDTPLMNs INTEGER ::= 16

maxnoofCoMPHypothesisSet INTEGER ::= 256

maxnoofCoMPCells INTEGER ::= 32

maxUEReport INTEGER ::= 128

maxCellReport INTEGER ::= 9

maxnoofPA INTEGER ::= 3

maxCSIProcess INTEGER ::= 4

maxCSIReport INTEGER ::= 2

maxSubband INTEGER ::= 14

maxofNRNeighbours INTEGER ::= 1024

maxCellinengNB INTEGER ::= 16384

-- maxnoofNRCarriers INTEGER ::= 32

maxnooftimeperiods INTEGER ::= 2

maxnoofCellIDforQMC INTEGER ::= 32

maxnoofTAforQMC INTEGER ::= 8

maxnoofPLMNforQMC INTEGER ::= 16

maxUEsinengNBDU INTEGER ::= 8192

maxnoofProtectedResourcePatterns INTEGER ::= 16

maxnoNRcellsSpectrumSharingWithE-UTRA INTEGER ::= 64

maxnoofNrCellBands INTEGER ::= 32

maxnoofBluetoothName INTEGER ::= 4

maxnoofWLANName INTEGER ::= 4

maxnoofextBPLMNs INTEGER ::= 12

maxnoofTLAs INTEGER ::= 16

maxnoofGTPTLAs INTEGER ::= 16

maxnoofTNLAssociations INTEGER ::= 32

maxnoofCellsinCHO INTEGER ::= 8

maxnoofPC5QoSFlows INTEGER ::= 2048

maxnoofSSBAreas INTEGER ::= 64

maxnoofNRSCSs INTEGER ::= 5

maxnoofNRPhysicalResourceBlocks INTEGER ::= 275

maxnoofNonAnchorCarrierFreqConfig INTEGER ::= 15

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IEs

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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 ::= 74

id-RRCConnSetupIndicator 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 ProtocolIE-ID ::= 82

id-SourceCellCRNTI ProtocolIE-ID ::= 83

id-MultibandInfoList ProtocolIE-ID ::= 84

id-M3Configuration ProtocolIE-ID ::= 85

id-M4Configuration ProtocolIE-ID ::= 86

id-M5Configuration ProtocolIE-ID ::= 87

id-MDT-Location-Info ProtocolIE-ID ::= 88

id-ManagementBasedMDTPLMNList ProtocolIE-ID ::= 89

id-SignallingBasedMDTPLMNList ProtocolIE-ID ::= 90

id-ReceiveStatusOfULPDCPSDUsExtended ProtocolIE-ID ::= 91

id-ULCOUNTValueExtended ProtocolIE-ID ::= 92

id-DLCOUNTValueExtended ProtocolIE-ID ::= 93

id-eARFCNExtension ProtocolIE-ID ::= 94

id-UL-EARFCNExtension ProtocolIE-ID ::= 95

id-DL-EARFCNExtension ProtocolIE-ID ::= 96

id-AdditionalSpecialSubframe-Info ProtocolIE-ID ::= 97

id-Masked-IMEISV ProtocolIE-ID ::= 98

id-IntendedULDLConfiguration ProtocolIE-ID ::= 99

id-ExtendedULInterferenceOverloadInfo ProtocolIE-ID ::= 100

id-RNL-Header ProtocolIE-ID ::= 101

id-x2APMessage ProtocolIE-ID ::= 102

id-ProSeAuthorized ProtocolIE-ID ::= 103

id-ExpectedUEBehaviour ProtocolIE-ID ::= 104

id-UE-HistoryInformationFromTheUE ProtocolIE-ID ::= 105

id-DynamicDLTransmissionInformation ProtocolIE-ID ::= 106

id-UE-RLF-Report-Container-for-extended-bands ProtocolIE-ID ::= 107

id-CoMPInformation ProtocolIE-ID ::= 108

id-ReportingPeriodicityRSRPMR ProtocolIE-ID ::= 109

id-RSRPMRList ProtocolIE-ID ::= 110

id-MeNB-UE-X2AP-ID ProtocolIE-ID ::= 111

id-SeNB-UE-X2AP-ID ProtocolIE-ID ::= 112

id-UE-SecurityCapabilities ProtocolIE-ID ::= 113

id-SeNBSecurityKey ProtocolIE-ID ::= 114

id-SeNBUEAggregateMaximumBitRate ProtocolIE-ID ::= 115

id-ServingPLMN ProtocolIE-ID ::= 116

id-E-RABs-ToBeAdded-List ProtocolIE-ID ::= 117

id-E-RABs-ToBeAdded-Item ProtocolIE-ID ::= 118

id-MeNBtoSeNBContainer ProtocolIE-ID ::= 119

id-E-RABs-Admitted-ToBeAdded-List ProtocolIE-ID ::= 120

id-E-RABs-Admitted-ToBeAdded-Item ProtocolIE-ID ::= 121

id-SeNBtoMeNBContainer ProtocolIE-ID ::= 122

id-ResponseInformationSeNBReconfComp ProtocolIE-ID ::= 123

id-UE-ContextInformationSeNBModReq ProtocolIE-ID ::= 124

id-E-RABs-ToBeAdded-ModReqItem ProtocolIE-ID ::= 125

id-E-RABs-ToBeModified-ModReqItem ProtocolIE-ID ::= 126

id-E-RABs-ToBeReleased-ModReqItem ProtocolIE-ID ::= 127

id-E-RABs-Admitted-ToBeAdded-ModAckList ProtocolIE-ID ::= 128

id-E-RABs-Admitted-ToBeModified-ModAckList ProtocolIE-ID ::= 129

id-E-RABs-Admitted-ToBeReleased-ModAckList ProtocolIE-ID ::= 130

id-E-RABs-Admitted-ToBeAdded-ModAckItem ProtocolIE-ID ::= 131

id-E-RABs-Admitted-ToBeModified-ModAckItem ProtocolIE-ID ::= 132

id-E-RABs-Admitted-ToBeReleased-ModAckItem ProtocolIE-ID ::= 133

id-E-RABs-ToBeReleased-ModReqd ProtocolIE-ID ::= 134

id-E-RABs-ToBeReleased-ModReqdItem ProtocolIE-ID ::= 135

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-ReceiveStatusOfULPDCPSDUsPDCP-SNlength18 ProtocolIE-ID ::= 150

id-ULCOUNTValuePDCP-SNlength18 ProtocolIE-ID ::= 151

id-DLCOUNTValuePDCP-SNlength18 ProtocolIE-ID ::= 152

id-UE-ContextReferenceAtSeNB ProtocolIE-ID ::= 153

id-UE-ContextKeptIndicator ProtocolIE-ID ::= 154

id-New-eNB-UE-X2AP-ID-Extension ProtocolIE-ID ::= 155

id-Old-eNB-UE-X2AP-ID-Extension ProtocolIE-ID ::= 156

id-MeNB-UE-X2AP-ID-Extension ProtocolIE-ID ::= 157

id-SeNB-UE-X2AP-ID-Extension ProtocolIE-ID ::= 158

id-LHN-ID ProtocolIE-ID ::= 159

id-FreqBandIndicatorPriority ProtocolIE-ID ::= 160

id-M6Configuration ProtocolIE-ID ::= 161

id-M7Configuration ProtocolIE-ID ::= 162

id-Tunnel-Information-for-BBF ProtocolIE-ID ::= 163

id-SIPTO-BearerDeactivationIndication ProtocolIE-ID ::= 164

id-GW-TransportLayerAddress ProtocolIE-ID ::= 165

id-Correlation-ID ProtocolIE-ID ::= 166

id-SIPTO-Correlation-ID ProtocolIE-ID ::= 167

id-SIPTO-L-GW-TransportLayerAddress ProtocolIE-ID ::= 168

id-X2RemovalThreshold ProtocolIE-ID ::= 169

id-CellReportingIndicator ProtocolIE-ID ::= 170

id-BearerType ProtocolIE-ID ::= 171

id-resumeID ProtocolIE-ID ::= 172

id-UE-ContextInformationRetrieve ProtocolIE-ID ::= 173

id-E-RABs-ToBeSetupRetrieve-Item ProtocolIE-ID ::= 174

id-NewEUTRANCellIdentifier ProtocolIE-ID ::= 175

id-V2XServicesAuthorized ProtocolIE-ID ::= 176

id-OffsetOfNbiotChannelNumberToDL-EARFCN ProtocolIE-ID ::= 177

id-OffsetOfNbiotChannelNumberToUL-EARFCN ProtocolIE-ID ::= 178

id-AdditionalSpecialSubframeExtension-Info ProtocolIE-ID ::= 179

id-BandwidthReducedSI ProtocolIE-ID ::= 180

id-MakeBeforeBreakIndicator ProtocolIE-ID ::= 181

id-UE-ContextReferenceAtWT ProtocolIE-ID ::= 182

id-WT-UE-ContextKeptIndicator ProtocolIE-ID ::= 183

id-UESidelinkAggregateMaximumBitRate ProtocolIE-ID ::= 184

id-uL-GTPtunnelEndpoint ProtocolIE-ID ::= 185

id-DL-scheduling-PDCCH-CCE-usage ProtocolIE-ID ::= 193

id-UL-scheduling-PDCCH-CCE-usage ProtocolIE-ID ::= 194

id-UEAppLayerMeasConfig ProtocolIE-ID ::= 195

id-extended-e-RAB-MaximumBitrateDL ProtocolIE-ID ::= 196

id-extended-e-RAB-MaximumBitrateUL ProtocolIE-ID ::= 197

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-NRrestrictioninEPSasSecondaryRAT 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-Admitted-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-ToBeModified-SgNBModAckList ProtocolIE-ID ::= 220

