

ETSI TS 138 423 V16.15.0 (2023-10)



**5G;
NG-RAN;
Xn Application Protocol (XnAP)
(3GPP TS 38.423 version 16.15.0 Release 16)**



Reference

RTS/TSGR-0338423vgf0

Keywords

5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
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History447

Foreword

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

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

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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the radio network layer signalling procedures of the control plane between NG-RAN nodes in NG-RAN. XnAP supports the functions of the Xn interface by signalling procedures defined in this document. XnAP is developed in accordance to the general principles stated in TS 38.401 [2] and TS 38.420 [3].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 38.401: "NG-RAN; Architecture Description".
- [3] 3GPP TS 38.420: "NG-RAN; Xn General Aspects and Principles".
- [4] 3GPP TS 38.422: "NG-RAN; Xn Signalling Transport".
- [5] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP) ".
- [6] 3GPP TS 25.921: "Guidelines and principles for protocol description and error handling".
- [7] 3GPP TS 23.501: "System Architecture for the 5G System".
- [8] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity; Stage 2".
- [9] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".
- [10] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) Protocol specification".
- [11] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".
- [12] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".
- [13] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [14] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".
- [15] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER) ".
- [16] ITU-T Recommendation X.680 (2002-07): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [17] ITU-T Recommendation X.681 (2002-07): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".
- [18] 3GPP TS 29.281: "General Packet Radio Service (GPRS); Tunnelling Protocol User Plane (GTPv1-U)".
- [19] 3GPP TS 38.424: "NG-RAN; Xn data transport".

- [20] 3GPP TS 38.414: "NG-RAN; NG data transport".
- [21] 3GPP TS 38.412: "NG-RAN; NG Signalling Transport".
- [22] 3GPP TS 23.003: "Numbering, Addressing and Identification".
- [23] 3GPP TS 32.422: "Trace control and configuration management".
- [24] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".
- [25] 3GPP TS 36.104: "Base Station (BS) radio transmission and reception".
- [26] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation".
- [27] 3GPP TS 36.101: "User Equipment (UE) radio transmission and reception".
- [28] 3GPP TS 33.501: "Security architecture and procedures for 5G System".
- [29] 3GPP TS 33.401: "3GPP System Architecture Evolution (SAE); Security architecture".
- [30] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".
- [31] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".
- [32] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".
- [33] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state".
- [34] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode".
- [35] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".
- [36] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".
- [37] IETF RFC 5905: "Network Time Protocol Version 4: Protocol and Algorithms Specification".
- [38] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".
- [39] 3GPP TS 38.211: "NR; Physical channels and modulation".
- [40] 3GPP TS 38.213: "NR; Physical layer procedures for control".
- [41] 3GPP TS 38.473: "NG-RAN; F1 application protocol (F1AP)".
- [42] 3GPP TS 38.314: "NR; Layer 2 measurements".
- [43] 3GPP TS 37.320: "Radio measurement collection for Minimization of Drive Tests (MDT)".
- [44] 3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 application protocol (X2AP)".
- [45] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

CAG Cell: As defined in TS 38.300 [9].

Conditional Handover: As defined in TS 38.300 [9].

Conditional PSCell Change: As defined in TS 37.340 [8].

DAPS Handover: As defined in TS 38.300 [9].

Elementary Procedure: XnAP protocol consists of Elementary Procedures (EPs). An XnAP Elementary Procedure is a unit of interaction between two NG-RAN nodes. An EP consists of an initiating message and possibly a response message. Two kinds of EPs are used:

- **Class 1:** Elementary Procedures with response (success or failure),
- **Class 2:** Elementary Procedures without response.

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

NG-RAN node: as defined in TS 38.300 [9].

Non-CAG Cell: As defined in TS 38.300 [9].

PDU Session Resource: As defined in TS 38.401 [2].

PDU session split: as defined in TS 37.340 [8].

Public Network Integrated NPN: as defined in TS 23.501 [7].

Stand-alone Non-Public Network: as defined in TS 23.501 [7].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

| | |
|---------------|---|
| 5QI | 5G QoS Identifier |
| AMF | Access and Mobility Management Function |
| CAG | Closed Access Group |
| CGI | Cell Global Identifier |
| CHO | Conditional Handover |
| CP | Control Plane |
| DAPS | Dual Active Protocol Stack |
| DL | Downlink |
| EN-DC | E-UTRA-NR Dual Connectivity |
| E-RAB | E-UTRAN Radio Access Bearer |
| GUAMI | Globally Unique AMF Identifier |
| IAB | Integrated Access and Backhaul |
| IMEISV | International Mobile station Equipment Identity and Software Version number |
| MCG | Master Cell Group |
| M-NG-RAN node | Master NG-RAN node |
| NGAP | NG Application Protocol |
| NID | Network Identifier |

| | |
|---------------|--|
| NPN | Non-Public Network |
| NSSAI | Network Slice Selection Assistance Information |
| PNI-NPN | Public Network Integrated Non-Public Network RANAC RAN Area Code |
| RSN | Redundancy Sequence Number |
| SCG | Secondary Cell Group |
| SCTP | Stream Control Transmission Protocol |
| SNPN | Stand-alone Non-Public Network |
| S-NG-RAN node | Secondary NG-RAN node |
| S-NSSAI | Single Network Slice Selection Assistance Information |
| SUL | Supplementary Uplink |
| TAC | Tracking Area Code |
| TAI | Tracking Area Identity |
| UL | Uplink |
| UPF | User Plane Function |
| V2X | Vehicle-to-Everything |

4 General

4.1 Procedure specification principles

The principle for specifying the procedure logic is to specify the functional behaviour of the terminating NG-RAN node exactly and completely. Any rule that specifies the behaviour of the originating NG-RAN node shall be possible to be verified with information that is visible within the system.

The following specification principles have been applied for the procedure text in clause 8:

- The procedure text discriminates between:

- 1) Functionality which "shall" be executed

The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the initiating message of a Class 1 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.

- 2) Functionality which "shall, if supported" be executed

The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

- Any required inclusion of an optional IE in a response message is explicitly indicated in the procedure text. If the procedure text does not explicitly indicate that an optional IE shall be included in a response message, the optional IE shall not be included. For requirements on including *Criticality Diagnostics* IE, see section 10.

4.2 Forwards and backwards compatibility

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

4.3 Specification notations

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

| | |
|----------------|---|
| Procedure | When referring to an elementary procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Handover Preparation procedure. |
| Message | When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. HANDOVER REQUEST message. |
| IE | When referring to an information element (IE) in the specification the <i>Information Element Name</i> is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. <i>PDU Session ID</i> IE. |
| Value of an IE | When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in sub clause 9.2 enclosed by quotation marks, e.g. "Value". |

5 XnAP services

The present clause describes the services an NG-RAN node offers to its neighbours.

5.1 XnAP procedure modules

The Xn interface XnAP procedures are divided into two modules as follows:

1. XnAP Basic Mobility Procedures;
2. XnAP Global Procedures;

The XnAP Basic Mobility Procedures module contains procedures used to handle the UE mobility within NG-RAN.

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

5.2 Parallel transactions

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

6 Services expected from signalling transport

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

Xn signalling transport is specified in TS 38.422 [4].

7 Functions of XnAP

The functions of XnAP are specified in TS 38.420 [3].

8 XnAP 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 |
| Retrieve UE Context | RETRIEVE UE CONTEXT REQUEST | RETRIEVE UE CONTEXT RESPONSE | RETRIEVE UE CONTEXT FAILURE |
| S-NG-RAN node Addition Preparation | S-NODE ADDITION REQUEST | S-NODE ADDITION REQUEST ACKNOWLEDGE | S-NODE ADDITION REQUEST REJECT |
| M-NG-RAN node initiated S-NG-RAN node Modification Preparation | S-NODE MODIFICATION REQUEST | S-NODE MODIFICATION REQUEST ACKNOWLEDGE | S-NODE MODIFICATION REQUEST REJECT |
| S-NG-RAN node initiated S-NG-RAN node Modification | S-NODE MODIFICATION REQUIRED | S-NODE MODIFICATION CONFIRM | S-NODE MODIFICATION REFUSE |
| S-NG-RAN node initiated S-NG-RAN node CHANGE | S-NODE CHANGE REQUIRED | S-NODE CHANGE CONFIRM | S-NODE CHANGE REFUSE |
| M-NG-RAN node initiated S-NG-RAN node Release | S-NODE RELEASE REQUEST | S-NODE RELEASE REQUEST ACKNOWLEDGE | S-NODE RELEASE REJECT |
| S-NG-RAN node initiated S-NG-RAN node Release | S-NODE RELEASE REQUIRED | S-NODE RELEASE CONFIRM | |
| Xn Setup | XN SETUP REQUEST | XN SETUP RESPONSE | XN SETUP FAILURE |
| NG-RAN node Configuration Update | NG-RAN NODE CONFIGURATION UPDATE | NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE | NG-RAN NODE CONFIGURATION UPDATE FAILURE |
| Cell Activation | CELL ACTIVATION REQUEST | CELL ACTIVATION RESPONSE | CELL ACTIVATION FAILURE |
| Reset | RESET REQUEST | RESET RESPONSE | |
| Xn Removal | Xn REMOVAL REQUEST | Xn REMOVAL RESPONSE | Xn REMOVAL FAILURE |
| E-UTRA - NR Cell Resource Coordination | E-UTRA - NR CELL RESOURCE COORDINATION REQUEST | E-UTRA - NR CELL RESOURCE COORDINATION RESPONSE | |
| 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 |

Table 8.1-2: Class 2 Elementary Procedures

| Elementary Procedure | Initiating Message |
|--|---------------------------------|
| Handover Cancel | HANDOVER CANCEL |
| SN Status Transfer | SN STATUS TRANSFER |
| RAN Paging | RAN PAGING |
| Xn-U Address Indication | XN-U ADDRESS INDICATION |
| S-NG-RAN node Reconfiguration Completion | S-NODE RECONFIGURATION COMPLETE |
| S-NG-RAN node Counter Check | S-NODE COUNTER CHECK REQUEST |
| UE Context Release | UE CONTEXT RELEASE |
| RRC Transfer | RRC TRANSFER |
| Error Indication | ERROR INDICATION |
| Notification Control Indication | NOTIFICATION CONTROL INDICATION |
| Activity Notification | ACTIVITY NOTIFICATION |
| Secondary RAT Data Usage Report | SECONDARY RAT DATA USAGE REPORT |
| Trace Start | TRACE START |
| Deactivate Trace | DEACTIVATE TRACE |
| Handover Success | HANDOVER SUCCESS |
| Conditional Handover Cancel | CONDITIONAL HANDOVER CANCEL |
| Early Status Transfer | EARLY STATUS TRANSFER |
| Failure Indication | FAILURE INDICATION |
| Handover Report | HANDOVER REPORT |
| Resource Status Reporting | RESOURCE STATUS UPDATE |
| Access And Mobility Indication | ACCESS AND MOBILITY INDICATION |

8.2 Basic mobility procedures

8.2.1 Handover Preparation

8.2.1.1 General

This procedure is used to establish necessary resources in an NG-RAN node for an incoming handover. If the procedure concerns a conditional handover, parallel transactions are allowed. Possible parallel requests are identified by the target cell ID when the source UE AP IDs are the same.

The procedure uses UE-associated signalling.

