**3GPP TSG-RAN3 Meeting #108-e R3-20xxxx**

**1 – 11 June 2020 E-Meeting**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.423** | **CR** | **1373** | **rev** | **12** | **Current version:** | **16.1.0** |  |
|  |
| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | Addition of SON feature |
|  |  |
| ***Source to WG:*** | CATT, CMCC, ZTE, Nokia, Nokia Shanghai Bell, Huawei, Qualcomm Incorporated, LG Electronics, NTTDOCOMO |
| ***Source to TSG:*** | RAN3 |
|  |  |
| ***Work item code:*** | NR\_SON\_MDT |  | ***Date:*** | 2020-06-16 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Addition of SON functions for NR, including MRO ones (for E-UTRAN-NG-RAN ping-pong), MLB ones (for load exchange for EN-DC) and RACH optimisation ones (for PRACH configuration delivering from the en-gNB toward the eNB). |
|  |  |
| ***Summary of change:*** | Rev12Includes the agreed TP R3-204344 and R3-204376, and some editorial changes.Rev11:Resubmitted to RAN3#108Rev10:Includes the agreed TP R3-202744.Rev9:Resubmitted to RAN3#107bisRev8:Includes the agreed TP R3-201404.Rev7:Add ASN.1 codesRev6:Includes the agreed TP R3-197764/R3-197578Rev5:Remove partial successRev4:Resubmitted to RAN3#106Rev 3:Includes the agreed TP in R3-196269Rev 2:Re-submission to RAN3#105bis meeting.Rev 1:Editorial Rev 0:The following changes are necessary:Add new procedures EN-DC Resource Status Reporting Initiation and EN-DC Resource Status Reporting |
|  |  |
| ***Consequences if not approved:*** | The SON function can not be supported. |
|  |  |
| ***Clauses affected:*** | 2, 7, 8.1, 8.3.10, 8.7.1, 8.7.2, 8.7.x (new), 8.7.y (new), 9.1.2.19, 9.1.2.x1 (new), 9.1.2.x2 (new), 9.1.2.x3 (new), 9.1.2.4x (new), 9.2.106, 9.2.110, 9.2.123, 9.2.xx (new), 9.2.yy (new), 9.2.zz (new), 9.2.a (new), 9.2.b (new), 9.2.c (new), 9.2.o (new), 9.2.x1 (new), 9.2.x2 (new), 9.3.3, 9.3.4, 9.3.5, 9.3.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.423 CR 0222TS 36.413 CR 1710TS 38.413 CR 0237TS 38.423 CR 0221TS 38.463 CR 0142TS 38.473 CR 0441 |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev1: EditorialRev2: resubmitted to RAN3#105bRev3: includes the agreed TP in R3-196269Rev4: Resubmitted to RAN3#106Rev5: Remove partial successRev6: Includes the agreed TP R3-197764/R3-197578Rev7: Add ASN.1 codesRev8: Includes the agreed TP R3-201404.Rev9: Resubmitted to RAN3#107bisRev10: Includes the agreed TP R3-202744.Rev11:Resubmitted to RAN3#108Rev12: Includes the agreed TP R3-204344 and R3-204376, and some editorial changes |

////////////////////////////////////////////////////////////////////////Change Start ///////////////////////////////////////////////////////////////////////////

# 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".

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

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

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

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

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# 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.

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 Preparationb) SN Status Transferc) UE Context Released) Handover Cancel |
| Dual Connectivity | a) SeNB Addition Preparationb) SeNB Reconfiguration Completionc) MeNB initiated SeNB Modification Preparationd) SeNB initiated SeNB Modificatione) MeNB initiated SeNB Releasef) SeNB initiated SeNB Releaseg) SeNB Counter Check |
| E-UTRA-NR Dual Connectivity | a) SgNB Addition Preparationb) SgNB Reconfiguration Completionc) MeNB initiated SgNB Modification Preparationd) SgNB initiated SgNB Modificatione) SgNB changef) MeNB initiated SgNB Releaseg) SgNB initiated SgNB Releaseh) SgNB Counter Checki) RRC transferj) EN-DC X2 Setupk) EN-DC Configuration Updatel) EN-DC Cell Activationm) SgNB Activity Notificationn) EN-DC X2 Removalo) gNB Status Indicationp) EN-DC Resource Status Reporting Initiationq) EN-DC Resource Status Reporting |
| Load Management | a) Load Indicationb) Resource Status Reporting Initiationc) 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 Updateb) Cell Activation |
| Mobility Parameters Management | Mobility Settings Change |
| Mobility Robustness Optimisation | a) Radio Link Failure Indicationb) Handover Report |
| Energy Saving | a) eNB Configuration Updateb) 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 Contextb) 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 |

# 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 |

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 |
| EN-DC Resource Status Reporting | EN-DC RESOURCE STATUS UPDATE |

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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

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**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 *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 *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.