id-E-RABs-Admitted-ToBeReleased-SgNBModAckList ProtocolIE-ID ::= 221

id-E-RABs-Admitted-ToBeAdded-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-SgNBModReqdList ProtocolIE-ID ::= 225

id-E-RABs-ToBeModified-SgNBModReqdList ProtocolIE-ID ::= 226

id-E-RABs-ToBeReleased-SgNBModReqd-Item ProtocolIE-ID ::= 227

id-E-RABs-ToBeModified-SgNBModReqd-Item ProtocolIE-ID ::= 228

id-E-RABs-ToBeReleased-SgNBChaConfList ProtocolIE-ID ::= 229

id-E-RABs-ToBeReleased-SgNBChaConf-Item ProtocolIE-ID ::= 230

id-E-RABs-ToBeReleased-SgNBRelReqList ProtocolIE-ID ::= 231

id-E-RABs-ToBeReleased-SgNBRelReq-Item ProtocolIE-ID ::= 232

id-E-RABs-ToBeReleased-SgNBRelConfList ProtocolIE-ID ::= 233

id-E-RABs-ToBeReleased-SgNBRelConf-Item ProtocolIE-ID ::= 234

id-E-RABs-SubjectToSgNBCounterCheck-List ProtocolIE-ID ::= 235

id-E-RABs-SubjectToSgNBCounterCheck-Item ProtocolIE-ID ::= 236

id-RRCContainer ProtocolIE-ID ::= 237

id-SRBType ProtocolIE-ID ::= 238

id-Target-SgNB-ID ProtocolIE-ID ::= 239

id-HandoverRestrictionList ProtocolIE-ID ::= 240

id-SCGConfigurationQuery ProtocolIE-ID ::= 241

id-SplitSRB ProtocolIE-ID ::= 242

id-NRUeReport ProtocolIE-ID ::= 243

id-InitiatingNodeType-EndcX2Setup ProtocolIE-ID ::= 244

id-InitiatingNodeType-EndcConfigUpdate ProtocolIE-ID ::= 245

id-RespondingNodeType-EndcX2Setup ProtocolIE-ID ::= 246

id-RespondingNodeType-EndcConfigUpdate ProtocolIE-ID ::= 247

id-NRUESecurityCapabilities ProtocolIE-ID ::= 248

id-PDCPChangeIndication ProtocolIE-ID ::= 249

id-ServedEUTRAcellsENDCX2ManagementList ProtocolIE-ID ::= 250

id-CellAssistanceInformation ProtocolIE-ID ::= 251

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-ServedEUTRAcellsToDeleteListENDCConfUpd ProtocolIE-ID ::= 260

id-ServedNRcellsToModifyListENDCConfUpd 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-SelectedPLMN ProtocolIE-ID ::= 269

id-UEs-ToBeReset ProtocolIE-ID ::= 270

id-UEs-Admitted-ToBeReset ProtocolIE-ID ::= 271

id-RRCConfigIndication 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-NRS-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-ListofEUTRACellsinNRCoordinationReq ProtocolIE-ID ::= 291