8.2.1.2 Successful Operation

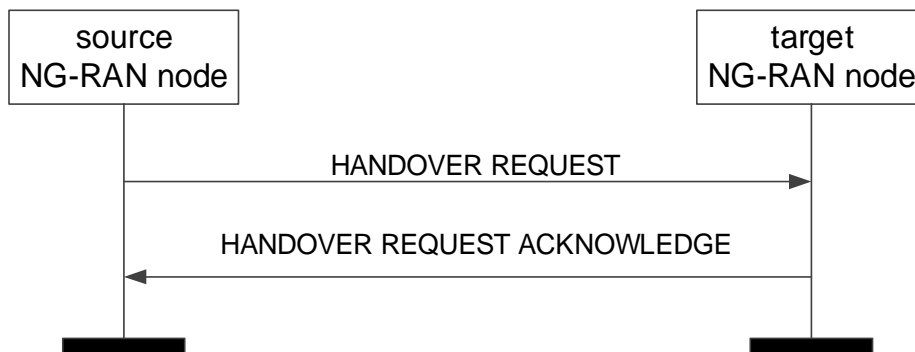


Figure 8.2.1.2-1: Handover Preparation, successful operation

The source NG-RAN node initiates the procedure by sending the HANDOVER REQUEST message to the target NG-RAN node. When the source NG-RAN node sends the HANDOVER REQUEST message, it shall start the timer $TX_{nRELOCprep}$.

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

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

Upon reception of the HANDOVER REQUEST ACKNOWLEDGE message, the source NG-RAN node shall stop the timer $TX_{nRELOCprep}$ and terminate the Handover Preparation procedure. If the procedure was initiated for an immediate handover, the source NG-RAN node shall start the timer $TX_{nRELOCoverall}$. The source NG-RAN node is then defined to have a Prepared Handover for that Xn UE-associated signalling.

For each *E-RAB ID* IE included in the *QoS Flow To Be Setup List* IE in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, store the content of the IE in the UE context and use it for subsequent inter-system handover.

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

At reception of the HANDOVER REQUEST message the target NG-RAN node shall prepare the configuration of the AS security relation between the UE and the target NG-RAN node by using the information in the *UE Security Capabilities* IE and the *AS Security Information* IE in the *UE Context Information* IE, as specified in TS 33.501 [28].

Upon reception of the *PDU Session Resource Setup List* IE, contained in the HANDOVER REQUEST message, the target NG-RAN node shall behave the same as specified in TS 38.413 [5] for the PDU Session Resource Setup procedure. The target NG-RAN node shall report in the HANDOVER REQUEST ACKNOWLEDGE message the successful establishment of the result for all the requested PDU session resources. When the target NG-RAN node

reports the unsuccessful establishment of a PDU session resource, the cause value should be precise enough to enable the source NG-RAN node to know the reason for the unsuccessful establishment.

For each PDU session if the *PDU Session Aggregate Maximum Bit Rate* IE is included in the *PDU Session Resources To Be Setup List* IE contained in the HANOVER REQUEST message, the target NG-RAN node shall store the received PDU Session Aggregate Maximum Bit Rate in the UE context and use it when enforcing traffic policing for Non-GBR QoS flows for the concerned UE as specified in TS 23.501 [7].

For each QoS flow for which the source NG-RAN node proposes to perform forwarding of downlink data, the source NG-RAN node shall include the *DL Forwarding* IE set to "DL forwarding proposed" within the *Data Forwarding and Offloading Info from source NG-RAN node* IE in the *PDU Session Resources To Be Setup List* IE in the HANOVER REQUEST message. The source NG-RAN node shall include the *DL Forwarding* IE set to "DL forwarding proposed" for all the QoS flows mapped to a DRB, if it requests a DAPS handover for that DRB.

For each PDU session, for which the target NG-RAN node decides to admit the data forwarding for at least one QoS flow, the target NG-RAN node may include the *PDU Session level DL data forwarding UP TNL Information* IE within the *Data Forwarding Info from target NG-RAN node* IE in the *PDU Session Resource Admitted Info* IE contained in the *PDU Session Resources Admitted List* IE in the HANOVER REQUEST ACKNOWLEDGE message.

For each QoS flow for which the source NG-RAN node has not yet received the SDAP end marker packet if QoS flow re-mapping happened before handover, the source NG-RAN node shall include the *UL Forwarding Proposal* IE within the *Data Forwarding and Offloading Info from source NG-RAN node* IE in the HANOVER REQUEST message, and if the target NG-RAN node decides to admit uplink data forwarding for at least one QoS flow, the target NG-RAN node may include the *PDU Session Level UL Data Forwarding UP TNL Information* IE in the *Data Forwarding Info from target NG-RAN node* IE in the *PDU Session Resources Admitted Item* IE contained in the *PDU Session Resources Admitted List* IE in the HANOVER REQUEST ACKNOWLEDGE message to indicate that it accepts the uplink data forwarding.

For each PDU session resource successfully setup at the target NG-RAN, the target NG-RAN node may allocate resources for additional Xn-U PDU session resource GTP-U tunnels, indicated in the *Secondary Data Forwarding Info from target NG-RAN node List* IE.

For each PDU session in the HANOVER REQUEST message, if the *Alternative QoS Parameters Set List* IE is included in the *GBR QoS Flow Information* IE in the *PDU Session Resources To Be Setup List* IE, the target NG-RAN node may accept the setup of the involved QoS flow when notification control has been enabled if the requested QoS parameters set or at least one of the alternative QoS parameters sets can be fulfilled at the time of handover as specified in TS 23.501 [7]. In case the target NG-RAN node accepts the handover fulfilling one of the alternative QoS parameters it shall indicate the alternative QoS parameters set which it can currently fulfil in the *Current QoS Parameters Set Index* IE within the *PDU Session Resources Admitted List* IE of the HANOVER REQUEST ACKNOWLEDGE message while setting the QoS parameters towards the UE according to the requested QoS parameters set as specified in TS 23.501 [7].

For each DRB for which the source NG-RAN node proposes to perform forwarding of downlink data, the source NG-RAN node shall include the *DRB ID* IE and the mapped *QoS Flows List* IE within the *Source DRB to QoS Flow Mapping List* IE contained in the *PDU Session Resources To Be Setup List* IE in the HANOVER REQUEST message. The source NG-RAN node may include the *QoS Flow Mapping Indication* IE in the *Source DRB to QoS Flow Mapping List* IE to indicate that only the uplink or downlink QoS flow is mapped to the DRB. If the target NG-RAN node decides to use the same DRB configuration and to map the same QoS flows as the source NG-RAN node, the target NG-RAN node includes the *DL Forwarding GTP Tunnel Endpoint* IE within the *Data Forwarding Response DRB List* IE in the HANOVER REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this DRB.

The target NG-RAN node may additionally include the *Redundant DL Forwarding UP TNL Information* IE if at least one of the QoS flow mapped to the DRB is eligible to the redundant transmission feature as indicated in the *Redundant QoS Flow Indicator* IE within the *PDU Session Resource To Be Setup List* IE received in the HANOVER REQUEST message for the QoS flow.

If the HANOVER REQUEST ACKNOWLEDGE message contains the *UL Forwarding UP TNL Information* IE for a given DRB in the *Data Forwarding Response DRB List* IE within *Data Forwarding Info from target NG-RAN node* IE in the *PDU Session Resources Admitted List* IE and the source NG-RAN node accepts the data forwarding proposed by the target NG-RAN node, the source NG-RAN node shall perform forwarding of uplink data for the DRB.

If the HANOVER REQUEST includes PDU session resources for PDU sessions associated to S-NSSAIs not supported by target NG-RAN, the target NG-RAN shall reject such PDU session resources. In this case, and if at least

one *PDU Session Resource To Be Setup Item* IE is admitted, the target NG-RAN shall send the HANOVER REQUEST ACKNOWLEDGE message including the *PDU Session Resources Not Admitted List* IE listing corresponding PDU sessions rejected at the target NG-RAN.

If the *Mobility Restriction List* IE is

- contained in the HANOVER REQUEST message, the target NG-RAN node shall
 - store the information received in the *Mobility Restriction List* IE in the UE context;
 - use this information to determine a target for the UE during subsequent mobility action for which the NG-RAN node provides information about the target of the mobility action towards the UE, except when one of the PDU sessions has a particular ARP value (TS 23.501 [7]) in which case the information shall not apply;
 - use this information to select a proper SCG during dual connectivity operation.
 - use this information to select proper RNA(s) for the UE when moving the UE to RRC_INACTIVE.
- not contained in the HANOVER REQUEST message, the target NG-RAN node shall
 - consider that no roaming and no access restriction apply to the UE except for the PNI-NPN mobility as described in TS 23.501 [7].

The target NG-RAN node shall consider that roaming or access to CAG cells is only allowed if the *Allowed PNI-NPN ID List* IE is contained in the HANOVER REQUEST message, as described in TS 23.501 [7].

If the *Trace Activation* IE is included in the HANOVER REQUEST message the target NG-RAN node shall, if supported, initiate the requested trace function as specified in TS 32.422 [23].

If the *Index to RAT/Frequency Selection Priority* IE is contained in the HANOVER REQUEST message, the target NG-RAN node shall store this information and use it as defined in TS 23.501 [7].

If the *UE Context Reference at the S-NG-RAN* IE is contained in the HANOVER REQUEST message the target NG-RAN node may use it as specified in TS 37.340 [8]. In this case, the source NG-RAN node may expect the target NG-RAN node to include the *UE Context Kept Indicator* IE set to "True" in the HANOVER REQUEST ACKNOWLEDGE message, which shall use this information as specified in TS 37.340 [8].

For each PDU session, if the *Network Instance* IE is included in the *PDU Session Resource To Be Setup List* IE and the *Common Network Instance* IE is not present, the target NG-RAN node shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [7].

Redundant transmission:

- For each PDU session, if the *Redundant UL NG-U UP TNL Information at UPF* IE is included in the *PDU Session Resource To Be Setup List* IE, the target NG-RAN node shall, if supported, use it as the uplink termination point for the user plane data for the redundant transmission for the concerned PDU session.
- For each PDU session, if the *Additional Redundant UL NG-U UP TNL Information at UPF List* IE is included in the *PDU Session Resource To Be Setup List* IE, the target NG-RAN node shall, if supported, use them as the uplink termination points for the user plane data for the redundant transmission for the concerned PDU session.
- For each PDU session, if the *Redundant Common Network Instance* IE is included in the *PDU Session Resource To Be Setup List* IE, the target NG-RAN node shall, if supported, use it when selecting transport network resource for the redundant transmission as specified in TS 23.501 [7].
- For each PDU session, if the *Redundant PDU Session Information* IE is included in the *PDU Session Resource To Be Setup List* IE contained in the HANOVER REQUEST message, the target NG-RAN node shall, if supported, store the received information in the UE context and set up the redundant user plane for the concerned PDU session, as specified in TS 23.501 [7].

If the *TSC Traffic Characteristics* IE is included in the *QoS Flows To Be Setup List* in the *PDU Session Resource To Be Setup List* IE, the target NG-RAN node shall, if supported, use it as specified in TS 23.501 [7].

For each PDU session, if the *Common Network Instance* IE is included in the *PDU Session Resource To Be Setup List* IE or in the *Additional UL NG-U UP TNL Information at UPF List* IE, or in the *Additional Redundant UL NG-U UP*

TNL Information at UPF List IE, the target NG-RAN node shall, if supported, use it when selecting transport network resource for the concerned NG-U transport bearer as specified in TS 23.501 [7].