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### 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: 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.

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.

**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.

**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.

#### 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.

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.

**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 X2 CONFIGURATION UPDATE ACKNOWLEDGE message the *SUL Information* IE and the *Supported SUL band List* IE for each cell added in the Served NR Cells To Add IE and in the Served NR Cells To Modify IE.

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 X2 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.

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

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

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

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

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

If the EN-DC CONFIGURATION UPDATE 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.

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 X2 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.

**Update of SCTP associations:**

If the *TNL Association 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. 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 *TNL Association Setup List* IE;

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

If the *TNL Association 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 *TNL Association 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.

#### 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.

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### 8.7.x EN-DC Resource Status Reporting Initiation

#### 8.7.x.1 General

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

The procedure uses non UE-associated signalling.

#### 8.7.x.2 Successful Operation



Figure 8.7.x.2-1: Resource Status Reporting Initiation, successful operation

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

If the *Report Characteristics* IE is included in the RESPOURCE STATUS REQUEST message and this indicates cell specific measurements, the *Cell To Report List* IE shall be included.

Upon receipt of the 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* 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

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

The en-gNB shall send a RESOURCE STATUS RESPONSE message to 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* IE in the RESOURCE STATUS REQUEST indicates the type of objects en-gNB shall perform measurements on. For each cell, the en-gNB 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. If the cell for which *Radio* *Resource Status* IE is requested to be reported supports more than one SSB, the *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 *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* IE included in the RESOURCE STATUS REQUEST message is set to 1;

- the *Composite Available Capacity Group* IE, if the third 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. If the cell for which *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 *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 IE in the RESPOURCE STATUS REQUEST is present, this indicates the periodicity for the reporting of periodic measurements. If the Reporting Periodicity IE is absent, the en-gNB shall report only once.

#### 8.7.x.3 Unsuccessful Operation



Figure 8.2.x.3-1: Resource Status Reporting Initiation, unsuccessful operation

If any of the requested measurements cannot be initiated, en-gNB shall send a RESOURCE STATUS FAILURE message.

#### 8.7.x.4 Abnormal Conditions

Void.

### 8.7.y EN-DC Resource Status Reporting

#### 8.7.y.1 General

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

The procedure uses non UE-associated signalling.

#### 8.7.y.2 Successful Operation



Figure 8.7.y.2-1: Resource Status Reporting, successful operation

The en-gNB shall report the results of the admitted measurements in 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.y.3 Unsuccessful Operation

Not applicable.

#### 8.7.y.4 Abnormal Conditions

Void.

////////////////////////////////////////////////////////////unchanged omitted///////////////////////////////////////////////////////////////////////

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 |  | Cause9.2.6 | Indicates handover cause employed for handover from eNB2 | YES | ignore |
| Source cell ECGI | M |  | ECGI9.2.14 | ECGI of source cell for handover procedure (in eNB2) | YES | ignore |
| Failure cell ECGI | M |  | ECGI9.2.14 | ECGI of target cell for handover procedure (in eNB1) | YES | ignore |
| Re-establishment cell ECGI | C-ifHandoverReportType HoToWrongCell |  | ECGI9.2.14 | 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" |

////////////////////////////////////////////////////////////unchanged omitted///////////////////////////////////////////////////////////////////////

#### 9.1.2.x1 EN-DC RESOURCE STATUS REQUEST

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

Direction: 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 |
| MeNB Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by MeNB | YES | reject |
| en-gNB Measurement ID | C-ifRegistrationRequestStoporAdd |  | INTEGER (1..4095,...) | Allocated by en-gNB | YES | ignore |
| Registration Request | M |  | ENUMERATED (start, stop, add…,) | Type of request for which the resource status is required. | YES | reject |
| Reporting Periodicity | 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 | C-ifRegistrationRequestStart |  | BITSTRING(SIZE(32)) | 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 UEsOther bits shall be ignored by the en-gNB. | YES | ignore |
| **Cell To Report List** |  | *0..1* |  | Cell ID list to which the request applies. | YES | ignore |
| **>Cell To Report Item** |  | *1 .. <maxCellinengNB>* |  |  | EACH | ignore |
| >>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.o |  | – | – |