id-ListofNRCellsinNRCoordinationReq ProtocolIE-ID ::= 292

id-ListofNRCellsinNRCoordinationResp ProtocolIE-ID ::= 293

id-E-RABs-AdmittedToBeModified-SgNBModConfList ProtocolIE-ID ::= 294

id-E-RABs-AdmittedToBeModified-SgNBModConf-Item ProtocolIE-ID ::= 295

id-UEContextLevelUserPlaneActivity ProtocolIE-ID ::= 296

id-ERABActivityNotifyItemList ProtocolIE-ID ::= 297

id-InitiatingNodeType-EndcX2Removal ProtocolIE-ID ::= 298

id-RespondingNodeType-EndcX2Removal ProtocolIE-ID ::= 299

id-RLC-Status ProtocolIE-ID ::= 300

id-CNTypeRestrictions ProtocolIE-ID ::= 301

id-uLpDCPSnLength ProtocolIE-ID ::= 302

id-BluetoothMeasurementConfiguration ProtocolIE-ID ::= 303

id-WLANMeasurementConfiguration ProtocolIE-ID ::= 304

id-NRrestrictionin5GS ProtocolIE-ID ::= 305

id-dL-Forwarding ProtocolIE-ID ::= 306

id-E-RABs-DataForwardingAddress-List ProtocolIE-ID ::= 307

id-E-RABs-DataForwardingAddress-Item ProtocolIE-ID ::= 308

id-Subscription-Based-UE-DifferentiationInfo ProtocolIE-ID ::= 309

id-GNBOverloadInformation ProtocolIE-ID ::= 310

id-dLPDCPSnLength ProtocolIE-ID ::= 311

id-secondarysgNBDLGTPTEIDatPDCP ProtocolIE-ID ::= 312

id-secondarymeNBULGTPTEIDatPDCP ProtocolIE-ID ::= 313

id-lCID ProtocolIE-ID ::= 314

id-duplicationActivation ProtocolIE-ID ::= 315

id-ECGI ProtocolIE-ID ::= 316

id-RLCMode-transferred ProtocolIE-ID ::= 317

id-E-RABs-Admitted-ToBeReleased-SgNBRelReqAckList ProtocolIE-ID ::= 318

id-E-RABs-Admitted-ToBeReleased-SgNBRelReqAck-Item ProtocolIE-ID ::= 319

id-E-RABs-ToBeReleased-SgNBRelReqdList ProtocolIE-ID ::= 320

id-E-RABs-ToBeReleased-SgNBRelReqd-Item ProtocolIE-ID ::= 321

id-NRCGI ProtocolIE-ID ::= 322

id-MeNBCoordinationAssistanceInformation ProtocolIE-ID ::= 323

id-SgNBCoordinationAssistanceInformation ProtocolIE-ID ::= 324

id-new-drb-ID-req ProtocolIE-ID ::= 325

id-endcSONConfigurationTransfer ProtocolIE-ID ::= 326

id-NRNeighbourInfoToAdd ProtocolIE-ID ::= 327

id-NRNeighbourInfoToModify ProtocolIE-ID ::= 328

id-DesiredActNotificationLevel ProtocolIE-ID ::= 329

id-LocationInformationSgNBReporting ProtocolIE-ID ::= 330

id-LocationInformationSgNB ProtocolIE-ID ::= 331

id-LastNG-RANPLMNIdentity ProtocolIE-ID ::= 332

id-EUTRANTraceID ProtocolIE-ID ::= 333

id-additionalPLMNs-Item ProtocolIE-ID ::= 334

id-InterfaceInstanceIndication ProtocolIE-ID ::= 335

id-BPLMN-ID-Info-EUTRA ProtocolIE-ID ::= 336

id-BPLMN-ID-Info-NR ProtocolIE-ID ::= 337

id-NBIoT-UL-DL-AlignmentOffset ProtocolIE-ID ::= 338

id-ERABs-transferred-to-MeNB ProtocolIE-ID ::= 339

id-AdditionalRRMPriorityIndex ProtocolIE-ID ::= 340

id-LowerLayerPresenceStatusChange ProtocolIE-ID ::= 341

id-FastMCGRecovery-SN-to-MN ProtocolIE-ID ::= 342

id-RequestedFastMCGRecoveryViaSRB3 ProtocolIE-ID ::= 343

id-AvailableFastMCGRecoveryViaSRB3 ProtocolIE-ID ::= 344

id-RequestedFastMCGRecoveryViaSRB3Release ProtocolIE-ID ::= 345

id-ReleaseFastMCGRecoveryViaSRB3 ProtocolIE-ID ::= 346

id-FastMCGRecovery-MN-to-SN ProtocolIE-ID ::= 347

id-PartialListIndicator ProtocolIE-ID ::= 348

id-MaximumCellListSize ProtocolIE-ID ::= 349

id-MessageOversizeNotification ProtocolIE-ID ::= 350

id-CellandCapacityAssistInfo ProtocolIE-ID ::= 351

id-TNLConfigurationInfo ProtocolIE-ID ::= 352

id-TNLA-To-Add-List ProtocolIE-ID ::= 353

id-TNLA-To-Update-List ProtocolIE-ID ::= 354

id-TNLA-To-Remove-List ProtocolIE-ID ::= 355

id-TNLA-Setup-List ProtocolIE-ID ::= 356

id-TNLA-Failed-To-Setup-List ProtocolIE-ID ::= 357

id-UnlicensedSpectrumRestriction ProtocolIE-ID ::= 358

id-UEContextReferenceatSourceNGRAN ProtocolIE-ID ::= 359

id-EPCHandoverRestrictionListContainer ProtocolIE-ID ::= 360

id-CHOinformation-REQ ProtocolIE-ID ::= 361

id-CHOinformation-ACK ProtocolIE-ID ::= 362

id-DAPSRequestInfo ProtocolIE-ID ::= 363

id-RequestedTargetCellID ProtocolIE-ID ::= 364

id-CandidateCellsToBeCancelledList ProtocolIE-ID ::= 365

id-DAPSResponseInfo ProtocolIE-ID ::= 366

id-ProcedureStage ProtocolIE-ID ::= 367

id-CHO-DC-Indicator ProtocolIE-ID ::= 368

id-Ethernet-Type ProtocolIE-ID ::= 369

id-NRV2XServicesAuthorized ProtocolIE-ID ::= 370

id-NRUESidelinkAggregateMaximumBitRate ProtocolIE-ID ::= 371

id-PC5QoSParameters ProtocolIE-ID ::= 372

id-NPRACHConfiguration ProtocolIE-ID ::= 373

id-NBIoT-RLF-Report-Container ProtocolIE-ID ::= 374

id-MDTConfigurationNR ProtocolIE-ID ::= 375

id-PrivacyIndicator ProtocolIE-ID ::= 376

id-TraceCollectionEntityIPAddress ProtocolIE-ID ::= 377

id-UERadioCapabilityID ProtocolIE-ID ::= 378

id-SNtriggered ProtocolIE-ID ::= 379

id-CSI-RSTransmissionIndication ProtocolIE-ID ::= 380

id-DLCarrierList ProtocolIE-ID ::= 381

id-TargetCellInNGRAN ProtocolIE-ID ::= 382

id-E-UTRAN-Node1-Measurement-ID ProtocolIE-ID ::= 383

id-E-UTRAN-Node2-Measurement-ID ProtocolIE-ID ::= 384

id-TDDULDLConfigurationCommonNR ProtocolIE-ID ::= 385

id-CarrierList ProtocolIE-ID ::= 386

id-ULCarrierList ProtocolIE-ID ::= 387

id-FrequencyShift7p5khz ProtocolIE-ID ::= 388

id-SSB-PositionsInBurst ProtocolIE-ID ::= 389

id-NRCellPRACHConfig ProtocolIE-ID ::= 390

id-CellToReport-NR-ENDC ProtocolIE-ID ::= 391

id-CellToReport-NR-ENDC-Item ProtocolIE-ID ::= 392

id-CellMeasurementResult-NR-ENDC ProtocolIE-ID ::= 393

id-CellMeasurementResult-NR-ENDC-Item ProtocolIE-ID ::= 394

id-IABNodeIndication ProtocolIE-ID ::= 395

id-QoS-Mapping-Information ProtocolIE-ID ::= 396

id-F1CTrafficContainer ProtocolIE-ID ::= 397

id-IntendedTDD-DL-ULConfiguration-NR ProtocolIE-ID ::= 399

id-UERadioCapability ProtocolIE-ID ::= 400

id-CellMeasurementResult-E-UTRA-ENDC ProtocolIE-ID ::= 401

id-CellMeasurementResult-E-UTRA-ENDC-Item ProtocolIE-ID ::= 402

id-CellToReport-E-UTRA-ENDC ProtocolIE-ID ::= 403

id-CellToReport-E-UTRA-ENDC-Item ProtocolIE-ID ::= 404

id-TraceCollectionEntityURI ProtocolIE-ID ::= 405

id-SFN-Offset ProtocolIE-ID ::= 406

id-CHO-DC-EarlyDataForwarding ProtocolIE-ID ::= 407

id-IMSvoiceEPSfallbackfrom5G ProtocolIE-ID ::= 408

id-AdditionLocationInformation ProtocolIE-ID ::= 409

id-DirectForwardingPathAvailability ProtocolIE-ID ::= 410

id-sourceNG-RAN-node-id ProtocolIE-ID ::= 411

id-SourceDLForwardingIPAddress ProtocolIE-ID ::= 412

id-SourceNodeDLForwardingIPAddress ProtocolIE-ID ::= 413

id-IABAuthorized ProtocolIE-ID ::= 449

END

-- ASN1STOP

### 9.3.8 Container definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Class Definition for Protocol IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Class Definition for Protocol Extensions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

X2AP-PROTOCOL-EXTENSION ::= CLASS {

&id ProtocolIE-ID UNIQUE,

&criticality Criticality,

&Extension,

&presence Presence

}

WITH SYNTAX {

ID &id

CRITICALITY &criticality

EXTENSION &Extension

PRESENCE &presence

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Class Definition for Private IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

X2AP-PRIVATE-IES ::= CLASS {

&id PrivateIE-ID,

&criticality Criticality,

&Value,

&presence Presence

}

WITH SYNTAX {

ID &id

CRITICALITY &criticality

TYPE &Value

PRESENCE &presence

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Container for Protocol IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ProtocolIE-Container {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-ContainerPair {X2AP-PROTOCOL-IES-PAIR : IEsSetParam} ::=

SEQUENCE (SIZE (0..maxProtocolIEs)) OF

ProtocolIE-FieldPair {{IEsSetParam}}

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 (SIZE (1..maxProtocolExtensions)) OF

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 (SIZE (1..maxPrivateIEs)) OF

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

-- ASN1STOP

## 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

TRELOCprep

- Specifies the maximum time for the Handover Preparation procedure in the source eNB.

TX2RELOCoverall

- Specifies the maximum time for the protection of the overall handover procedure in the source eNB.

TDCprep

- 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.