For each PDU session for which the *Security Indication IE* is included in the *PDU Session Resource To Be Setup List IE* and the *Integrity Protection Indication IE* or *Confidentiality Protection Indication IE* is set to "required", the target NG-RAN node shall perform user plane integrity protection or ciphering, respectively. If the NG-RAN node is not able to perform the user plane integrity protection or ciphering, it shall reject the setup of the PDU Session Resources with an appropriate cause value.

If the NG-RAN node is an ng-eNB, it shall reject all PDU sessions for which the *Integrity Protection Indication IE* is set to "required".

For each PDU session for which the *Security Indication IE* is included in the *PDU Session Resource To Be Setup List IE* and the *Integrity Protection Indication IE* or the *Confidentiality Protection Indication IE* is set to "preferred", the target NG-RAN node should, if supported, perform user plane integrity protection or ciphering, respectively and shall notify the SMF whether it succeeded the user plane integrity protection or ciphering or not for the concerned security policy.

For each PDU session for which the *Maximum Integrity Protected Data Rate IE* is included in the *Security Indication IE* in the *PDU Session Resources To Be Setup List IE*, the NG-RAN node shall store the respective information and, if integrity protection is to be performed for the PDU session, it shall enforce the traffic corresponding to the received *Maximum Integrity Protected Data Rate IE*, for the concerned PDU session and concerned UE, as specified in TS 23.501 [7].

For each PDU session for which the *Security Indication IE* is included in the *PDU Session Resource To Be Setup List IE* and the *Integrity Protection Indication IE* or *Confidentiality Protection Indication IE* is set to "not needed", the target NG-RAN node shall not perform user plane integrity protection or ciphering, respectively, for the concerned PDU session.

For each PDU session, if the *Additional UL NG-U UP TNL Information List IE* is included in the *PDU Session Resources To Be Setup List IE* contained in the HANOVER REQUEST message, the target NG-RAN node may forward the UP transport layer information to the target S-NG-RAN node as the uplink termination point for the user plane data for this PDU session split in different tunnel.

If the *Location Reporting Information IE* is included in the HANOVER REQUEST message, then the target NG-RAN node should initiate the requested location reporting functionality as defined in TS 38.413 [5].

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

If the *Trace Activation IE* is included in the HANOVER REQUEST message which includes

- the *MDT Activation IE* set to "Immediate MDT and Trace", then the target NG-RAN node shall if supported, initiate the requested trace session and MDT session as described in TS 32.422 [23].
- the *MDT Activation IE* set to "Immediate MDT Only" or "Logged MDT only", the target NG-RAN node shall, if supported, initiate the requested MDT session as described in TS 32.422 [23] and the target NG-RAN node shall ignore the *Interfaces To Trace IE*, and the *Trace Depth IE*.
- the *MDT Location Information IE*, within the *MDT Configuration IE*, the target NG-RAN node shall, if supported, store this information and take it into account in the requested MDT session.
- the *MDT Activation IE* set to "Immediate MDT Only" or "Logged MDT only", and if the *Signalling based MDT PLMN List IE* is included in the *MDT Configuration IE*, the target NG-RAN node may use it to propagate the MDT Configuration as described in TS 37.320 [43].
- the *Bluetooth Measurement Configuration IE*, within the *MDT Configuration IE*, the target NG-RAN node shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [43].
- the *WLAN Measurement Configuration IE*, within the *MDT Configuration IE*, the target NG-RAN node shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [43].
- the *Sensor Measurement Configuration IE*, within the *MDT Configuration IE*, the target NG-RAN node shall take it into account for MDT Configuration as described in TS 37.320 [43].

- the *MDT Configuration* IE and if the target NG-RAN node is a gNB at least the *MDT Configuration-NR* IE shall be present, while if the target NG-RAN node is an ng-eNB at least the *MDT Configuration-EUTRA* IE shall be present. If the target NG-RAN node is a gNB receiving a *MDT Configuration-EUTRA* IE, or the target NG-RAN node is a ng-eNB receiving a *MDT Configuration-NR* IE, the target NG-RAN node shall store it as part of the UE context, and propagate it at the next Xn handover as described in TS 37.320 [43].

If the *Area Scope* IE is not present in the *MDT Configuration* IE, the target NG-RAN node shall consider that the MDT Configuration is applied to all PLMNs indicated in the MDT PLMN List, as described in TS 32.422 [23].

If the *Management Based MDT PLMN List* IE is contained in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, store the received information in the UE context, and use this information to allow subsequent selection of the UE for management based MDT defined in TS 32.422 [23].

If the HANDOVER REQUEST message includes the *Management Based MDT PLMN List* IE, the target NG-RAN node shall take it into account if it includes information regarding the PLMN serving the UE in the target NG-RAN node.

If the *Mobility Information* IE is provided in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, store this information. The target NG-RAN shall, if supported, store the C-RNTI assigned at the source cell as received in the HANDOVER REQUEST message.

Upon reception of the *UE History Information from the UE* IE in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, store the collected information and use it for future handover preparations.

For each QoS flow which has been successfully established in the target NG-RAN node, if the *QoS Monitoring Request* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the HANDOVER REQUEST message, the target NG-RAN node shall store this information, and, if supported, perform delay measurement and QoS monitoring, as specified in TS 23.501 [7]. If the *QoS Monitoring Reporting Frequency* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the HANDOVER REQUEST message, the target NG-RAN node shall store this information, and, if supported, use it for RAN part delay reporting.

If the *5GC Mobility Restriction List Container* IE is included in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, store this information in the UE context and use it as specified in TS 38.300 [9].

V2X:

- If the *NR V2X Services Authorized* IE is included in the HANDOVER REQUEST message and it contains one or more IEs set to "authorized", the target NG-RAN node shall, if supported, consider that the UE is authorized for the relevant service(s).
- If the *LTE V2X Services Authorized* IE is included in the HANDOVER REQUEST message and it contains one or more IEs set to "authorized", the target NG-RAN node shall, if supported, consider that the UE is authorized for the relevant service(s).
- If the *NR UE Sidelink Aggregate Maximum Bit Rate* IE is included in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, use the received value for the concerned UE's sidelink communication in network scheduled mode for NR V2X services.
- If the *LTE UE Sidelink Aggregate Maximum Bit Rate* IE is included in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, use the received value for the concerned UE's sidelink communication in network scheduled mode for LTE V2X services.

If the *PC5 QoS Parameters* IE is included in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, use it as defined in TS 23.287 [38].

If the *DAPS Request Information* IE is included for a given DRB in the HANDOVER REQUEST message, the target NG-RAN node shall consider that the request concerns a DAPS handover for that DRB, as described in TS 38.300 [9]. Accordingly, the target NG-RAN node shall include the *DAPS Response Information* IE in the HANDOVER REQUEST ACKNOWLEDGE message.

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

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

If the *IAB Node Indication* IE is contained in the HANOVER REQUEST message, the target NG-RAN node shall, if supported, consider that the handover is for an IAB node.

If the *UE Radio Capability ID* IE is contained in the HANOVER REQUEST message, the target NG-RAN node shall, if supported, store this information in the UE context and use it as defined in TS 23.501 [7] and TS 23.502 [13].

If for a given QoS Flow the *Source DL Forwarding IP Address* IE is included within the *Data Forwarding and Offloading Info from source NG-RAN node* IE in the *PDU Session Resources To Be Setup List* IE contained in the HANOVER REQUEST message, the target NG-RAN node shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

Interaction with SN Status Transfer procedure:

If the *UE Context Kept Indicator* IE set to "True" and the *DRBs transferred to MN* IE are included in the HANOVER REQUEST ACKNOWLEDGE message, the source NG-RAN node shall, if supported, include the uplink/downlink PDCP SN and HFN status received from the S-NG-RAN node in the SN Status Transfer procedure towards the target NG-RAN node, as specified in TS 37.340 [8].

8.2.1.3 Unsuccessful Operation

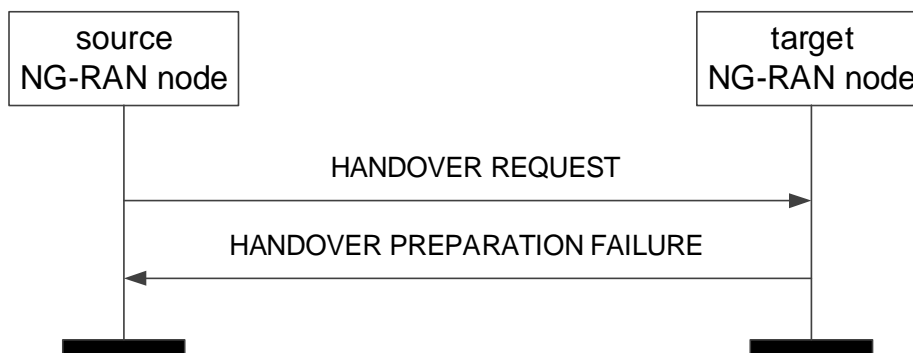


Figure 8.2.1.3-1: Handover Preparation, unsuccessful operation

If the target NG-RAN node does not admit at least one PDU session resource, or a failure occurs during the Handover Preparation, the target NG-RAN node shall send the HANOVER PREPARATION FAILURE message to the source NG-RAN node. The message shall contain the *Cause* IE with an appropriate value.

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

Interactions with Handover Cancel procedure:

If there is no response from the target NG-RAN node to the HANOVER REQUEST message before timer $TX_{nRELOC_{prep}}$ expires in the source NG-RAN node, the source NG-RAN node should cancel the Handover Preparation procedure towards the target NG-RAN node by initiating the Handover Cancel procedure with the appropriate value for the *Cause* IE. The source NG-RAN node shall ignore any HANOVER REQUEST ACKNOWLEDGE or HANOVER PREPARATION FAILURE message received after the initiation of the Handover Cancel procedure and remove any reference and release any resources related to the concerned Xn UE-associated signalling.

8.2.1.4 Abnormal Conditions

If the supported algorithms for encryption defined in the *UE Security Capabilities* IE in the *UE Context Information* IE, plus the mandated support of the EEA0 and NEA0 algorithms in all UEs (TS 33.501 [28]), do not match any allowed algorithms defined in the configured list of allowed encryption algorithms in the NG-RAN node (TS 33.501 [28]), the NG-RAN node shall reject the procedure using the HANOVER PREPARATION FAILURE message.

If the supported algorithms for integrity defined in the *UE Security Capabilities IE* in the *UE Context Information IE*, plus the mandated support of the EIA0 and NIA0 algorithms in all UEs (TS 33.501 [28]), do not match any allowed algorithms defined in the configured list of allowed integrity protection algorithms in the NG-RAN node (TS 33.501 [28]), the NG-RAN node shall reject the procedure using the HANOVER PREPARATION FAILURE message.

If the *CHO trigger IE* is set to "CHO-replace" in the HANOVER REQUEST message, but there is no CHO prepared for the included Target NG-RAN node UE XnAP ID, or the candidate cell in the *Target Cell ID IE* was not prepared using the same UE-associated signaling connection, the NG-RAN node shall reject the procedure using the HANOVER PREPARATION FAILURE message.

If the HANOVER REQUEST message includes information for a PLMN not serving the UE in the target NG-RAN node in the *Management Based MDT PLMN List IE*, the target NG-RAN node shall ignore information for that PLMN within the Management Based MDT PLMN List.