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

#### 9.1.2.x2 EN-DC RESOURCE STATUS RESPONSE

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

Direction: 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 |
| MeNB Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by MeNB | YES | reject |
| en-gNB Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by en-gNB | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |

#### 9.1.2.x3 EN-DC RESOURCE STATUS FAILURE

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

Direction: 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 |
| MeNB Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by MeNB | YES | reject |
| en-gNB Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by en-gNB | 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 |

#### 9.1.2.x4 EN-DC RESOURCE STATUS UPDATE

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

Direction: 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 | ignore |
| MeNB Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by MeNB | YES | reject |
| en-gNB Measurement ID | M |  | INTEGER (1..4095,...) | Allocated by en-gNB | YES | reject |
| **Cell Measurement Result** |  | *0..1* |  |  | YES | ignore |
| **>Cell Measurement Result Item** |  | *1 .. <maxCellinengNB>* |  |  | EACH | ignore |
| >>Cell ID | M |  | NR CGI 9.2.111 |  |  |  |
| >>Radio Resource Status | O |  | NR Radio Resource Status 9.2.yy |  |  |  |
| >>TNL Capacity Indicator | O |  | TNL Capacity Indicator 9.2.xx |  |  |  |
| >>Composite Available Capacity Group | O |  | NR Composite Available Capacity Group 9.2.zz |  |  |  |
| >>Number of Active UEs | O |  | INTEGER (0..16777215, ...) | As defined in TS 38.314 [xe] and where 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. |  |  |
|  |  |  |  |  |  |  |

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

////////////////////////////////////////////////////////////unchanged omitted///////////////////////////////////////////////////////////////////////

### 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. |

////////////////////////////////////////////////////////////unchanged omitted///////////////////////////////////////////////////////////////////////

### 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 | – |  |
| 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. 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 Info9.2.106 |  | – |  |
| >>>DL FreqInfo | M |  | NR Frequency Info9.2.106 |  | – |  |
| >>>UL Transmission Bandwidth | M |  | NR Transmission Bandwidth9.2.114 |  | – |  |
| >>>DL Transmission Bandwidth | M |  | NR Transmission Bandwidth9.2.114 |  | – |  |
| >>>UL Carrier List | O |  | NR Carrier List9.2.x1 | If included, the *UL Transmission Bandwidth* IE shall be ignored. | YES | ignore |
| *>TDD* |  |  |  |  |  |  |
| **>>TDD Info** |  | *1* |  |  | – |  |
| >>>NRFreqInfo | M |  | NR Frequency Info9.2.106 |  | – |  |
| >>>Transmission Bandwidth | M |  | NR Transmission Bandwidth9.2.114 |  | – |  |
| >>>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 List9.2.x1 | If included, the *Transmission Bandwidth* IE shall be ignored. | 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-1>* |  | This IE corresponds to the *PLMN-IdentityInfoList* IE in *SIB1* as specified in TS 38.331 [31]. The PLMN Identities and associated information contained in this IE shall be provided in the same order as broadcast in SIB1. | YES | ignore |
| **>Broadcast PLMNs** |  | *1..<maxnoofextBPLMNs>* |  |  | – |  |
| >>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.x2 |  | YES | ignore |
| NR Cell PRACH Configuration | O |  | OCTET STRING | Containing 9.3.1.xx NR Cell PRACH Configuration as of TS 38.473 [xd]. | 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. |
| maxnoofextBPLMNs-1 | Maximum no. of extended broadcast PLMN Ids minus 1. Value is 11. |

////////////////////////////////////////////////////////////unchanged omitted///////////////////////////////////////////////////////////////////////

### 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 Bandwidth9.2.114 |  | – |  |
| Carrier List | O |  | NR Carrier List9.2.x1 | 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. |

////////////////////////////////////////////////////////////unchanged omitted///////////////////////////////////////////////////////////////////////

### 9.2.xx 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.yy 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.o |  |
| >>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.zz 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.a | For the Downlink |
| Composite Available Capacity Uplink | M |  | NR Composite Available Capacity 9.2.a | For the Uplink |

### 9.2.a 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 Value9.2.b |  |
| Capacity Value | M |  | NR Capacity Value9.2.c |  |

### 9.2.b 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.c 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.o |  |
| >>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. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
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| --- | --- | --- | --- | --- | --- | --- |
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|  |  |  |  |  |  |  |

9.2.o 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.x1 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 [xa], 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 [xa], 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.x2 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 [xb], 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)) |  |

###

### 9.3.3 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,

 ENDCResourceStatusRequest,

 ENDCResourceStatusResponse,

 ENDCResourceStatusFailure,

 ENDCResourceStatusUpdate

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-endcresourceStatusReporting,

 id-endcresourceStatusReportingInitiation

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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 ,

 ...