TDCoverall

- 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

| TSG # | TSG Doc. | CR | Rev | Subject/Comment | New |
| --- | --- | --- | --- | --- | --- |
| 09/2009 |  |  |  | Rel-9 version is created based on v.8.7.0 | 9.0.0 |
| 45 | RP-090787 | 0296 | 1 | Handling of Emergency Calls in Limited Service Mode | 9.0.0 |
| 45 | RP-090787 | 0297 | 1 | Emergency Calls Mobility Handling | 9.0.0 |
| 46 | RP-091192 | 0307 |  | Introduction of signalling support for Composite Available Capacity with relative units | 9.1.0 |
| 46 | RP-091192 | 0308 | 2 | Configuration adaptation for MLB on X2 | 9.1.0 |
| 46 | RP-091183 | 0310 | 1 | Clarification on operational use of updated configuration data | 9.1.0 |
| 46 | RP-091192 | 0317 | 2 | Automatic PRACH information exchange over X2 for SON | 9.1.0 |
| 46 | RP-091192 | 0333 | 1 | Introduction of Radio Link Failure Indication procedure | 9.1.0 |
| 46 | RP-091192 | 0334 | 1 | Introduction of Handover Report procedure | 9.1.0 |
| 46 | RP-091192 | 0335 |  | Introduction of signalling support for Composite Available Capacity with relative units | 9.1.0 |
| 47 | RP-100213 | 0337 |  | Correction to the Resource Status Reporting Initiation procedure | 9.2.0 |
| 47 | RP-100229 | 0341 | 2 | Addition of MBSFN information on X2 interface | 9.2.0 |
| 47 | RP-100228 | 0344 | 4 | Cell pair identification for Mobility Settings Change procedure | 9.2.0 |
| 47 | RP-100213 | 0352 |  | Addition of cause value for not admitted E-RAB | 9.2.0 |
| 47 | RP-100229 | 0355 | 1 | Rapporteur’s update of X2AP protocol | 9.2.0 |
| 47 | RP-100230 | 0356 | 3 | RNL-based energy saving solution | 9.2.0 |
| 47 | RP-100228 | 0358 | 1 | Inclusion of UE RLF Report in RLF INDICATION message | 9.2.0 |
| 48 | RP-100599 | 0363 | 1 | Correction of RLF INDICATION message | 9.3.0 |
| 48 | RP-100599 | 0364 | 1 | Missing error cause for Not supported QCI on Handover | 9.3.0 |
| 48 | RP-100599 | 0370 | 1 | Introduction of PLMN-related abnormal conditions during X2 handover in network sharing scenarios. | 9.3.0 |
| 48 | RP-100599 | 0372 | 1 | Outcome of RAN3#68 review of X2AP | 9.3.0 |
| 48 | RP-100599 | 0373 | 1 | Correction of forbidden inter-RAT | 9.3.0 |
| 49 | RP-100908 | 0376 | 1 | Explicit PLMN coding in Trace IEs | 9.4.0 |
| 49 | RP-100906 | 0380 | 2 | The corrections for Last Visited Cell Information | 9.4.0 |
| 49 | RP-100906 | 0383 | 1 | Handover Restriction List | 9.4.0 |
| 49 | RP-100908 | 0384 | 1 | Complete list of served cells to be provided in X2 SETUP and eNB Configuration Update messages | 9.4.0 |
| 50 | RP-101271 | 0385 |  | Clarification on Handover Restriction List | 9.5.0 |
| 50 | RP-101270 | 0403 | 3 | Correction of semantics description | 9.5.0 |
| 12/2010 |  |  |  | Rel-10 version created based in v. 9.5.0 | 10.0.0 |
| 50 | RP-101304 | 0393 | 2 | Introduction of partial failure in Resource Status Reporting Initiation procedure including detailed reporting of failure cause | 10.0.0 |
| 50 | RP-101279 | 0407 | 4 | X2 handover support | 10.0.0 |
| SP-49 | SP-100629 |  |  | Clarification on the use of References (TS 21.801 CR#0030) | 10.1.0 |
| 51 | RP-110231 | 0408 |  | Conditions for Enhanced X2 mobility | 10.1.0 |
| 51 | RP-110237 | 0409 |  | Introduction of X2 signalling support for eICIC | 10.1.0 |
| 51 | RP-110222 | 0411 | 1 | Correction of the usage of optional ShortMAC-I IE in RLF INDICATION message | 10.1.0 |
| 51 | RP-110230 | 0413 | 2 | Support for MDT | 10.1.0 |
| 51 | RP-110226 | 0419 | 2 | Clarification on TEID value range for X2AP | 10.1.0 |
| 51 | RP-110231 | 0420 |  | Clarify X2 Handover Scenarios | 10.1.0 |
| 51 | RP-110237 | 0427 | 1 | Enabling reporting of ABS resource status for eICIC purposes | 10.1.0 |
| 52 | RP-110695 | 0435 | 1 | MDT correction for TAI | 10.2.0 |
| 52 | RP-110698 | 0436 | 1 | Clarification on Radio Resource Status | 10.2.0 |
| 52 | RP-110700 | 0443 | 4 | X2 support of RLF Report extension for SON MRO defined in R10 | 10.2.0 |
| 52 | RP-110695 | 0447 | 3 | Support for MDT user consent | 10.2.0 |
| 52 | RP-110686 | 0451 | 2 | Rapporteur’s proposal following review of TS 36.423 | 10.2.0 |
| 52 | RP-110689 | 0452 | 1 | Correction of the partial success mechanism in Resource Status Reporting | 10.2.0 |
| 52 | RP-110695 | 0453 | 2 | MDT amendments | 10.2.0 |
| 52 | RP-110685 | 0454 |  | Reference review outcome in TS 36.423 | 10.2.0 |
| 52 | RP-110695 | 0456 |  | Correction of trace function and trace session | 10.2.0 |
| 53 | RP-111196 | 0464 | 2 | Clarification of procedures defined for MLB purposes | 10.3.0 |
| 53 | RP-111196 | 0469 | 1 | ASN.1 definition conforms to ITU-T Recommendations | 10.3.0 |
| 53 | RP-111194 | 0476 | 2 | Updates of reported quantities for eICIC | 10.3.0 |
| 53 | RP-111195 | 0478 | 1 | Definition of value of bit in Measurements to Activate | 10.3.0 |
| 53 | RP-111197 | 0479 |  | Clarification on PLMN Identity | 10.3.0 |
| 54 | RP-111648 | 0480 | 2 | Correction on ABS Information | 10.4.0 |
| 55 | RP-120234 | 0491 | 1 | Correct of reset | 10.5.0 |
| 03/2012 |  |  |  | Rel-11 version created based in v. 10.5.0 | 11.0.0 |
| 55 | RP-120236 | 0487 | 1 | Addition of TAC to the neighbour information of a served cell for X2 setup and eNB update procedures | 11.0.0 |
| 56 | RP-120751 | 0496 | - | Introduction of the Security Algorithm (ZUC) | 11.1.0 |
| 56 | RP-120751 | 0498 | 2 | Clarification on TAC in X2 Setup | 11.1.0 |
| 56 | RP-120751 | 0501 | 3 | Adding RRC re-establishment cause to RLF indication | 11.1.0 |
| 56 | RP-120752 | 0513 | 1 | Correction on Emergency ARP Value | 11.1.0 |
| 56 | RP-120752 | 0516 | 1 | Improved granularity for the time UE stayed in cell | 11.1.0 |
| 57 | RP-121137 | 0520 | 2 | Support of MBMS Service Continuity | 11.2.0 |
| 57 | RP-121140 | 0527 | 3 | Multiband support per cell | 11.2.0 |
| 57 | RP-121135 | 0540 | 1 | Enhancement of HO REPORT to enable inter-RAT ping-pong detection and addition of HO cause value to the UE history information | 11.2.0 |
| 57 | RP-121139 | 0546 |  | Support for new special subframe configurations | 11.2.0 |
| 58 | RP-121731 | 0548 |  | Addition of Mobility Information | 11.3.0 |
| 58 | RP-121730 | 0549 | 3 | Introduction of new MDT measurements | 11.3.0 |
| 58 | RP-121732 | 0550 | 1 | HeNB Mobility enhancement when target is hybrid HeNB | 11.3.0 |
| 58 | RP-121730 | 0552 | 2 | Multi-PLMN MDT | 11.3.0 |
| 58 | RP-121731 | 0564 |  | Clarification on successful handover for HO report procedure | 11.3.0 |
| 58 | RP-121737 | 0569 | 2 | X2AP Rapporteur Update | 11.3.0 |
| 59 | RP-130208 | 0572 | 3 | Correction on the Special Subframe Pattern | 11.4.0 |
| 59 | RP-130208 | 0580 | 2 | Support for Downlink-Only Bands | 11.4.0 |
| 59 | RP-130207 | 0581 |  | Correction on use of Mobility Information | 11.4.0 |
| 59 | RP-130207 | 0582 | 1 | Correction on MRO procedures | 11.4.0 |
| 59 | RP-130237 | 0583 | 2 | Extending maxEARFCN | 11.4.0 |
| 59 | RP-130237 | 0584 | 1 | Extending Maximum Frequency Band Index | 11.4.0 |
| 59 | RP-130211 | 0585 | 1 | Rapporteur correction of X2AP | 11.4.0 |
| 59 | RP-130207 | 0586 |  | Clarification on Signalling Based MDT PLMN List | 11.4.0 |