8.2.2 SN Status Transfer

8.2.2.1 General

The purpose of the SN Status Transfer procedure is to transfer the uplink PDCP SN and HFN receiver status and the downlink PDCP SN and HFN transmitter status either, from the source to the target NG-RAN node during an Xn handover, between the NG-RAN nodes involved in dual connectivity, or after retrieval of a UE context for RRC reestablishment, for each respective DRB of the source DRB configuration for which PDCP SN and HFN status preservation applies.

In case that the Xn handover is a DAPS handover, the SN Status Transfer procedure may also be used to transfer the uplink PDCP SN and HFN receiver status, or the downlink PDCP SN and HFN transmitter status for a DRB associated with RLC-UM and configured with DAPS as described in TS 38.300 [9].

If the SN Status Transfer procedure is applied in the course of dual connectivity or RRC connection re-establishment in the subsequent specification text

- the behaviour of the NG-RAN node from which the DRB context is transferred, i.e. the NG-RAN node involved in dual connectivity or RRC connection re-establishment, from which data is forwarded, is specified by the behaviour of the "source NG-RAN node",
- the behaviour of the NG-RAN node to which the DRB context is transferred, i.e., the NG-RAN node involved in dual connectivity or RRC connection re-establishment, to which data is forwarded, is specified by the behaviour of the "target NG-RAN node".

The procedure uses UE-associated signalling.

8.2.2.2 Successful Operation



Figure 8.2.2.2-1: SN Status Transfer, successful operation

The source NG-RAN node initiates the procedure by stop assigning PDCP SNs to downlink SDUs and stop delivering UL SDUs towards the 5GC and sending the SN STATUS TRANSFER message to the target NG-RAN node at the time point when it considers the transmitter/receiver status to be frozen. The target NG-RAN node using full configuration for this handover as per TS 38.300 [9] or for the MR-DC operations as per TS 37.340 [8] shall ignore the information

received in this message. In case of MR-DC, if the target NG-RAN node performs PDCP SN length change or RLC mode change for a DRB as specified in TS 37.340 [8], it shall ignore the information received for that DRB in this message.

In case that the Xn handover is a DAPS handover, the source NG-RAN node may continue assigning PDCP SNs to downlink SDUs and delivering uplink SDUs toward the 5GC when initiating this procedure for DRBs not configured with DAPS as in TS 38.300 [9].

For each DRB in the *DRBs Subject to Status Transfer List* IE, the source NG-RAN node shall include the *DRB ID* IE, the *UL COUNT Value* IE and the *DL COUNT Value* IE.

The source NG-RAN node may also include in the SN STATUS TRANSFER message the missing and the received uplink SDUs in the *Receive Status of UL PDCP SDUs* IE for each DRB for which the source NG-RAN node has accepted the request from the target NG-RAN node for uplink forwarding.

For each DRB in the *DRBs Subject to Status Transfer List* IE, the target NG-RAN node shall not deliver any uplink packet which has a PDCP-SN lower than the value contained within the *UL COUNT Value* IE.

For each DRB in the *DRBs Subject to Status Transfer List* IE, the target NG-RAN node shall use the value of the PDCP SN contained within the *DL COUNT Value* IE for the first downlink packet for which there is no PDCP-SN yet assigned.

If the *Receive Status of UL PDCP SDUs* IE is included for at least one DRB in the SN STATUS TRANSFER message, the target NG-RAN node may use it in a Status Report message sent to the UE over the radio interface.

If the SN STATUS TRANSFER message contains in the *DRBs Subject To Status Transfer List* IE the *Old QoS Flow List - UL End Marker expected* IE, the target NG-RAN shall be prepared to receive the SDAP end marker for the QoS flow via the corresponding DRB, as specified in TS 38.300 [8].

8.2.2.3 Unsuccessful Operation

Not applicable.

8.2.2.4 Abnormal Conditions

If the target NG-RAN node receives this message for a UE for which no prepared handover exists at the target NG-RAN node, the target NG-RAN node shall ignore the message.

8.2.3 Handover Cancel

8.2.3.1 General

The Handover Cancel procedure is used to enable a source NG-RAN node to cancel an ongoing handover preparation or an already prepared handover.

The procedure uses UE-associated signalling.

8.2.3.2 Successful Operation



Figure 8.2.3.2-1: Handover Cancel, successful operation

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

If the *Candidate Cells To Be Cancelled List* IE is included in the HANDOVER CANCEL message, the target NG-RAN node shall consider that the source NG-RAN node is cancelling only the handover associated to the candidate cells identified by the included NG-RAN CGI and associated to the same UE-associated signaling connection identified by the *Source NG-RAN node UE XnAP ID* IE and, if included, also by the *Target NG-RAN node UE XnAP ID* IE.

8.2.3.3 Unsuccessful Operation

Not applicable.

8.2.3.4 Abnormal Conditions

If the HANDOVER CANCEL message refers to a context that does not exist, the target NG-RAN node shall ignore the message.

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

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

8.2.4 Retrieve UE Context

8.2.4.1 General

The purpose of the Retrieve UE Context procedure is to either retrieve the UE context from the old NG-RAN node and transfer it to the NG-RAN node where the UE RRC Connection has been requested to be established, or to enable the old NG-RAN node to forward an RRC message to the UE via the new NG-RAN node without context transfer.

The procedure uses UE-associated signalling.

8.2.4.2 Successful Operation

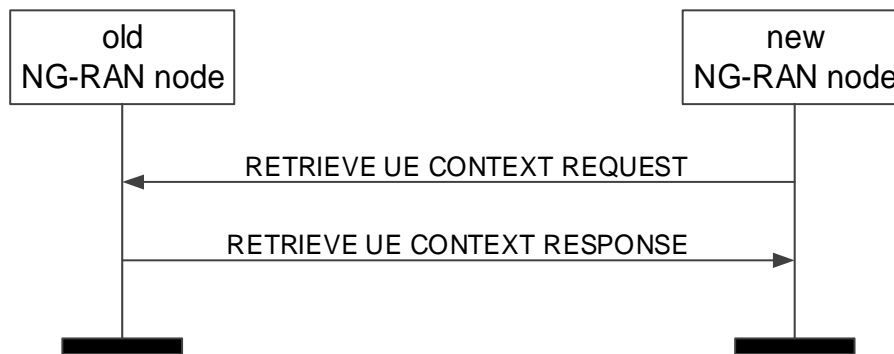


Figure 8.2.4.2-1: Retrieve UE Context, successful operation

The new NG-RAN node initiates the procedure by sending the RETRIEVE UE CONTEXT REQUEST message to the old NG-RAN node.

If the old NG-RAN node is able to identify the UE context by means of the UE Context ID, and to successfully verify the UE by means of the integrity protection contained in the RETRIEVE UE CONTEXT REQUEST message, and decides to provide the UE context to the new NG-RAN node, it shall respond to the new NG-RAN node with the RETRIEVE UE CONTEXT RESPONSE message.

If the *Trace Activation IE* is included in the RETRIEVE UE CONTEXT RESPONSE message, the new NG-RAN node shall, if supported, initiate the requested trace function as specified in TS 32.422 [23].

If the *Index to RAT/Frequency Selection Priority IE* is contained in the RETRIEVE UE CONTEXT RESPONSE message, the new NG-RAN node shall store this information and use it as defined in TS 23.501 [7].

If the *Location Reporting Information IE* is included in the RETRIEVE UE CONTEXT RESPONSE message, then the new NG-RAN node should initiate the requested location reporting functionality as defined in TS 38.413 [5].

If the *Trace Activation IE* is included in the RETRIEVE UE CONTEXT RESPONSE message which includes

- the *MDT Activation IE* set to "Immediate MDT and Trace", then the target NG-RAN node shall if supported, initiate the requested trace session and MDT session as described in TS 32.422 [23].
- the *MDT Activation IE* set to "Immediate MDT Only" or "Logged MDT only", the target NG-RAN node shall, if supported, initiate the requested MDT session as described in TS 32.422 [23] and the target NG-RAN node shall ignore the *Interfaces To Trace IE*, and the *Trace Depth IE*.
- the *MDT Location Information IE*, within the *MDT Configuration IE*, the target NG-RAN node shall, if supported, store this information and take it into account in the requested MDT session.
- the *MDT Activation IE* set to "Immediate MDT Only" or "Logged MDT only", and if the *Signalling based MDT PLMN List IE* is included in the *MDT Configuration IE*, the target NG-RAN node may use it to propagate the MDT Configuration as described in TS 37.320 [43].
- the *Bluetooth Measurement Configuration IE*, within the *MDT Configuration IE*, the target NG-RAN node shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [43].
- the *WLAN Measurement Configuration IE*, within the *MDT Configuration IE*, the target NG-RAN node shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [43].
- the *Sensor Measurement Configuration IE*, within the *MDT Configuration IE*, take it into account for MDT Configuration as described in TS 37.320 [43].
- the *MDT Configuration IE* and if the target NG-RAN Node is a gNB at least the *MDT Configuration-NR IE* shall be present, while if the target NG-RAN Node is an ng-eNB at least the *MDT Configuration-EUTRA IE* shall be present.

If the *Area Scope IE* is not present in the *MDT Configuration IE*, the new NG-RAN node shall consider that the MDT Configuration is applied to all PLMNs indicated in the MDT PLMN List, as described in TS 32.422 [23].

For each QoS flow in the RETRIEVE UE CONTEXT RESPONSE message, if the *QoS Monitoring Request* IE is included in the *QoS Flow Level QoS Parameters* IE in the *PDU Session Resources To Be Setup List* IE, the new NG-RAN node shall store this information, and, if supported, perform delay measurement and QoS monitoring, as specified in TS 23.501 [7]. If the *QoS Monitoring Reporting Frequency* IE is included in the *QoS Flow Level QoS Parameters* IE in the *PDU Session Resources To Be Setup List* IE, the new NG-RAN node shall store this information, and, if supported, use it for RAN part delay reporting.

If the *5GC Mobility Restriction List Container* IE is included in the RETRIEVE UE CONTEXT RESPONSE message, the new NG-RAN node shall, if supported, store this information in the UE context and use it as specified in TS 38.300 [9].

V2X:

- If the *NR V2X Services Authorized* IE is included in the RETRIEVE UE CONTEXT RESPONSE message and it contains one or more IEs set to "authorized", the new NG-RAN node shall, if supported, consider that the UE is authorized for the relevant service(s).
- If the *LTE V2X Services Authorized* IE is included in the RETRIEVE UE CONTEXT RESPONSE message and it contains one or more IEs set to "authorized", the new NG-RAN node shall, if supported, consider that the UE is authorized for the relevant service(s).
- If the *NR UE Sidelink Aggregate Maximum Bit Rate* IE is included in the *UE Context Information Retrieve UE Context Response* IE in the RETRIEVE UE CONTEXT RESPONSE message, the new NG-RAN node shall, if supported, use the received value for the concerned UE's sidelink communication in network scheduled mode for NR V2X services.
- If the *LTE UE Sidelink Aggregate Maximum Bit Rate* IE is included in the *UE Context Information Retrieve UE Context Response* IE in the RETRIEVE UE CONTEXT RESPONSE message, the new NG-RAN node shall, if supported, use the received value for the concerned UE's sidelink communication in network scheduled mode for LTE V2X services.

If the *PC5 QoS Parameters* IE is included in the RETRIEVE UE CONTEXT RESPONSE message, the target NG-RAN node shall, if supported, use it as defined in TS 23.287[38].