}

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 |

 endcresourceStatusReporting ,

 ...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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

}

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

}

END

-- ASN1STOP

### 9.3.4 PDU Definitions

-- ASN1START

-- 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,

 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,

 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.

 TargetCellInNGRAN,

 Measurement-ID-ENDC,

 Registration-Request-ENDC,

 ReportCharacteristics-ENDC,

 NRRadioResourceStatus,

 TNLCapacityIndicator,

 NRCompositeAvailableCapacityGroup,

 SSBIndex,

 TDDULDLConfigurationCommonNR,

 NRCarrierList,

 SSB-PositionsInBurst,

 NRCellPRACHConfig

FROM X2AP-IEs

 PrivateIE-Container{},

 ProtocolExtensionContainer{},

 ProtocolIE-Container{},

 ProtocolIE-ContainerList{},

 ProtocolIE-ContainerPair{},

 ProtocolIE-ContainerPairList{},

 ProtocolIE-Single-Container{},

 X2AP-PRIVATE-IES,

 X2AP-PROTOCOL-EXTENSION,

 X2AP-PROTOCOL-IES,

 X2AP-PROTOCOL-IES-PAIR

FROM X2AP-Containers

 id-ABSInformation,

 id-ActivatedCellList,

 id-BearerType,

 id-Cause,

 id-CellInformation,

 id-CellInformation-Item,

 id-CellMeasurementResult,

 id-CellMeasurementResult-Item,

 id-CellToReport,

 id-CellToReport-Item,

 id-CompositeAvailableCapacityGroup,

 id-AerialUEsubscriptionInformation,

 id-CriticalityDiagnostics,

 id-DeactivationIndication,

 id-DynamicDLTransmissionInformation,

 id-E-RABs-Admitted-Item,

 id-E-RABs-Admitted-List,

 id-E-RABs-NotAdmitted-List,

 id-E-RABs-SubjectToStatusTransfer-List,

 id-E-RABs-SubjectToStatusTransfer-Item,

 id-E-RABs-ToBeSetup-Item,

 id-GlobalENB-ID,

 id-GUGroupIDList,

 id-GUGroupIDToAddList,

 id-GUGroupIDToDeleteList,

 id-GUMMEI-ID,

 id-Masked-IMEISV,

 id-InvokeIndication,

 id-New-eNB-UE-X2AP-ID,

 id-Old-eNB-UE-X2AP-ID,

 id-Registration-Request,

 id-ReportingPeriodicity,

 id-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-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-TargetCellInNGRAN,

 id-MeNB-Measurement-ID,

 id-engNB-Measurement-ID,

 id-TDDULDLConfigurationCommonNR,

 id-CarrierList,

 id-ULCarrierList,

 id-SSB-PositionsInBurst,

 id-NRCellPRACHConfig,

 maxCellineNB,

 maxnoofBearers,

 maxnoofPDCP-SN,

 maxFailedMeasObjects,

 maxnoofCellIDforMDT,

 maxnoofTAforMDT,

 maxCellinengNB,

 maxnoofCellIDforQMC,

 maxnoofTAforQMC,

 maxnoofPLMNforQMC,

 maxnoofProtectedResourcePatterns,

 maxnoNRcellsSpectrumSharingWithE-UTRA,

 maxnoofNrCellBands,

 maxnoofSSBAreas

FROM X2AP-Constants;

/////////////////////////////////////////////////////////////skip unchanged/////////////////////////////////////////////////////////////

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- HANDOVER REPORT

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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" -- ,

 ...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC X2 SETUP REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCX2SetupRequest ::= SEQUENCE {

 protocolIEs ProtocolIE-Container {{ENDCX2SetupRequest-IEs}},

 ...

}

ENDCX2SetupRequest-IEs X2AP-PROTOCOL-IES ::= {

 { ID id-InitiatingNodeType-EndcX2Setup CRITICALITY reject TYPE InitiatingNodeType-EndcX2Setup PRESENCE mandatory}|

 { 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}

,

 ...

}

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 },

 ...

}

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},

 ...