| 59 | RP-130210 | 0587 | 1 | X2AP modification for PDCP SN extension | 11.4.0 |
| 60 | RP-130643 | 0588 |  | Correction on the Definition of Direct Neighbours | 11.5.0 |
| 60 | RP-130641 | 0589 | 1 | Correction for the MDT Location Information IE | 11.5.0 |
| 60 | RP-130640 | 0590 | 5 | Correction on RLF INDICATION procedure | 11.5.0 |
| 60 | RP-130643 | 0592 | 1 | Security key generation in case of MFBI | 11.5.0 |
| 60 | RP-130643 | 0593 | 2 | Correction on the Multiple Frequency Band Indicators | 11.5.0 |
| 61 | RP-131181 | 0598 | 1 | Correction on Handover Report procedure | 11.6.0 |
| 61 | RP-131179 | 0602 | 2 | Correction on ABS Information | 11.6.0 |
| 61 | RP-131183 | 0606 | 1 | Correction of terminology concerning the mobility restriction function | 11.6.0 |
| 62 | RP-131902 | 0609 | 3 | Correction of Handover Restriction List | 11.7.0 |
| 62 | RP-131902 | 0611 | 1 | Correction for Load Balancing Related cause value CR for 36423 | 11.7.0 |
| 62 | RP-131902 | 0623 | 2 | Correction for Load Balancing Related IE | 12.0.0 |
| 62 | RP-131909 | 0607 | 3 | Handling SIPTO@LN during UE Context Release procedure | 12.0.0 |
| 63 | RP-140294 | 0634 |  | Correction to tabular of Served Cell Information IE | 12.1.0 |
| 64 | RP-140901 | 0629 | 4 | TDD eIMTA support on X2AP | 12.2.0 |
| 64 | RP-140906 | 0630 | 4 | Provide IMEISV to eNB to identify UE characteristics | 12.2.0 |
| 64 | RP-140905 | 0661 | 1 | Correction of SN STATUS TRANSFER | 12.2.0 |
| 64 | RP-140905 | 0676 |  | Clarification of DL ABS status | 12.2.0 |
| 64 | RP-140897 | 0641 | 4 | Introduce X2GW procedures in Stage-3 | 12.2.0 |
| 65 | RP-141520 | 0663 | 3 | Introduction of the UE history reported from the UE | 12.3.0 |
| 65 | RP-141518 | 0690 | 2 | Introduction of an indication of the expected UE behaviour | 12.3.0 |
| 66 | RP-142089 | 0691 | 8 | Introduction of Dual Connectivity | 12.4.0 |
| 66 | RP-142090 | 0692 | 10 | Introduction of inter-eNB CoMP signalling | 12.4.0 |
| 66 | RP-142092 | 0748 | 5 | X2 support for Network Assisted Interference Cancellation | 12,4.0 |
| 66 | RP-142094 | 0754 | 2 | X2AP Rapporteur Update | 12.4.0 |
| 66 | RP-142094 | 0759 | 2 | Correction on RLF Report Container | 12.4.0 |
| 66 | RP-142094 | 0776 | 2 | Setting of Re-establishment Cell ID in RLF Indication message | 12.4.0 |
| 66 | RP-142094 | 0777 | 3 | X2 Removal Signaling | 12.4.0 |
| 12/2014 |  |  |  | History table corrected | 12.4.1 |
| 12/2014 |  |  |  | ASN.1 correction to make it compilable | 12.4.2 |
| 67 | RP-150353 | 0693 | 5 | ProSe authorized indication | 12.5.0 |
| 67 | RP-150351 | 0782 | 1 | Corrections on the usage of SeNB UE AMBR in dual connectivity | 12.5.0 |
| 67 | RP-150351 | 0790 | 1 | Corrections of Dual Connectivity in general | 12.5.0 |
| 67 | RP-150356 | 0797 | 1 | Correction on DC stage3 | 12.5.0 |
| 67 | RP-150348 | 0801 | 1 | Correction of the Usage of the MultibandInfoList IE | 12.5.0 |
| 67 | RP-150351 | 0802 | 1 | Introduction of Cause values for Dual Connectivity | 12.5.0 |
| 67 | RP-150356 | 0803 | 1 | ASN.1 Corrections for X2AP | 12.5.0 |
| 67 | RP-150351 | 0804 | 2 | Corrections for Dual Connectivity | 12.5.0 |
| 67 | RP-150356 | 0805 |  | Miscellaneous Editorials for X2AP | 12.5.0 |
| 67 | RP-150351 | 0806 | 1 | Correction on SeNB behaviour for distinguishing uplink PDCP PDUs | 12.5.0 |
| 68 | RP-150943 | 0807 | 1 | Correction on the definition of SeNB Reconfiguration Complete | 12.6.0 |
| 68 | RP-150943 | 0827 | 1 | Introduction of a new DC cause for not supported configurations | 12.6.0 |
| 68 | RP-150943 | 0831 |  | Clarification on UE-AMBR for split bearer | 12.6.0 |
| 06/2015 |  |  |  | Rel-13 version created based in v. 12.6.0 | 13.0.0 |
| 68 | RP-150945 | 0808 | 8 | Addition of Intra-LTE notifications of AAS-based reconfigurations | 13.0.0 |
| 69 | RP-151455 | 0788 | 11 | Introduction of enhanced inter-eNB CoMP signalling | 13.1.0 |
| 69 | RP-151451 | 0854 | 1 | Correction on GBR parameters for dual connectivity | 13.1.0 |
| 69 | RP-151450 | 0877 | 1 | Handling of Unknown or Erroneous AP IDs in Dual Connectivity | 13.1.0 |
| 70 | RP-152100 | 0850 | 5 | UE-to-Network Relay authorization | 13.2.0 |
| 70 | RP-152099 | 0892 | 2 | Extension of PDCP SN | 13.2.0 |
| 70 | RP-152102 | 0901 | 4 | Adding CSG support to DC | 13.2.0 |
| 70 | RP-152086 | 0907 |  | Correction on inter eNB CoMP | 13.2.0 |
| 70 | RP-152102 | 0910 | 5 | Support of SIPTO stand-alone architecture in dual connectivity | 13.2.0 |
| 70 | RP-152102 | 0911 | 2 | Support of SIPTO and LIPA in dual connectivity | 13.2.0 |
| 70 | RP-152102 | 0912 | 6 | Support of handover without SeNB change | 13.2.0 |
| 70 | RP-152102 | 0916 | 2 | Handling of User Inactivity in the SeNB | 13.2.0 |
| 70 | RP-152086 | 0918 |  | Correction of Subband Index | 13.2.0 |
| 70 | RP-152085 | 0924 | 4 | Correction of intra cell handovers in multiband deployments | 13.2.0 |
| 70 | RP-152102 | 0927 | 2 | Extension of UE X2AP ID | 13.2.0 |
| 70 | RP-152102 | 0929 | 2 | SIPTO@LN and LIPA bearer deactivation for DC | 13.2.0 |
| 70 | RP-152103 | 0932 | 3 | Introduction of feMDT | 13.2.0 |
| 70 | RP-152108 | 0936 | 2 | Addition of the Cell Deployment Status Indicator and replacing cell information | 13.2.0 |
| 70 | RP-152102 | 0939 | 1 | Tunnel Information of BBAI in Dual Connectivity | 13.2.0 |
| 71 | RP-160449 | 0937 | 3 | Addition of X2 Removal Threshold to the X2 Removal Request message | 13.3.0 |
| 71 | RP-160449 | 0949 | 2 | Modification of an ongoing resource reporting procedure | 13.3.0 |
| 71 | RP-160448 | 0950 | 1 | Correction on SeNB Addition Preparation concerning inter-MeNB handover without SeNB change | 13.3.0 |
| 71 | RP-160448 | 0953 | 1 | Correction on usage of extended eNB UE X2AP ID | 13.3.0 |
| 71 | RP-160448 | 0954 |  | Correction for SeNB Addition behaviour Abnormal | 13.3.0 |
| 71 | RP-160451 | 0959 |  | Clarification on the abnormal condition for DC SIPTO@LN | 13.3.0 |
| 71 | RP-160449 | 0962 | 1 | Rapporteur’s Update | 13.3.0 |
| 71 | RP-160448 | 0963 | 3 | Correction on Old/New eNB UE X2AP ID | 13.3.0 |
| 72 | RP-161042 | 0965 | 7 | Introduction of the inter-eNB UE Context Resume function | 13.4.0 |
| 72 | RP-161043 | 0968 | 1 | Correction on the DC function description | 13.4.0 |
| 72 | RP-161043 | 0969 | 3 | Correction on eNB UE X2AP ID Extension | 13.4.0 |
| 72 | RP-161043 | 0972 | 2 | Indication of Bearer Type for cIOT | 13.4.0 |
| 72 | RP-161047 | 0978 |  | Correction of RSRP Measurement Report List | 13.4.0 |
| 73 | RP-161551 | 0989 | 1 | Correction on NB-IoT inter node RRC container | 13.5.0 |
| 73 | RP-161550 | 0998 | 2 | Correction on Security Related Information in UE Context Retrieval Request | 13.5.0 |
| 09/2016 |  |  |  | Rel-14 version created based in v. 13.5.0 | 14.0.0 |
| 73 | RP-161552 | 0975 | 5 | Vehicular Authorization Signaling over X2 | 14.0.0 |
| 74 | RP-162337 | 1007 |  | Clarification on V2X Services Authorized IE | 14.1.0 |
| 74 | RP-162340 | 1008 | 3 | Target cell selection for low complexity UEs and UEs in enhanced coverage | 14.1.0 |
| 74 | RP-162340 | 1011 | - | Correction to Served Cell Information for NB-IoT | 14.1.0 |