In case of RRC Re-establishment, the old NG-RAN may include the *UE History Information* IE or the *UE History Information from the UE* IE in the RETRIEVE UE CONTEXT RESPONSE message. Upon reception of the *UE History Information* IE or the *UE History Information from the UE* IE in the RETRIEVE UE CONTEXT RESPONSE message, the new NG-RAN node shall, if supported, store the collected information and use it for future handover preparations.

If the *UE Radio Capability ID* IE is contained in the RETRIEVE UE CONTEXT RESPONSE message, the new NG-RAN node shall, if supported store this information in the UE context and use it as defined in TS 23.501 [7] and TS 23.502 [13].

8.2.4.3 Unsuccessful Operation

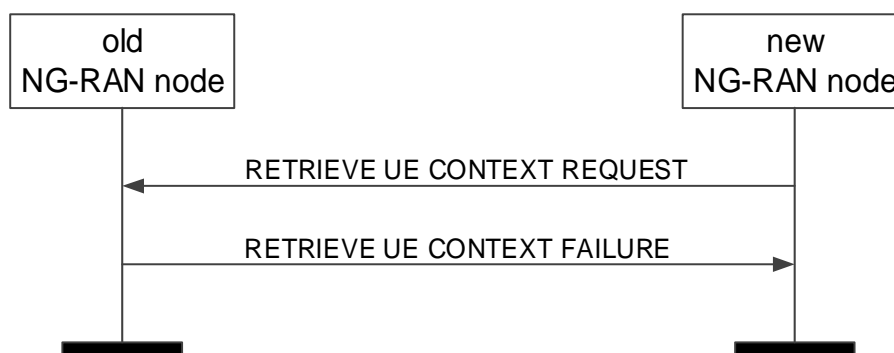


Figure 8.2.4.3-1: Retrieve UE Context, unsuccessful operation

If the old NG-RAN node is not able to identify the UE context by means of the UE Context ID, or if the integrity protection contained in the RETRIEVE UE CONTEXT REQUEST message is not valid, or, if it decides not to provide

the UE context to the new NG-RAN node, it shall respond to the new NG-RAN node with the RETRIEVE UE CONTEXT FAILURE message.

If the old NG-RAN node decides to keep the UE context in case of periodic RNAU, it shall store the *Allocated C-RNTI* IE and the *Access PCI* IE in the *UE Context ID* IE, as described in TS 38.300 [9].

If the *Old NG-RAN node to New NG-RAN node Resume Container* IE is included in the RETRIEVE UE CONTEXT FAILURE message, the new NG-RAN node should transparently forward the content of this IE to the UE as described in TS 38.300 [9].

8.2.4.4 Abnormal Conditions

Void.

8.2.5 RAN Paging

8.2.5.1 General

The purpose of the RAN Paging procedure is to enable the NG-RAN node₁ to request paging of a UE in the NG-RAN node₂.

The procedure uses non UE-associated signalling.

8.2.5.2 Successful operation



Figure 8.2.5.2-1: RAN Paging: successful operation

The RAN Paging procedure is triggered by the NG-RAN node₁ by sending the RAN PAGING message to the NG-RAN node₂, in which the necessary information e.g. UE RAN Paging Identity should be provided.

If the *Paging Priority* IE is included in the RAN PAGING message, the NG-RAN node₂ may use it to prioritize paging.

If the *Assistance Data for RAN Paging* IE is included in the RAN PAGING message, the NG-RAN node₂ may use it according to TS 38.300 [9].

If the *UE Radio Capability for Paging* IE is included in the RAN PAGING message, the NG-RAN node₂ may use it to apply specific paging schemes.

If the *Extended UE Identity Index Value* IE is included in the RAN PAGING message, the NG-RAN node₂ may use it according to TS 36.304 [34]. When available, NG-RAN node₁ may include the *Extended UE Identity Index Value* IE in the RAN PAGING message towards an ng-eNB (e.g. NG-RAN node₂).

When available, the NG-RAN node₁ shall include the *Paging eDRX Information* IE in the RAN PAGING message towards the NG-RAN node₂. If the *Paging eDRX Information* IE is included in the RAN PAGING message, the NG-RAN node₂ shall, if supported, use it according to TS 36.304 [34].

When available, the NG-RAN node₁ shall include the *UE Specific DRX* IE in the RAN PAGING message towards the NG-RAN node₂. If the *UE specific DRX* IE is included in the RAN PAGING message, the NG-RAN node₂ shall, if supported, use it according to TS 36.304 [34].

When available, the NG-RAN node₁ shall include the *Hashed UE Identity Index Value* IE in the RAN PAGING message towards the NG-RAN node₂. If the *Hashed UE Identity Index Value* IE is included in the RAN PAGING message, the NG-RAN node₂ shall, if supported, use it according to TS 36.304 [34].

8.2.5.3 Unsuccessful Operation

Not applicable.

8.2.5.4 Abnormal Condition

Void.

8.2.6 XN-U Address Indication

8.2.6.1 General

For the retrieval of a UE context, the Xn-U Address Indication procedure is used to provide forwarding addresses from the new NG-RAN node to the old NG-RAN node for all PDU session resources successfully established at the new NG-RAN node for which forwarding was requested.

For MR-DC with 5GC, the Xn-U Address Indication procedure is used to provide data forwarding related information, and Xn-U bearer address information for completion of setup of SN terminated bearers from the M-NG-RAN node to the S-NG-RAN node as specified in TS 37.340 [8],

The procedure uses UE-associated signalling.

8.2.6.2 Successful Operation



Figure 8.2.6.2-1: Xn-U Address Indication, successful operation for UE context retrieval

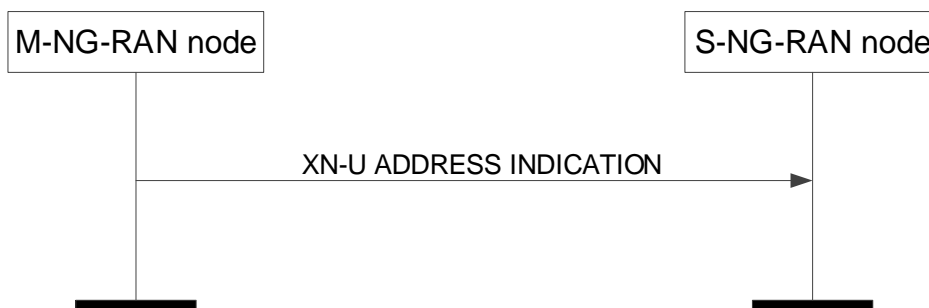


Figure 8.2.6.2-2: Xn-U Address Indication, successful operation for MR-DC with 5GC

UE Context Retrieval

The Xn-U Address Indication procedure is initiated by the new NG-RAN node. Sending the XN-U ADDRESS INDICATION message, the new NG-RAN node informs the old NG-RAN node of successfully established PDU Session Resource contexts to which user data pending at the old NG-RAN node can be forwarded.

The new NG-RAN node may include *Secondary Data Forwarding Info from target NG-RAN node List* IE for an additional Xn-U tunnel for data forwarding.

Upon reception of the XN-U ADDRESS INDICATION message, the old NG-RAN node should forward pending user data to the indicated TNL addresses.

MR-DC with 5GC

The Xn-U Address Indication procedure is initiated by the M-NG-RAN node.

Upon reception of the XN-U ADDRESS INDICATION message, in case of data forwarding, the S-NG-RAN node should forward pending DL user data to the indicated TNL addresses; in case *Data Forwarding Info from target E-UTRAN node* IE is received, the S-NG-RAN node should perform inter-system direct data forwarding to the indicated TNL addresses as specified in TS38.300 [9]; in case of completion of Xn-U bearer establishment for SN terminated bearers, the S-NG-RAN node may start delivery of user data to the indicated TNL address, and shall, if supported, use the received *QoS Mapping Information* IE within the *DRBs to Be Setup List* IE in the *PDU Session Resource Setup Complete Info – SN terminated* IE to set DSCP and/or flow label fields for the delivery of user data to the indicated TNL address.

If the XN-U ADDRESS INDICATION message includes the *DRB IDs taken into use* IE, the S-NG-RAN node shall, if applicable, act as specified in TS 37.340 [8].

If the XN-U ADDRESS INDICATION message includes the *CHO MR-DC Indicator* IE, the S-NG-RAN node shall, if supported, consider that the XN-U ADDRESS INDICATION message concerns a Conditional Handover, and act as specified in TS 37.340 [8].

If the XN-U ADDRESS INDICATION message includes the *CHO MR-DC Early Data Forwarding Indicator* IE set to "stop", the S-NG-RAN node shall, if supported and if already initiated, stop early data forwarding for the provided Data Forwarding Address information.

8.2.6.3 Unsuccessful Operation

Not applicable.

8.2.6.4 Abnormal Conditions

Void.

8.2.7 UE Context Release

8.2.7.1 General

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

For dual connectivity, the UE Context Release procedure is initiated by the M-NG-RAN node to initiate the release the UE context at the S-NG-RAN node. For dual connectivity specific mobility scenarios specified in TS 37.340 [8], where SCG radio resources in the S-NG-RAN node are kept, only resources related to the UE-associated signalling connection between the M-NG-RAN node and the S-NG-RAN node are released.

For UE context retrieval, the UE Context Release procedure is initiated by the new NG-RAN node to indicate to the old NG-RAN node that radio and control plane resources for the associated UE context are allowed to be released.

The procedure uses UE-associated signalling.

8.2.7.2 Successful Operation



Figure 8.2.7.2-1: UE Context Release, successful operation for handover



Figure 8.2.7.2-2: UE Context Release, successful operation for dual connectivity



Figure 8.2.7.2-3: UE Context Release, successful operation for UE context retrieval

Handover

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

Upon reception of the UE CONTEXT RELEASE message, the source NG-RAN node may release radio and control plane related resources associated to the UE context. If data forwarding has been performed, the source NG-RAN node should continue forwarding of user plane data as long as packets are received at the source NG-RAN node.

Dual Connectivity

The UE Context Release procedure is initiated by the M-NG-RAN node. By sending the UE CONTEXT RELEASE message the M-NG-RAN node informs the S-NG-RAN node that the UE Context can be removed.

Upon reception of the UE CONTEXT RELEASE message, the S-NG-RAN node may release radio and control plane related resources associated to the UE context. If data forwarding has been performed, the S-NG-RAN node should continue forwarding of user plane data as long as packets are received at the S-NG-RAN node.

UE Context Retrieval

The UE Context Release procedure is initiated by the new NG-RAN node. By sending the UE CONTEXT RELEASE message the new NG-RAN node informs the old NG-RAN node of RRC connection reestablishment success or RRC connection resumption success and triggers the release of resources.

Interaction with the M-NG-RAN node initiated S-NG-RAN node Release procedure:

The S-NG-RAN node may receive the S-NODE RELEASE REQUEST message including the *UE Context Kept Indicator* IE set to "True", upon which the S-NG-RAN node shall, if supported, only release the resources related to the UE-associated signalling connection between the M-NG-RAN node and the S-NG-RAN node, as specified in TS 37.340 [8].

8.2.7.3 Unsuccessful Operation

Not applicable.

8.2.7.4 Abnormal Conditions

If the UE Context Release procedure is not initiated towards the source NG-RAN node from any prepared NG-RAN node before the expiry of the timer $TXn_{RELOCoverall}$, the source NG-RAN node shall request the AMF to release the UE context.

If the UE returns to source NG-RAN node before the reception of the UE CONTEXT RELEASE message or the expiry of the timer $TXn_{RELOCoverall}$, the source NG-RAN node shall stop the $TXn_{RELOCoverall}$ and continue to serve the UE.