}

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 ::= {

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC RESOURCE STATUS REQUEST

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusRequest ::= SEQUENCE {

 protocolIEs ProtocolIE-Container {{ENDCResourceStatusRequest-IEs}},

 ...

}

ENDCResourceStatusRequest-IEs X2AP-PROTOCOL-IES ::= {

 { ID id-MeNB-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

 { ID id-engNB-Measurement-ID CRITICALITY ignore TYPE Measurement-ID-ENDC PRESENCE conditional}| -- The IE shall be present if the *Registration Request* 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* IE is set to “Start”

 { ID id-CellToReport CRITICALITY ignore TYPE CellToReport-ENDC-List PRESENCE optional},

 ...

}

ReportingPeriodicity-ENDC ::= ENUMERATED {ms500, ms1000, ms2000, ms5000, ms10000, ...}

CellToReport-ENDC-List ::= SEQUENCE (SIZE (1..maxCellinengNB)) OF ProtocolIE-Single-Container { {CellToReport-ENDC-ItemIEs} }

CellToReport-ENDC-ItemIEs X2AP-PROTOCOL-IES ::= {

 { ID id-CellToReport-Item CRITICALITY ignore TYPE CellToReport-ENDC-Item PRESENCE mandatory}

}

CellToReport-ENDC-Item ::= SEQUENCE {

 cell-ID NRCGI,

 ssbToReport-List SSBToReport-List OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {CellToReport-ENDC-Item-ExtIEs} } OPTIONAL,

 ...

}

CellToReport-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 ::= {

 ...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC RESOURCE STATUS RESPONSE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusResponse ::= SEQUENCE {

 protocolIEs ProtocolIE-Container {{ENDCResourceStatusResponse-IEs}},

 ...

}

ENDCResourceStatusResponse-IEs X2AP-PROTOCOL-IES ::= {

 { ID id-MeNB-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

 { ID id-engNB-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},

 ...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC RESOURCE STATUS FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusFailure ::= SEQUENCE {

 protocolIEs ProtocolIE-Container {{ENDCResourceStatusFailure-IEs}},

 ...

}

ENDCResourceStatusFailure-IEs X2AP-PROTOCOL-IES ::= {

 { ID id-MeNB-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

 { ID id-engNB-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},

 ...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- EN-DC RESOURCE STATUS UPDATE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ENDCResourceStatusUpdate ::= SEQUENCE {

 protocolIEs ProtocolIE-Container {{ENDCResourceStatusUpdate-IEs}},

 ...

}

ENDCResourceStatusUpdate-IEs X2AP-PROTOCOL-IES ::= {

 { ID id-MeNB-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

 { ID id-engNB-Measurement-ID CRITICALITY reject TYPE Measurement-ID-ENDC PRESENCE mandatory}|

 { ID id-CellMeasurementResult CRITICALITY ignore TYPE CellMeasurementResult-ENDC-List PRESENCE optional },

 ...

}

CellMeasurementResult-ENDC-List ::= SEQUENCE (SIZE (1..maxCellinengNB)) OF ProtocolIE-Single-Container { {CellMeasurementResult-ENDC-ItemIEs} }

CellMeasurementResult-ENDC-ItemIEs X2AP-PROTOCOL-IES ::= {

 { ID id-CellMeasurementResult-ENDC-Item CRITICALITY ignore TYPE CellMeasurementResult-ENDC-Item PRESENCE mandatory}

}

CellMeasurementResult-ENDC-Item ::= SEQUENCE {

 cell-ID NRCGI,

 radioResourceStatus NRRadioResourceStatus OPTIONAL,

 tnlCapacityIndicator TNLCapacityIndicator OPTIONAL,

 compositeAvailableCapacityGroup NRCompositeAvailableCapacityGroup OPTIONAL,

 numberofActiveUEs INTEGER (0..16777215, ...) OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {CellMeasurementResult-Item-ExtIEs} } OPTIONAL,

 ...

}

CellMeasurementResult-Item-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

### 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-CarrierList,

 id-FrequencyShift7p5khz,

 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,

 maxnoofextBPLMNsminus1,

 maxnoofBPLMNsminus1,

 maxnoofTLAs,

 maxnoofGTPTLAs,

 maxnoofSSBAreas,

 maxnoofNRSCSs,

 maxnoofPhysicalResourceBlocks

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

/////////////////////////////////////skip unchanged/////////////////////////////////////

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- F

/////////////////////////////////////skip unchanged/////////////////////////////////////

FrequencyShift7p5khz ::= ENUMERATED {false, true, ...}

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- H

/////////////////////////////////////skip unchanged/////////////////////////////////////

HandoverReportType ::= ENUMERATED {

 hoTooEarly,

 hoToWrongCell,

 ...,

 interRATpingpong,

 interSystemPingpong

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- M

/////////////////////////////////////skip unchanged/////////////////////////////////////

Measurement-ID-ENDC ::= INTEGER (1..4095, ...)