| **Change history** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 03/2017 | RP-75 | RP-170535 | 1023 |  | B | X2AP Support for Inter-eNB Mobility without WT Change | 14.2.0 |
| 03/2017 | RP-75 | RP-170537 | 1005 | 3 | B | Introduction of a new special subframe configuration | 14.2.0 |
| 03/2017 | RP-75 | RP-170538 | 1025 |  | B | Support of V2X over X2 | 14.2.0 |
| 03/2017 | RP-75 | RP-170542 | 1026 |  | B | Introduction of New types of eNB ID | 14.2.0 |
| 03/2017 | RP-75 | RP-170536 | 1024 | 1 | B | Introduction of eMOB Stage3 | 14.2.0 |
| 06/2017 | RP-75 | RP-171329 | 1033 | 1 | A | Introduction of UL TNL address in CIoT UP Solution | 14.3.0 |
| 09/2017 | RP-77 | RP-171974 | 1035 | 1 | F | Correction on NB-IoT UP mobility | 14.4.0 |
| 09/2017 | RP-77 | RP-171974 | 1037 | 1 | F | Correction of SeNB Release Confirm | 14.4.0 |
| 12/2017 | RP-78 | RP-172673 | 1044 | 2 | F | Introduction of new IEs in X2 for high performing load balance | 14.5.0 |
| 12/2017 | RP-78 | RP-172715 | 1046 | - | F | Correction of mismatched tabular and ASN.1 | 14.5.0 |
| 12/2017 | RP-78 | RP-172672 | 1041 | 6 | B | Baseline CR to TS 36.423 covering agreements of RAN3 #98 | 15.0.0 |
| 12/2017 | RP-78 | RP-172674 | 1045 | 1 | B | Introduction of QoE Measurement Collection for LTE | 15.0.0 |
| 03/2018 | RP-79 | RP-180468 | 1050 | - | B | X2AP corrections for agreed EN-DC BL CR | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1051 | 1 | F | Essential corrections for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1052 | 1 | F | Clarification on HRL for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1053 | - | F | Correction of counter Check procedure for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1054 | - | B | Support for supplementary UL carrier | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1056 | - | F | Correction on SgNB initiated SgNB Modification procedure | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1061 | 1 | F | Correction of mandatory/optional/Conditional IEs in 36.423 | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1067 | 2 |  | Support for S-RLF | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1071 | 2 | F | Update of EN-DC X2 Setup and EN-DC Configuration Update | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1073 | - | F | Removal of wrong abnormal behaviour that does not exist in EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1078 | 1 |  | CR for addition of cause | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1079 | 2 | F | Clarification and correction on X2 for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1081 | 1 | F | Corrections for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1082 | 1 | F | Resolve the remaining issues over X2 for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1083 | 1 | F | Introduction of DRB ID for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180314 | 1087 | 1 | F | Removing data forwarding from the corresponding node for EN-DC | 15.1.0 |
| 03/2018 | RP-79 | RP-180472 | 1092 | 1 | F | Rapporteur correction of 36.423 before NSA ASN.1 freeze | 15.1.0 |
| 03/2018 | RP-79 | RP-180473 | 1093 | - | A | Correction on Offset of NB-IoT Channel Number to EARFCN | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1094 | - | F | Correction of TAC for NG-RAN cells before NSA ASN.1 freeze | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1095 | - | F | Remove PDCP change indication in SN modification request message | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1096 | - | F | Change the presence of container in SgNB reconfiguration complete procedure | 15.1.0 |
| 03/2018 | RP-79 | RP-180468 | 1097 | - | F | Addition of Measurement Timing Configuration information | 15.1.0 |
| 06/2018 | RP-80 | RP-181241 | 1047 | 6 | B | Support of Enhanced VoLTE Performance | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1065 | 4 | F | X2 partial reset for EN-DC | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1068 | 1 | F | Clarification of the interactions with the UE Context Release | 15.2.0 |
| 06/2018 | RP-80 | RP-181241 | 1086 | 3 | C | Introduction of QMC for MTSI in EUTRAN | 15.2.0 |
| 06/2018 | RP-80 | RP-181237 | 1090 | 9 | B | Baseline CR for E-UTRA - NR Cell Resource Coordination for TS 36.423 covering agreements of RAN3#100 | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1104 | - | F | Correction of UL link configuration in TS36.423 | 15.2.0 |
| 06/2018 | RP-80 | RP-181410 | 1107 | 4 | F | Addition of the full config indicator | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1116 | 1 | F | Correction of the SeNB Reconfiguration Completion procedure | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1117 | 2 | F | Correction of abnormal conditions for EN-DC security algorithm selection | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1121 | 1 | F | Correction of reference in RRC Container | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1122 | - | F | Correction of condition presence of E-RAB Level QoS Parameters related | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1123 | 1 | F | Support of TEID change at SN | 15.2.0 |
| 06/2018 | RP-80 | RP-181237 | 1125 | 4 | B | X2AP CR for support of NR Multiple frequency band in EN-DC | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1130 | - | F | Correction of max NR ARFCN value | 15.2.0 |
| 06/2018 | RP-80 | RP-181243 | 1132 | 3 | B | Baseline CR: Introduction of the Aerial Usage Indication | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1133 | 1 | F | Use of SPID for EN-DC | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1134 | 1 | F | Correction of references to RRC containers for EN-DC | 15.2.0 |
| 06/2018 | RP-80 | RP-181238 | 1135 | - | F | Corrections on Tabular indentation and ASN.1 criticality | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1138 | - | F | Adding missing relation for the TEID | 15.2.0 |
| 06/2018 | RP-80 | RP-181241 | 1142 | 3 | B | Retrieve UE Context at UE Re-establishment | 15.2.0 |
| 06/2018 | RP-80 | RP-181241 | 1143 | - | D | Rapporteur’s corrections on the specification | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1145 | - | F | Correction on the same terminology of “Split SRB” in TS36.423 | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1146 | 2 | F | Correction of Split SRB configuration in TS36.423 | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1149 | 3 | F | CR for Clarification on resource coordination | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1152 | - | F | Correction for PDCP Duplication | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1153 | - | F | Coordination of Inactivity for EN-DC | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1155 | - | C | Introduction of CN type restriction | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1158 | - | F | User Inactivity handling over X2 EN-DC | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1160 | 1 | F | Addition of Cause Value | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1161 | 2 | F | Addition of MeNB cell ID to solve the PCI confusion | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1164 | - | F | Corrections on misalignment between tabular and ASN.1 | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1165 | 1 | F | Introduction of EN-DC X2 removal procedure | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1167 | - | F | Support of DL TEID change over S1 at SN | 15.2.0 |
| 06/2018 | RP-80 | RP-181242 | 1174 | 2 | B | Support of NB-IoT measurement enhancement and TDD Config | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1175 | - | F | ASN.1 correction for EN-DC support in TS 36.423 | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1176 | 1 | F | Introduction of a Configured TAC into the NR Neighbour Information IE and the Served NR Cell Information IE | 15.2.0 |
| 06/2018 | RP-80 | RP-181239 | 1178 | - | F | Correction of the Limited List IE encoding to enable extensibility | 15.2.0 |
| 09/2018 | RP-81 | RP-181920 | 1115 | 4 | F | Indication of the RLC re-establishment at the assisting node | 15.3.0 |
| 09/2018 | RP-81 | RP-181920 | 1190 | - | F | Addition of RRC config indication to SGNB MODIFICATION REQUIRED and SGNB MODIFICATION REQUEST ACKNOWLEDGE | 15.3.0 |
| 09/2018 | RP-81 | RP-181920 | 1191 | 2 | F | Clarification on secondary RAT data volume reporting | 15.3.0 |
| 09/2018 | RP-81 | RP-181920 | 1192 | 1 | F | Essential corrections for EN-DC | 15.3.0 |
| 09/2018 | RP-81 | RP-181920 | 1193 | 1 | F | Corrections on EN-DC Resource Configuration | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1196 | 3 | F | Notification of PDCP SN length change | 15.3.0 |