8.2.8 Handover Success

8.2.8.1 General

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

The procedure uses UE-associated signalling.

8.2.8.2 Successful Operation



Figure 8.2.8.2-1: Handover Success, successful operation

The target NG-RAN node initiates the procedure by sending the HANDOVER SUCCESS message to the source NG-RAN node.

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

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

Interactions with other procedures

If a CONDITIONAL HANDOVER CANCEL message was received for this UE prior the reception of the HANDOVER SUCCESS message, the source NG-RAN node shall consider that the UE successfully executed the handover.

The source NG-RAN node may initiate Handover Cancel procedure towards the other signalling connections or other candidate target NG-RAN nodes for this UE, if any.

8.2.8.3 Unsuccessful Operation

Not applicable.

8.2.8.4 Abnormal Conditions

If the HANDOVER SUCCESS message refers to a context that does not exist, the source NG-RAN node shall ignore the message.

8.2.9 Conditional Handover Cancel

8.2.9.1 General

The Conditional Handover Cancel procedure is used to enable a target NG-RAN node to cancel an already prepared conditional handover.

The procedure uses UE-associated signalling.

8.2.9.2 Successful Operation



Figure 8.2.9.2-1: Conditional Handover Cancel, successful operation

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

At the reception of the CONDITIONAL HANDOVER CANCEL message, the source NG-RAN node shall consider that the target NG-RAN node is about to remove any reference to, and release any resources previously reserved for candidate cells associated to the UE-associated signalling identified by the *Source NG-RAN node UE XnAP ID* IE and the *Target NG-RAN node UE XnAP ID* IE. If the *Candidate Cells To Be Cancelled List* IE is included in CONDITIONAL HANDOVER CANCEL message, the source NG-RAN node shall consider that only the resources reserved for the cells identified by the included NG-RAN CGI are about to be released.

8.2.9.3 Unsuccessful Operation

Not applicable.

8.2.9.4 Abnormal Conditions

If the CONDITIONAL HANDOVER CANCEL message refers to a context that does not exist, the source NG-RAN node shall ignore the message.

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

8.2.10 Early Status Transfer

8.2.10.1 General

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

For MR-DC with 5GC, the Early Status Transfer procedure is also used from the source S-NG-RAN node to the source M-NG-RAN node during a Conditional Handover as specified in TS 37.340 [8].

The procedure uses UE-associated signalling.

8.2.10.2 Successful Operation



Figure 8.2.10.2-1: Early Status Transfer during DAPS Handover or Conditional Handover, successful operation



Figure 8.2.10.2-2: Early Status Transfer during Conditional Handover in MR-DC operation, successful operation

From source NG-RAN node to target NG-RAN node

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

For each DRB in the *DRBs Subject To Early Status Transfer List* IE, the target NG-RAN node shall use the value of the *FIRST DL COUNT Value* IE as the COUNT of the first downlink SDU that the source NG-RAN node forwards to the target NG-RAN node.

For each DRB in the *DRBs Subject To Early Status Transfer List* IE for which the *DISCARD DL COUNT Value* IE is received in the EARLY STATUS TRANSFER message, the target NG-RAN node does not transmit forwarded downlink SDUs to the UE whose COUNT is less than the provided and discards them if transmission has not been attempted.

From source S-NG-RAN node to source M-NG-RAN node, the source NG-RAN node for Conditional Handover

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

For each DRB in the *DRBs Subject To Early Status Transfer List* IE, the source M-NG-RAN node shall forward to the target, the value of the received *FIRST DL COUNT Value* IE or *DISCARD DL COUNT Value* IE.

8.2.10.3 Unsuccessful Operation

Not applicable.

8.2.10.4 Abnormal Conditions

If the target NG-RAN node receives this message for a UE for which no prepared DAPS Handover or Conditional Handover exists at the target NG-RAN node, the target NG-RAN node shall ignore the message.

8.3 Procedures for Dual Connectivity

8.3.1 S-NG-RAN node Addition Preparation

8.3.1.1 General

The purpose of the S-NG-RAN node Addition Preparation procedure is to request the S-NG-RAN node to allocate resources for dual connectivity operation for a specific UE.

The procedure uses UE-associated signalling.

8.3.1.2 Successful Operation

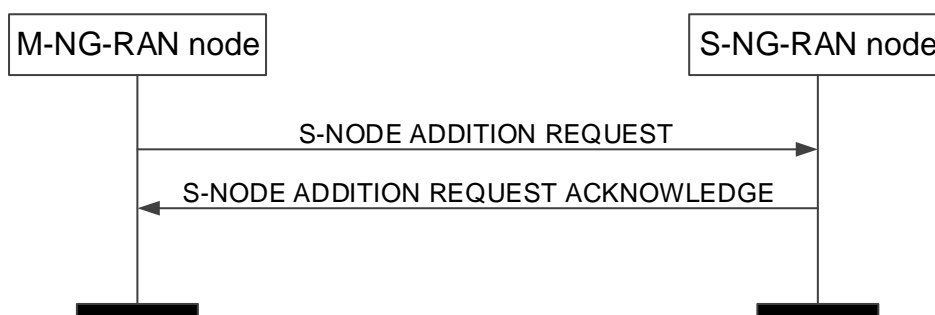


Figure 8.3.1.2-1: S-NG-RAN node Addition Preparation, successful operation

The M-NG-RAN node initiates the procedure by sending the S-NODE ADDITION REQUEST message to the S-NG-RAN node.

When the M-NG-RAN node sends the S-NODE ADDITION REQUEST message, it shall start the timer $TX_{nDCprep}$.

The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *QoS Flow Level QoS Parameters* IE for each QoS flow shall follow the principles specified for the PDU Session Resource Setup procedure in TS 38.413 [5].

The S-NG-RAN node shall choose the ciphering algorithm based on the information in the *UE Security Capabilities* IE and locally configured priority list of AS encryption algorithms and apply the key indicated in the *S-NG-RAN node Security Key* IE as specified in TS 33.501 [28].

If the *TSC Traffic Characteristics* IE is included for a QoS flow in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall behave the same as the NG-RAN node in the PDU Session Resource Setup procedure, specified in TS 38.413 [5].

If the *Additional QoS Flow Information* IE is included for a QoS flow in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall behave the same as the NG-RAN node in the PDU Session Resource Setup procedure, specified in TS 38.413 [5].

For each GBR QoS flow, if the *Alternative QoS Parameters Sets* IE is included in the *GBR QoS Flow Information* IE, the S-NG-RAN node shall, if supported, behave the same as the NG-RAN node in the PDU Session Resource Setup procedure specified in TS 38.413 [5].

For each PDU session, if the *Network Instance* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE contained in the *PDU Session Resources To Be Added List* IE and the *Common Network Instance* IE is not present, the S-NG-RAN node shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [7].

For each GBR QoS flow, if the *Offered GBR QoS Flow Information* IE is included in the *QoS Flows To Be Setup List* IE contained in the *PDU Session Resource Setup Info – SN terminated* IE, the S-NG-RAN node may request the M-NG-RAN node to configure the DRB to which that QoS flow is mapped with MCG resources.

For each PDU session, if the *Non-GBR Resources Offered* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE contained in the *PDU Session Resources To Be Added List* IE and set to "true", the S-NG-RAN node may request the M-NG-RAN node to configure DRBs to which non-GBR QoS flows of the PDU session are mapped with MCG resources.

For each PDU session, if the *Common Network Instance* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE contained in the *PDU Session Resources To Be Added List* IE, the S-NG-RAN node shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [7].

Redundant transmission:

- For each PDU session, if the *Redundant UL NG-U UP TNL Information at UPF* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE, the S-NG-RAN node shall, if supported, use it as the uplink termination point for the user plane data for this PDU session for the redundant transmission and it shall include the *Redundant DL NG-U UP TNL Information at NG-RAN* IE in the *PDU Session Resource Setup Response Info – SN terminated* IE as described in TS 23.501 [9].
- For each PDU session, if the *Redundant Common Network Instance* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE the S-NG-RAN node shall, if supported, use it when selecting transport network resource for the redundant transmission as specified in TS 23.501 [7].
- For each PDU session for which the *Redundant QoS Flow Indicator* IE is include in *QoS Flows To Be Setup List* IE contained in the *S-NODE ADDITION REQUEST* message, the S-NG-RAN node shall, if supported, store and use it as specified in TS 23.501 [7].
- For each PDU session, if the *Redundant PDU Session Information* IE is included in the *PDU Session Resource Setup Info - SN terminated* IE in the S-NODE ADDITION REQUEST message, the S-NODE-RAN node shall, if supported, store the received information in the UE context and setup the redundant user plane resources for the concerned PDU session, as specified in TS 23.501 [7].
- For each PDU session resource successfully setup for which the *Redundant PDU Session Information* IE is included in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall, if supported, include the *Used RSN Information* IE in the *PDU Session Resource Setup Response Info – SN terminated* IE in the S-NODE ADDITION REQUEST ACKNOWLEDGE message.

If the S-NODE ADDITION REQUEST message contains the *Selected PLMN* IE, the S-NG-RAN node may use it for RRM purposes.

If the S-NODE ADDITION REQUEST message contains the *Expected UE Behaviour* IE, the S-NG-RAN node shall, if supported, store this information and may use it to optimize resource allocation.

If the S-NODE ADDITION REQUEST message contains the *Mobility Restriction List* IE, the S-NG-RAN node, if supported, shall store this information and use it to select an appropriate SCG.

If the S-NODE ADDITION REQUEST message contains the *Index to RAT/Frequency Selection Priority* IE, the S-NG-RAN node may use it for RRM purposes.

If the S-NG-RAN node is a gNB and the S-NODE ADDITION REQUEST message contains the *PCell ID* IE, the S-NG-RAN node shall search for the target NR cell among the NR neighbour cells of the PCell indicated, as specified in the TS 37.340 [8].

If the S-NODE ADDITION REQUEST message contains the *S-NG-RAN node PDU Session Aggregate Maximum Bit Rate* IE, the S-NG-RAN node may use it for RRM purposes.

If the S-NODE ADDITION REQUEST message contains the *MR-DC Resource Coordination Information* IE, the S-NG-RAN node should forward it to lower layers and it may use it for the purpose of resource coordination with the M-NG-RAN node, or to coordinate with sidelink resources used in the M-NG-RAN node. The S-NG-RAN node shall consider the value of the received *UL Coordination Information* IE valid until reception of a new update of the IE for the same UE. The S-NG-RAN node shall consider the value of the received *DL Coordination Information* IE valid until reception of a new update of the IE for the same UE. If the *E-UTRA Coordination Assistance Information* IE or the *NR Coordination Assistance Information* IE is contained in the *MR-DC Resource Coordination Information* IE, the S-NG-RAN node shall, if supported, use the information to determine further coordination of resource utilisation between the S-NG-RAN node and the M-NG-RAN node.

If the S-NODE ADDITION REQUEST message contains the *NE-DC TDM Pattern* IE, the S-NG-RAN node should forward it to lower layers and use it for the purpose of single uplink transmission. The S-NG-RAN node shall consider the value of the received *NE-DC TDM Pattern* IE valid until reception of a new update of the IE for the same UE.

If the S-NODE ADDITION REQUEST message contains the *QoS Flow Mapping Indication* IE, the S-NG-RAN node may take it into account that only the uplink or downlink QoS flow is mapped to the DRB.