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- N

/////////////////////////////////////skip unchanged/////////////////////////////////////

NRCarrierList ::= SEQUENCE (SIZE(1..maxnoofNRSCSs)) OF NRCarrierItem

NRCarrierItem ::= SEQUENCE {

 carrierSCS NRSCS,

 offsetToCarrier INTEGER (0..2199, ...),

 carrierBandwidth INTEGER (0..maxnoofPhysicalResourceBlocks, ...),

 iE-Extension ProtocolExtensionContainer { {NRCarrierItem-ExtIEs} } OPTIONAL,

 ...

}

NRCarrierItem-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

NRCellPRACHConfig ::= OCTET STRING

/////////////////////////////////////skip unchanged/////////////////////////////////////

NRCellCapacityClassValue ::= INTEGER (1..100, ...)

NRCapacityValue ::= SEQUENCE {

 capacityValue INTEGER (0..100)

 ssbAreaCapacityValue-List SSBAreaCapacityValue-List OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { NRCapacityValue-ExtIEs} } OPTIONAL,

 ...

}

NRCapacityValue-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

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 ::= {

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

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},

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

NRRadioResourceStatus ::= SEQUENCE {

 ssbAreaRadioResourceStatus-List SSBAreaRadioResourceStatus-List,

 iE-Extensions ProtocolExtensionContainer { {NRRadioResourceStatus-ExtIEs} } OPTIONAL,

 ...

}

NRRadioResourceStatus-ExtIEs X2AP-PROTOCOL-EXTENSION ::= {

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- R

/////////////////////////////////////skip unchanged/////////////////////////////////////

Registration-Request-ENDC ::= ENUMERATED {

 start,

 stop,

 add

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

ReportCharacteristics-ENDC ::= BIT STRING (SIZE (32))

/////////////////////////////////////skip unchanged/////////////////////////////////////

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- S

/////////////////////////////////////skip unchanged/////////////////////////////////////

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)

/////////////////////////////////////skip unchanged/////////////////////////////////////

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 ::= {

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

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 },

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

-- T

/////////////////////////////////////skip unchanged/////////////////////////////////////

TargetCellInNGRAN ::= OCTET STRING

/////////////////////////////////////skip unchanged/////////////////////////////////////

TDDULDLConfigurationCommonNR ::= OCTET STRING

/////////////////////////////////////skip unchanged/////////////////////////////////////

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 ::= {

 ...

}

/////////////////////////////////////skip unchanged/////////////////////////////////////

### 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-endcresourceStatusReporting ProcedureCode ::=

id-endcresourceStatusReportingInitiation ProcedureCode ::=

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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

maxnoofextBPLMNsminus1 INTEGER ::= 11

maxnoofBPLMNsminus1 INTEGER ::= 11

maxnoofTLAs INTEGER ::= 16

maxnoofGTPTLAs INTEGER ::= 16

maxnoofTNLAssociations INTEGER ::= 32

maxnoofSSBAreas INTEGER ::= 64

maxnoofNRSCSs INTEGER ::= 5

maxnoofPhysicalResourceBlocks INTEGER ::= 275

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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-AdmittedFastMCGRecoveryViaSRB3 ProtocolIE-ID ::= 344

id-RequestedFastMCGRecoveryViaSRB3Release ProtocolIE-ID ::= 345

id-AdmittedFastMCGRecoveryViaSRB3Release 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-TargetCellInNGRAN ProtocolIE-ID ::=

id-MeNB-Measurement-ID ProtocolIE-ID ::=

id-engNB-Measurement-ID ProtocolIE-ID ::=

id-TDDULDLConfigurationCommonNR ProtocolIE-ID ::=

id-CarrierList ProtocolIE-ID ::=

id-ULCarrierList ProtocolIE-ID ::=

id-FrequencyShift7p5khz ProtocolIE-ID ::=

id-SSB-PositionsInBurst ProtocolIE-ID ::=

id-NRCellPRACHConfig ProtocolIE-ID ::=

END

-- ASN1STOP

/////////////////////////////////////CR END/////////////////////////////////////