| 09/2018 | RP-81 | RP-181920 | 1198 | 1 | F | Corrections on E-UTRA – NR Cell Resource Coordination | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1201 | 2 | F | RLC Mode Indication over X2 – for 36.423 | 15.3.0 |
| 09/2018 | RP-81 | RP-181922 | 1202 | 4 | F | Baseline CR for TS 36.423 covering agreements of RAN3#AH1807 and RAN3#101 | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1203 | 2 | F | Correction of "Maximum MCG admittable E-RAB Level QoS Parameters" | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1206 | - | F | X2 Corrections for EN-DC | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1211 | 1 | F | Access Restriction Data for NR in EPC | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1214 | 2 | C | Extension of Data Traffic Resources IE for E-UTRA-NR Cell Resource Coordination | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1217 | - | F | Correction of 5GS TAC | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1221 | 1 | F | CR on clarification of successfully delivered for NR-U | 15.3.0 |
| 09/2018 | RP-81 | RP-181923 | 1226 | 3 | F | Data forwarding for Retrieve UE Context in case of RRC connection re-establishment | 15.3.0 |
| 09/2018 | RP-81 | RP-181924 | 1231 | 1 | F | CR to X2AP to introduce Bluetooth and WLAN measurement in MDT | 15.3.0 |
| 09/2018 | RP-81 | RP-182127 | 1233 | 4 | B | Introduction of Subscription based UE differentiation | 15.3.0 |
| 09/2018 | RP-81 | RP-181921 | 1235 | - | F | Correction of SgNB Activity Notification Procedure | 15.3.0 |
| 12/2018 | RP-82 | RP-182447 | 1237 | 4 | F | Addition of the RLC Mode information for PDCP transfer | 15.4.0 |
| 12/2018 | RP-82 | RP-182446 | 1243 | 3 | F | Correction on PDCP SN length | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1244 | 2 | F | Support of CA based PDCP duplication on X2 | 15.4.0 |
| 12/2018 | RP-82 | RP-182446 | 1245 | 1 | F | CR on Introduction of overload indication over X2 | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1246 | 1 | F | CR on alingment of terminology for eNB or MeNB | 15.4.0 |
| 12/2018 | RP-82 | RP-182446 | 1247 | 1 | F | Correction of SgNB Initiated SN Modification procedure for Measurement Gap | 15.4.0 |
| 12/2018 | RP-82 | RP-182446 | 1248 | - | F | ASN.1 corrections on NRNeighbour-Information IE and NRFreqInfo IE | 15.4.0 |
| 12/2018 | RP-82 | RP-182446 | 1250 | - | F | Correction on E-UTRA - NR resource coordination | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1253 | 3 | F | Corrections of MeNB/SgNB resource coordination | 15.4.0 |
| 12/2018 | RP-82 | RP-182446 | 1256 | 1 | F | Correction on SGNB ACTIVITY NOTIFICATION IE's | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1259 | 1 | F | Correction of PDCP SN Length Indication | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1264 | 2 | F | RLC reestablishment indication for TS36.423 | 15.4.0 |
| 12/2018 | RP-82 | RP-182504 | 1267 | 1 | F | Update on Retrieve UE Context Request message for TS36.423 | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1272 | 1 | F | Handling of RLC failure | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1273 | - | F | Add missing description on non-operational X2 interface for EN-DC | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1275 | 2 | F | Further corrections of MeNB/SgNB resource coordination | 15.4.0 |
| 12/2018 | RP-82 | RP-182447 | 1279 | 1 | F | Criticality Correction for X2AP UE-ID | 15.4.0 |
| 12/2018 | RP-82 | RP-182437 | 1280 | 2 | F | Allowing SgNB to request new DRB ID from MeNB in EN-DC for an already established SN terminated bearer | 15.4.0 |
| 03/2019 | RP-83 | RP-190555 | 1282 | 3 | F | Correction to RRC transfer | 15.5.0 |
| 03/2019 | RP-83 | RP-190555 | 1283 | 2 | F | Transfer of the PSCell information for LI purposes | 15.5.0 |
| 03/2019 | RP-83 | RP-190555 | 1285 | - | F | Enabling using Dual Connectivity cause values in EN-DC | 15.5.0 |
| 03/2019 | RP-83 | RP-190555 | 1287 | 1 | F | Desired Activity Notification Level | 15.5.0 |
| 03/2019 | RP-83 | RP-190555 | 1291 | - | F | Introduction of IMEISV to Addition Request over X2 | 15.5.0 |
| 03/2019 | RP-83 | RP-190555 | 1292 | 1 | F | Clarification on the usage of coordination assistance information | 15.5.0 |
| 03/2019 | RP-83 | RP-190556 | 1297 | 1 | F | Introducing NR Neighbour information in X2 Setup | 15.5.0 |
| 03/2019 | RP-83 | RP-190555 | 1298 | - | F | Rapporteur updates on version 15.4.0 | 15.5.0 |
| 03/2019 | RP-83 | RP-190523 | 1300 | 3 | F | Adding Trace Messages in X2AP | 15.5.0 |
| 03/2019 | RP-83 | RP-190556 | 1301 | 1 | F | Correction of EPC interworking | 15.5.0 |
| 03/2019 | RP-83 | RP-190555 | 1302 | - | F | Straighten-up SgNB’s request to release and add the same SN-terminated bearer with different DRB ID | 15.5.0 |
| 03/2019 | RP-83 | RP-190561 | 1304 | 1 | F | Introduction of TNL Address discovery for EN-DC (using new container) | 15.5.0 |
| 2019-07 | RP-84 | RP-191395 | 1299 | 2 | F | Correction of MaxnoofBPLMNs for NR | 15.6.0 |
| 2019-07 | RP-84 | RP-191395 | 1307 | 1 | F | RRC config indication behaviour | 15.6.0 |
| 2019-07 | RP-84 | RP-191395 | 1308 | - | F | Transferring of NR RRC message in MeNB | 15.6.0 |
| 2019-07 | RP-84 | RP-191396 | 1313 | 1 | F | PDCP SN length related clean-up over To Be Mofidified structure in SN initiated SN Modifcation procedure | 15.6.0 |
| 2019-07 | RP-84 | RP-191429 | 1314 | 5 | F | RAN sharing with multiple Cell ID broadcast | 15.6.0 |
| 2019-07 | RP-84 | RP-191395 | 1315 | - | F | SN Status Transfer applicability for Re-establishment | 15.6.0 |
| 2019-07 | RP-84 | RP-191395 | 1316 | 2 | F | Rapporteur’s corrections to version 15.5.0 | 15.6.0 |
| 2019-07 | RP-84 | RP-191397 | 1317 | 1 | F | Correction of Core Network Type Restriction | 15.6.0 |
| 2019-07 | RP-84 | RP-191395 | 1318 | - | F | CR36423 for Addition of MN (MeNB) cell ID to solve the PCI confusion in SN(SgNB) modification Request message | 15.6.0 |
| 2019-07 | RP-84 | RP-191395 | 1321 | 1 | F | Updates on TS 36.423 for EN-DC TNL Address discovery | 15.6.0 |
| 2019-07 | RP-84 | RP-191394 | 1330 | 1 | F | PDCP SN length related clean-up over To Be Modified structure in MN initiated SN Modification procedure | 15.6.0 |
| 2019-09 | RP-85 | RP-192166 | 1322 | 2 | F | Correction of handling of the Location Information at the MeNB | 15.7.0 |
| 2019-09 | RP-85 | RP-192169 | 1336 | - | F | Correction on Data Forwarding Address Indication | 15.7.0 |
| 2019-09 | RP-85 | RP-192170 | 1339 | 1 | A | Correction on Handover Request Acknowledge | 15.7.0 |
| 2019-09 | RP-85 | RP-192169 | 1341 | 1 | F | Correction of NB-IoT TDD Cell Frequency info | 15.7.0 |
| 2019-09 | RP-85 | RP-192169 | 1359 | 1 | F | Non IP bearer support for Dual Connectivity | 15.7.0 |
| 2019-12 | RP-86 | RP-192916 | 1346 | 3 | F | Critical correction to the presence of the SgNB UE X2AP ID in the SgNB Release Request Reject | 15.8.0 |
| 2019-12 | RP-86 | RP-192916 | 1364 | 3 | F | Correction to SN Status Transfer considering EN-DC operations | 15.8.0 |
| 2019-12 | RP-86 | RP-192916 | 1380 | 2 | F | SN Status Transfer for bearer reconfiguration during HO with EN-DC | 15.8.0 |
| 2019-12 | RP-86 | RP-192915 | 1398 | - | F | Correction on the DL forwarding for MeNB terminated bearer in SgNB initiated SgNB Release | 15.8.0 |
| 2019-12 | RP-86 | RP-192916 | 1410 | 1 | F | CR36.423 for correction on EN-DC X2 SETUP REQUEST message | 15.8.0 |
| 2019-12 | RP-86 | RP-192916 | 1415 | 2 | F | Support of delta configuration in EN-DC | 15.8.0 |
| 2019-12 | RP-86 | RP-192913 | 1311 | 5 | B | Introduction of Additional RRM Policy Index (ARPI) | 16.0.0 |
| 2019-12 | RP-86 | RP-192910 | 1391 | 4 | B | Resuming SCG in RRC Resume | 16.0.0 |
| 2019-12 | RP-86 | RP-192910 | 1416 | 2 | B | Fast MCG link recovery via SRB3 | 16.0.0 |
| 2019-12 | RP-86 | RP-192913 | 1418 | 1 | F | Introduction of message size control for EN-DC X2 Setup | 16.0.0 |
| 2019-12 | RP-86 | RP-192692 | 1421 | 2 | F | Support for setting up IPSec a priori in X2 | 16.0.0 |
| 2020-03 | RP-87-e | RP-200425 | 1390 | 3 | B | Support for Multiple SCTP | 16.1.0 |
| 2020-03 | RP-87-e | RP-200422 | 1408 | 2 | B | Introduction of NR-U | 16.1.0 |
| 2020-03 | RP-87-e | RP-200429 | 1426 | - | A | Correction on Assigned Criticality for Bearer Type | 16.1.0 |
| 2020-03 | RP-87-e | RP-200419 | 1438 | 1 | B | SA to ENDC handover with shared SgNB/gNB | 16.1.0 |
| 2020-03 | RP-87-e | RP-200427 | 1448 | 1 | F | Cleanup for Fast MCG link Recovery with SRB3 | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 1452 | - | A | Correction of CR1380r2 to explicate procedural interaction | 16.1.0 |