For each bearer for which allocation of the PDCP entity is requested at the S-NG-RAN node:

- the M-NG-RAN node may propose to apply forwarding of downlink data by including the *DL Forwarding* IE within *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE ADDITION REQUEST message. For each bearer that it has decided to admit, the S-NG-RAN node may include the *DL Forwarding GTP Tunnel Endpoint* IE within the *PDU Session Resource Setup Response Info – SN terminated* IE of the S-NODE ADDITION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer.
- the S-NG-RAN node may include for each bearer in the *PDU Session Resource Setup Response Info – SN terminated* IE the *UL Forwarding GTP Tunnel Endpoint* IE to indicate it request data forwarding of uplink packets to be performed for that bearer.
- the M-NG-RAN node shall include *RLC Mode* IE for each bearer offloaded from M-NG-RAN node to S-NG-RAN node in the *DRBs to QoS Flow Mapping List* IE within the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE ADDITION REQUEST message, and the *RLC Mode* IE indicates the mode that the M-NG-RAN used for the DRB when it was hosted at the M-NG-RAN node.

For each bearer for which the PDCP entity is at the M-NG-RAN node:

- the M-NG-RAN node shall include the *RLC mode* IE for each bearer in the *DRBs To Be Setup List* IE within the *PDU Session Resource Setup Info – MN terminated* IE of the S-NODE ADDITION REQUEST message to indicate the RLC mode has been configured at the M-NG-RAN node, so that the S-NG-RAN node shall configure the same RLC mode for this MN terminated split bearer.

The M-NG-RAN node may also propose to apply forwarding of UL data when offloading QoS flows for which in-order delivery is requested by including the *UL Forwarding Proposal* IE in the *Data Forwarding and Offloading Info from source NG-RAN node* IE within the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE ADDITION REQUEST message. The S-NG-RAN node may include the *PDU Session Level UL Data Forwarding UP TNL Information* IE in the *Data Forwarding Info from target NG-RAN node* IE within the *PDU Session Resource Setup Response Info – SN terminated* IE of the S-NODE ADDITION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding.

If the *Masked IMEISV* IE is contained in the S-NODE ADDITION REQUEST message the S-NG-RAN node shall, if supported, use it to determine the characteristics of the UE for subsequent handling.

If the *UE Radio Capability ID* IE is contained in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall, if supported, store this information in the UE context and use it as defined in TS 23.501 [7] and TS 23.502 [13].

The S-NG-RAN node shall report to the M-NG-RAN node, in the S-NODE ADDITION REQUEST ACKNOWLEDGE message, the result for all the requested PDU session resources in the following way:

- A list of PDU session resources which are successfully established shall be included in the *PDU Session Resources Admitted To Be Added List* IE.
- A list of PDU session resources which failed to be established shall be included in the *PDU Session Resources Not Admitted List* IE.

Upon reception of the S-NODE ADDITION REQUEST ACKNOWLEDGE message the M-NG-RAN node shall stop the timer TXn_{DCprep}.

If the S-NODE ADDITION REQUEST ACKNOWLEDGE message contains the *MR-DC Resource Coordination Information* IE, the M-NG-RAN node may use it for the purpose of resource coordination with the S-NG-RAN node. The M-NG-RAN node shall consider the value of the received *UL Coordination Information* IE valid until reception of a new update of the IE for the same UE. The M-NG-RAN node shall consider the value of the received *DL Coordination Information* IE valid until reception of a new update of the IE for the same UE. If the *E-UTRA Coordination Assistance Information* IE or the *NR Coordination Assistance Information* IE is contained in the *MR-DC Resource Coordination Information* IE, the M-NG-RAN node shall, if supported, use the information to determine further coordination of resource utilisation between the M-NG-RAN node and the S-NG-RAN node.

The S-NG-RAN node may include for each bearer in the *DRBs To Be Setup List* IE in the S-NODE ADDITION REQUEST ACKNOWLEDGE message the *PDCP SN Length* IE to indicate the PDCP SN length for that DRB.

If the *S-NG-RAN node UE XnAP ID* IE is contained in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall, if supported, store this information and use it as defined in TS 37.340 [8].

If the S-NODE ADDITION REQUEST message contains the *PDCP SN Length* IE, the S-NG-RAN node shall, if supported, store this information and use it for lower layer configuration of the concerned MN terminated bearer.

If the S-NODE ADDITION REQUEST message contains the *SN Addition Trigger Indication* IE, the S-NG-RAN node shall include the *RRC config indication* IE in the S-NODE ADDITION REQUEST ACKNOWLEDGE message to inform the M-NG-RAN node if the S-NG-RAN node applied full or delta configuration, as specified in TS 37.340 [8].

If the S-NODE ADDITION REQUEST message contains the *S-NG-RAN node Maximum Integrity Protected Data Rate Uplink* IE or the *S-NG-RAN node Maximum Integrity Protected Data Rate Downlink* IE, the S-NG-RAN node shall use the received information when enforcing the maximum integrity protected data rate for the UE.

If the *Security Indication* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE ADDITION REQUEST message, the behaviour of the S-NG-RAN node shall be the same as specified for the same IE in the *PDU Session Resources To Be Setup List* IE in the Handover Preparation procedure, for the concerned PDU session, and the S-NG-RAN node shall include the *Security Result* IE in the *PDU Session Resource Setup Response Info – SN terminated* IE. If either the S-NG-RAN node or the M-NG-RAN node is an ng-eNB, the S-NG-RAN node shall behave as specified in TS 33.501 [28].

If the *Security Result* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE ADDITION REQUEST message, the S-NG-RAN node may take the information into account when deciding whether to perform user plane integrity protection or ciphering for the DRBs that it establishes for the concerned PDU session, except if the *Split Session Indicator* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE and set to "split", in which case it shall perform user plane integrity protection or ciphering according to the information in the *Security Result* IE.

The S-NG-RAN node may include the *Location Information at S-NODE* IE in the S-NODE ADDITION REQUEST ACKNOWLEDGE message, if respective information is available at the S-NG-RAN node.

If the *Location Information at S-NODE Reporting* IE set to "pscell" is included in the S-NODE ADDITION REQUEST, the S-NG-RAN node shall, start providing information about the current location of the UE. If the *Location Information at S-NODE* IE is included in the S-NODE ADDITION REQUEST ACKNOWLEDGE, the M-NG-RAN node shall store the included information so that it may be transferred towards the AMF.

If the *Default DRB Allowed* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE ADDITION REQUEST message and set to "true", the S-NG-RAN node may configure the default DRB for the PDU session.

If the S-NODE ADDITION REQUEST ACKNOWLEDGE message includes the *DRB IDs taken into use* IE, the M-NG-RAN node, if applicable, shall act as specified in TS 37.340 [8].

If *Trace Activation* IE has previously been received for this UE, it shall be included in the S-NODE ADDITION REQUEST message. If the *Trace Activation* IE is included in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall, if supported, initiate the requested trace function as described in TS 32.422 [23].

If the *Area Scope* IE is not present in the *MDT Configuration* IE, the S-NG-RAN node shall consider that the MDT Configuration is applied to all PLMNs indicated in the MDT PLMN List, as described in TS 32.422 [23].

If the *Requested Fast MCG recovery via SRB3* IE set to "true" is included in the S-NODE ADDITION REQUEST message and the S-NG-RAN node decides to configure fast MCG link recovery via SRB3 as specified in TS 37.340 [8], the S-NG-RAN shall, if supported, include the *Available fast MCG recovery via SRB3* IE set to "true" in the S-NODE ADDITION REQUEST ACKNOWLEDGE message.

If the *QoS Monitoring Request* IE is included in the *QoS Flow Level QoS Parameters* IE for a QoS flow contained in the *DRBs To Be Setup List* IE of the *PDU Session Resource Setup Info – MN terminated* IE, the S-NG-RAN node shall, if supported, use it to configure lower layers for the purpose of delay measurement and QoS monitoring as specified in TS 23.501 [7]. If the *QoS Monitoring Reporting Frequency* IE is included in the *QoS Flow Level QoS Parameters* IE for a QoS flow contained in the *DRBs To Be Setup List* IE of the *PDU Session Resource Setup Info – MN terminated* IE, the S-NG-RAN node shall, if supported, use it for RAN part delay reporting.

For each QoS flow which has been successfully established in the S-NG-RAN node, if the *QoS Monitoring Request* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the *PDU Session Resource Setup Info – SN terminated* IE, the S-NG-RAN node shall store this information, and, if supported, perform delay measurement and QoS monitoring as specified in TS 23.501 [7]. If the *QoS Monitoring Reporting Frequency* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the *PDU Session Resource Setup Info – SN terminated* IE, the S-NG-RAN node shall store this information, and, if supported, use it for RAN part delay reporting. In case such a QoS flow is included in the *DRBs To Be Setup List* IE of the *PDU Session Resource Setup Response Info – SN terminated* IE, the M-NG-RAN node shall, if supported, use it to configure lower layers for the purpose of delay measurement and QoS monitoring. If the *QoS Monitoring Reporting Frequency* IE is included in the *DRBs To Be Setup List* IE of the *PDU Session Resource Setup Response Info – SN terminated* IE, the M-NG-RAN node shall, if supported, use it for RAN part delay reporting.

For each DRB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is included in the *DRBs Admitted List* IE in the *PDU Session Resource Setup Response Info – MN terminated* IE of the S-NODE ADDITION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from M-NG-RAN node to S-NG-RAN node through the GTP tunnels indicated by the *UP Transport Layer Information* IE.

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

If for a given QoS Flow the *Source DL Forwarding IP Address* IE or both, the *Source DL Forwarding IP Address* IE and the *Source Node DL Forwarding IP Address* IE are included within the *Data Forwarding and Offloading Info from source NG-RAN node* IE in the *PDU Session Resource Setup Info – SN terminated* IE contained in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

If for a given QoS Flow the *Source DL Forwarding IP Address* IE is included within the *QoS Flows Mapped To DRB List* IE in the *PDU Session Resource Setup Response Info – SN terminated* IE contained in the S-NODE ADDITION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall, if supported, store this information and use it as part of its ACL functionality to identify source TNL address for data forwarding in case of subsequent handover preparation, if such ACL functionality is deployed.

Interactions with the S-NG-RAN node Reconfiguration Completion procedure:

If the S-NG-RAN node admits at least one PDU session resource, the S-NG-RAN node shall start the timer $TX_{nDCoverall}$ when sending the S-NODE ADDITION REQUEST ACKNOWLEDGE message to the M-NG-RAN node. The reception of the S-NODE RECONFIGURATION COMPLETE message shall stop the timer $TX_{nDCoverall}$.

Interaction with the Activity Notification procedure

Upon receiving an S-NODE ADDITION REQUEST message containing the *Desired Activity Notification Level IE*, the S-NG-RAN node shall, if supported, use this information to decide whether to trigger subsequent Activation Notification procedures according to the requested notification level.