| 2020-03 | RP-87-e | RP-200429 | 1454 | 1 | A | Correction of tabular representation of the RRC TRANSFER message | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 1456 | 1 | A | Correction of CR1415r2 – procedure text | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 1460 | - | A | Propagation of Roaming and Access Restriction information in E-UTRAN in non-homogenous eNB deployments | 16.1.0 |
| 2020-03 | RP-87-e | RP-200425 | 1462 | - | F | Correction of CR1418 on X2 Setup Message Size Control | 16.1.0 |
| 2020-03 | RP-87-e | RP-200425 | 1463 | - | F | Rapporteur Corrections Rel-16 | 16.1.0 |
| 2020-03 | RP-87-e | RP-200423 | 1468 | - | B | X2AP support for Radio Capability Signaling Optimization  (The CR is not implemented. The CR was marked agreed by mistake while the WI is not yet complete) | 16.1.0 |
| 2020-07 | RP-88-e | RP-201077 | 1303 | 16 | B | BL CR to 36.423: Support for IAB | 16.2.0 |
| 2020-07 | RP-88-e | RP-201089 | 1331 | 15 | B | Baseline CR for introducing Rel-16 LTE further mobility enhancements | 16.2.0 |
| 2020-07 | RP-88-e | RP-201079 | 1340 | 9 | B | Support of Ethernet Type Bearer | 16.2.0 |
| 2020-07 | RP-88-e | RP-201074 | 1369 | 12 | B | Support of NR V2X over X2 | 16.2.0 |
| 2020-07 | RP-88-e | RP-201082 | 1373 | 12 | B | Addition of SON feature | 16.2.0 |
| 2020-07 | RP-88-e | RP-201088 | 1374 | 4 | B | CR for 36.423 on NB-IoT PRACH configuration exchange over X2AP | 16.2.0 |
| 2020-07 | RP-88-e | RP-201088 | 1427 | 4 | B | Support of RLF in NB-IoT | 16.2.0 |
| 2020-07 | RP-88-e | RP-201082 | 1440 | 6 | B | MDT support for EN-DC | 16.2.0 |
| 2020-07 | RP-88-e | RP-201078 | 1468 | 4 | B | X2AP support for Radio Capability Signaling Optimization | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 1472 | - | F | Correction of the criticality of the TNLA to add/update/remove list | 16.2.0 |
| 2020-07 | RP-88-e | RP-201090 | 1475 | 2 | A | Encoding PLMNs in served cell information NR | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 1478 | 1 | F | Rapporteur's Correction to X2AP version 16.1.0 | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 1479 | - | F | Wrong ASN.1 IE-Id for the New eNB UE X2AP ID Extension IE | 16.2.0 |
| 2020-07 | RP-88-e | RP-201091 | 1485 | - | A | CR 36.423 Correction to E-UTRA-NR Cell-level Resource Coordination | 16.2.0 |
| 2020-07 | RP-88-e | RP-201091 | 1489 |  | F | Correction on nested SN modification procedure for EN-DC | 16.2.0 |
| 2020-07 | RP-88-e | RP-201090 | 1491 | - | A | Encoding PLMNs in served cell information IEs - semantics corrections | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 1492 | 1 | F | CR to TS36.423 on Correction of R3-202726 Agreed for EN-DC CSI-RS Transfer | 16.2.0 |
| 2020-07 | RP-88-e | RP-201090 | 1494 | 3 | A | Clarification on MIB only scenario | 16.2.0 |
| 2020-07 | RP-88-e | RP-201092 | 1502 | - | A | Tabular and ASN.1 correction of messages of the EN-DC X2 Setup and EN-DC Configuration Update procedures | 16.2.0 |
| 2020-07 | RP-88-e | RP-201076 | 1503 | - | B | Inter-RAT HO support for fast MCG recovery | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 1505 | 2 | F | Correction on RF parameters in NR cell information | 16.2.0 |
| 2020-09 | RP-89-e | RP-201946 | 1504 | 2 | F | Further correction on fast MCG recovery via SRB3 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201948 | 1511 |  | B | Introduction of NR SCG Release for Power Saving | 16.3.0 |
| 2020-09 | RP-89-e | RP-201948 | 1513 | 1 | F | Support for intended TDD configuration transfer for EN-DC | 16.3.0 |
| 2020-09 | RP-89-e | RP-201948 | 1518 | 2 | F | Clarification of the TNL Capacity Indicator | 16.3.0 |
| 2020-09 | RP-89-e | RP-201951 | 1525 | - | F | Essential correction for Rel-16 LTE\_feMob-Core WI | 16.3.0 |
| 2020-09 | RP-89-e | RP-201951 | 1526 | 1 | F | Rapporteur's corrections to TS 36.423 v16.2.0 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201947 | 1528 | 1 | F | Rapporteur Corrections for NR SON MDT WI and IAB WI | 16.3.0 |
| 2020-09 | RP-89-e | RP-201952 | 1529 | - | F | Missing ASN.1 of TNL Transport Layer Address Info IE in the EN-DC X2 SETUP RESPONSE message | 16.3.0 |
| 2020-09 | RP-89-e | RP-201954 | 1530 | - | A | Missing MeNB UE X2AP ID Extension IE in Trace messages | 16.3.0 |
| 2020-09 | RP-89-e | RP-201954 | 1531 | - | A | Correction for the Interface Instance Indication in the EN-DC X2 SETUP RESPONSE message | 16.3.0 |
| 2020-09 | RP-89-e | RP-201948 | 1532 | 1 | B | Introducing UE Radio Capability ID Mapping procedure | 16.3.0 |
| 2020-09 | RP-89-e | RP-201951 | 1537 | - | F | Correction on the Maximum Number of CHO Preparations in X2AP | 16.3.0 |
| 2020-09 | RP-89-e | RP-201954 | 1539 | 2 | A | Clarification on TAC presence in Serving Cell Info over X2 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201948 | 1542 | - | F | Correction on protocol IE for MDTConfigurationNR | 16.3.0 |
| 2020-12 | RP-90-e | RP-202314 | 1545 | 1 | F | Correction on CPC Complete Transfer | 16.4.0 |
| 2020-12 | RP-90-e | RP-202310 | 1550 | - | F | Correction of IAB related RRC Container in RRC TRANSFER message | 16.4.0 |
| 2020-12 | RP-90-e | RP-202310 | 1552 | 1 | F | Clarification for F1-C Traffic Container IE | 16.4.0 |
| 2020-12 | RP-90-e | RP-202313 | 1562 | - | F | Removal of duplicated imports | 16.4.0 |
| 2020-12 | RP-90-e | RP-202312 | 1563 | 1 | F | Load information for SN-initiated DC release | 16.4.0 |
| 2020-12 | RP-90-e | RP-202312 | 1565 |  | F | Enabling URI configuration within Trace Activation over X2 | 16.4.0 |
| 2021-03 | RP-91-e | RP-210799 | 1367 | 8 | B | Introduction of SFN Offset per cell over X2 | 16.5.0 |
| 2021-03 | RP-91-e | RP-210239 | 1561 | 4 | F | Cause value on X2 for insufficient UE capabilities CR 36.423 | 16.5.0 |
| 2021-03 | RP-91-e | RP-210239 | 1580 | 1 | F | Cause value on X2 for normal release CR 38.423 | 16.5.0 |
| 2021-06 | RP-92-e | RP-211331 | 1543 | 3 | F | Clarification of the use of the max no of CHO preparations | 16.6.0 |
| 2021-06 | RP-92-e | RP-211331 | 1588 | 2 | F | 36.423 correction for CHO early data forwarding in MN to eNB Change scenario | 16.6.0 |
| 2021-06 | RP-92-e | RP-211317 | 1593 | 1 | F | Correction of en-gNB initiated EN-DC Resource Status Reporting | 16.6.0 |
| 2021-06 | RP-92-e | RP-211332 | 1594 | 1 | F | Correction of IMS Voice EPS Fallback | 16.6.0 |
| 2021-06 | RP-92-e | RP-211333 | 1600 | 2 | F | Correction on SN initiated SN Modification procedure for EN-DC | 16.6.0 |
| 2021-06 | RP-92-e | RP-211328 | 1603 | 1 | F | Addition of MeNB to SN sidelink resource coordination | 16.6.0 |
| 2021-09 | RP-93-e | RP-211874 | 1612 | 1 | F | Correction on EN-DC case | 16.7.0 |
| 2021-12 | RP-94-e | RP-212863 | 1630 | 1 | A | SN triggerred SCG release | 16.8.0 |
| 2021-12 | RP-94-e | RP-212863 | 1637 | - | A | Transfer of PSCell Location Reporting control information at X2 mobility | 16.8.0 |
| 2021-12 | RP-94-e | RP-212860 | 1645 | 1 | F | Direct data forwarding for mobility between DC and SA | 16.8.0 |
| 2021-12 | RP-94-e | RP-212864 | 1648 | - | A | Correction on EN-DC X2 Removal for RAN Sharing in Rel-16 | 16.8.0 |
| 2022-03 | RP-95-e | RP-220279 | 1639 | 3 | F | Dynamic ACL over X2 CR 36.423 | 16.9.0 |
| 2022-03 | RP-95-e | RP-220276 | 1658 | 1 | F | Correction of Qos Mapping Information IE in X2AP message for IAB (CR to TS36.423, R16) | 16.9.0 |
| 2022-03 | RP-95-e | RP-220275 | 1662 | 2 | A | Correction on UE X2AP ID in the ERROR INDICATION message | 16.9.0 |
| 2022-03 | RP-95-e | RP-220278 | 1664 | 2 | F | Correction of indirect data forwarding for MR-DC | 16.9.0 |
| 2022-03 | RP-95-e | RP-220279 | 1670 | 1 | F | Correction of frequency information for DL only cell for ENDC | 16.9.0 |
| 2022-03 | RP-95-e | RP-220279 | 1672 |  | F | Correction on the ASN.1 for neighbour cell information | 16.9.0 |
| 2022-03 | RP-95-e | RP-220284 | 1679 | 1 | A | Misalignment on M8 and M9 measurement configurations | 16.9.0 |
| 2022-06 | RP-96 | RP-221150 | 1686 |  | F | X2AP rapporteur's corrections | 16.10.0 |
| 2022-06 | RP-96 | RP-221150 | 1693 | 1 | F | Dynamic ACL over X2 CR 36.423 | 16.10.0 |
| 2022-06 |  |  |  |  |  | Some revision marks left unaccepted were accepted | 16.10.1 |
| 2023-06 | RAN#100 | RP-231075 | 1739 | 2 | F | Corrections on TNL association addition and removal (X2AP) | 16.11.0 |
| 2023-06 | RAN#100 | RP-231075 | 1742 | 4 | F | Missing Use Cases for Dynamic ACL | 16.11.0 |
| 2023-09 | RAN#101 | RP-231898 | 1755 | 1 | F | Misalignment between tabular and ASN.1 for CHO Information IE | 16.12.0 |
| 2023-09 | RAN#101 | RP-231894 | 1759 | 2 | A | Correction on QoE area scope tabular reference and presence | 16.12.0 |
| 2024-03 | RAN#103 | RP-24xxxx | 1769 | - | F | Correction on IAB authorization status transfer for EN-DC | 16.13.0 |