8.3.1.3 Unsuccessful Operation

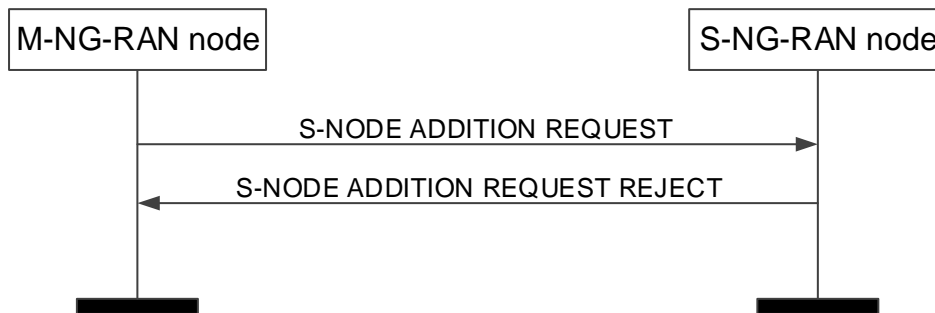


Figure 8.3.1.3-1: S-NG-RAN node Addition Preparation, unsuccessful operation

If the S-NG-RAN node is not able to accept any of the bearers or a failure occurs during the S-NG-RAN node Addition Preparation, the S-NG-RAN node sends the S-NODE ADDITION REQUEST REJECT message with an appropriate cause value to the M-NG-RAN node.

8.3.1.4 Abnormal Conditions

If the S-NG-RAN node receives an S-NODE ADDITION REQUEST message containing in a *PDU Session Resource To Be Added Item IE* neither the *PDU Session Resource Setup Info – SN terminated IE* nor the *PDU Session Resource Setup Info – MN terminated IE*, the S-NG-RAN node shall fail the S-NG-RAN node Addition Preparation procedure indicating an appropriate cause.

If the supported algorithms for encryption defined in the *NR Encryption Algorithms IE* in the *NR UE Security Capabilities IE*, plus the mandated support of NEA0 in all UEs (TS 33.501 [28]), do not match any algorithms defined in the configured list of allowed encryption algorithms in the S-NG-RAN node (TS 33.501 [28]), the S-NG-RAN node shall reject the procedure using the S-NODE ADDITION REQUEST REJECT message.

If the supported algorithms for integrity defined in the *NR Integrity Protection Algorithms IE* in the *NR UE Security Capabilities IE* do not match any algorithms defined in the configured list of allowed integrity protection algorithms in the S-NG-RAN node (TS 33.501 [28]), the S-NG-RAN node shall reject the procedure using the S-NODE ADDITION REQUEST REJECT message.

If the S-NG-RAN node receives an S-NODE ADDITION REQUEST message containing a *NG-RAN node UE XnAP ID IE* that does not match any existing UE Context that has such ID, the S-NG-RAN node shall reject the procedure using the S-NODE ADDITION REQUEST REJECT message.

If the M-NG-RAN node receives an S-NODE ADDITION REQUEST ACKNOWLEDGE message containing a value for *PDU Session ID* in *PDU Session Resources Admitted List IE* and in *PDU Session Resources Not Admitted List IE*, the M-NG-RAN node shall regard setup of S-NG-RAN node resources of that PDU Session as being failed.

If the S-NG-RAN node receives an S-NODE ADDITION REQUEST message containing, for a PDU session, a *PDU Session Resource Setup Info – SN terminated IE* for which the *Split Session Indicator IE* is included and set to "split", the *Security Result IE* is not included, and either the *Integrity Protection Indication IE* or the *Confidentiality Protection Indication IE* is set to "preferred", it shall reject the PDU session.

Interaction with the M-NG-RAN node initiated S-NG-RAN node Release procedure:

If the M-NG-RAN node receives an S-NODE ADDITION REQUEST ACKNOWLEDGE message containing in a *PDU Session Resource Admitted To Be Added Item IE* neither the *PDU Session Resource Setup Response Info – SN*

terminated IE nor the *PDU Session Resource Setup Response Info – MN terminated* IE, the M-NG-RAN node shall trigger the M-NG-RAN node initiated S-NG-RAN node Release procedure indicating an appropriate cause.

If the timer $TX_{nDCprep}$ expires before the M-NG-RAN node has received the S-NODE ADDITION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall regard the S-NG-RAN node Addition Preparation procedure as being failed and shall trigger the M-NG-RAN node initiated S-NG-RAN node Release procedure.

Interactions with the S-NG-RAN node Reconfiguration Completion and S-NG-RAN node initiated S-NG-RAN node Release procedure:

If the timer $TX_{nDCoverall}$ expires before the S-NG-RAN node has received the S-NODE RECONFIGURATION COMPLETE or the S-NODE RELEASE REQUEST message, the S-NG-RAN node shall regard the requested RRC connection reconfiguration as being not applied by the UE and shall trigger the S-NG-RAN node initiated S-NG-RAN node Release procedure.

8.3.2 S-NG-RAN node Reconfiguration Completion

8.3.2.1 General

The purpose of the S-NG-RAN node Reconfiguration Completion procedure is to provide information to the S-NG-RAN node whether the requested configuration was successfully applied by the UE.

The procedure uses UE-associated signalling.

8.3.2.2 Successful Operation



Figure 8.3.2.2-1: S-NG-RAN node Reconfiguration Complete procedure, successful operation.

The M-NG-RAN node initiates the procedure by sending the S-NODE RECONFIGURATION COMPLETE message to the S-NG-RAN node.

The S-NODE RECONFIGURATION COMPLETE message may contain information that

- either the UE has successfully applied the configuration requested by the S-NG-RAN node. The M-NG-RAN node may also provide configuration information in the *M-NG-RAN node to S-NG-RAN node Container* IE.
- or the configuration requested by the S-NG-RAN node has been rejected. The M-NG-RAN node shall provide information with sufficient precision in the included *Cause* IE to enable the S-NG-RAN node to know the reason for an unsuccessful reconfiguration. The M-NG-RAN node may also provide configuration information in the *M-NG-RAN node to S-NG-RAN node Container* IE.

Upon reception of the S-NODE RECONFIGURATION COMPLETE message the S-NG-RAN node shall stop the timer $TX_{nDCoverall}$.

8.3.2.3 Abnormal Conditions

Void.

8.3.3 M-NG-RAN node initiated S-NG-RAN node Modification Preparation

8.3.3.1 General

This procedure is used to enable an M-NG-RAN node to request an S-NG-RAN node to either modify the UE context at the S-NG-RAN node or to query the current SCG configuration for supporting delta signalling in M-NG-RAN node initiated S-NG-RAN node change, or to provide the S-RLF-related information to the S-NG-RAN node.

The procedure uses UE-associated signalling.

8.3.3.2 Successful Operation

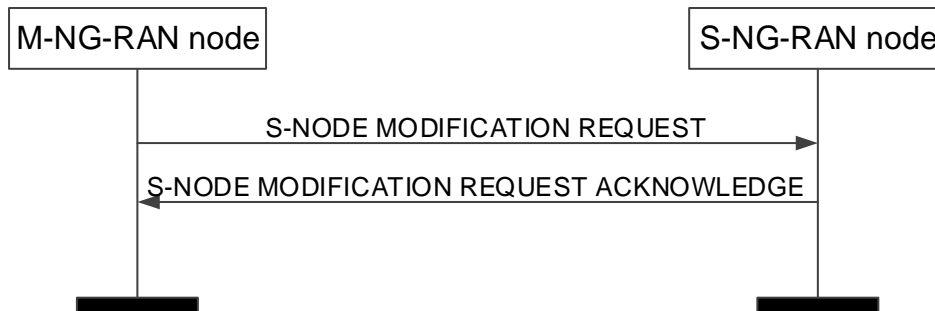


Figure 8.3.3.2-1: M-NG-RAN node initiated S-NG-RAN node Modification Preparation, successful operation

The M-NG-RAN node initiates the procedure by sending the S-NODE MODIFICATION REQUEST message to the S-NG-RAN node.

When the M-NG-RAN node sends the S-NODE MODIFICATION REQUEST message, it shall start the timer $TX_{NDcprep}$.

The S-NODE MODIFICATION REQUEST message may contain

- within the *UE Context Information* IE;
- PDU session resources to be added within the *PDU Session Resources To Be Added* Item IE;
- PDU session resources to be modified within the *PDU Session Resources To Be Modified* Item IE;
- PDU session resources to be released within the *PDU Session Resources To Be Released* Item IE;
- the *S-NG-RAN node Security Key* IE;
- the *S-NG-RAN node UE Aggregate Maximum Bit Rate* IE;
- the *M-NG-RAN node to S-NG-RAN node Container* IE;
- the *PDCP Change Indication* IE;
- the *SCG Configuration Query* IE;
- the *Requested split SRBs* IE;
- the *Requested split SRBs release* IE;
- the *Requested fast MCG recovery via SRB3* IE;
- the *Requested fast MCG recovery via SRB3 Release* IE;
- the *Additional DRB IDs* IE;
- the *MR-DC Resource Coordination Information* IE.

If the S-NODE MODIFICATION REQUEST message contains the *Selected PLMN* IE, the S-NG-RAN node may use it for RRM purposes.

If the S-NODE MODIFICATION REQUEST message contains the *Mobility Restriction List* IE, the S-NG-RAN node shall

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

If the *S-NG-RAN node UE Aggregate Maximum Bit Rate* IE is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall:

- replace the previously provided S-NG-RAN node UE Aggregate Maximum Bit Rate by the received S-NG-RAN node UE Aggregate Maximum Bit Rate in the UE context;
- use the received S-NG-RAN node UE Aggregate Maximum Bit Rate for Non-GBR Bearers for the concerned UE as defined in TS 37.340 [8].

If the S-NODE MODIFICATION REQUEST message contains the *Index to RAT/Frequency Selection Priority* IE, the S-NG-RAN node may use it for RRM purposes.

If the S-NODE MODIFICATION REQUEST message contains the *S-NG-RAN node PDU Session Aggregate Maximum Bit Rate* IE, the S-NG-RAN node may use it for RRM purposes.

If the S-NODE MODIFICATION REQUEST message contains the *MR-DC Resource Coordination Information* IE, the S-NG-RAN node should forward it to lower layers and it may use it for the purpose of resource coordination with the M-NG-RAN node, or to coordinate with sidelink resources used in the M-NG-RAN node. The S-NG-RAN node shall consider the value of the received *UL Coordination Information* IE valid until reception of a new update of the IE for the same UE. The S-NG-RAN node shall consider the value of the received *DL Coordination Information* IE valid until reception of a new update of the IE for the same UE. If the *E-UTRA Coordination Assistance Information* IE or the *NR Coordination Assistance Information* IE is contained in the *MR-DC Resource Coordination Information* IE, the S-NG-RAN node shall, if supported, use the information to determine further coordination of resource utilisation between the S-NG-RAN node and the M-NG-RAN node.

If the S-NODE MODIFICATION REQUEST message contains the *NE-DC TDM Pattern* IE, the S-NG-RAN node should forward it to lower layers and use it for the purpose of single uplink transmission. The S-NG-RAN node shall consider the value of the received *NE-DC TDM Pattern* IE valid until reception of a new update of the IE for the same UE.

The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *QoS Flow Level QoS Parameters* IE for each QoS flow shall follow the principles specified for the PDU Session Resource Setup procedure in TS 38.413 [5].

If the *Additional QoS Flow Information* IE is included for a QoS flow in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall behave the same as the NG-RAN node in the PDU Session Resource Setup procedure, specified in TS 38.413 [5].

For each GBR QoS flow, if the *Alternative QoS Parameters Sets* IE is included in the *GBR QoS Flow Information* IE, the S-NG-RAN node shall, if supported, behave the same as the NG-RAN node in the PDU Session Resource Setup procedure specified in TS 38.413 [5].

If the *TSC Traffic Characteristics* IE is included for a QoS flow in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall behave the same as the NG-RAN node in the PDU Session Resource Setup procedure, specified in TS 38.413 [5].

For each PDU session, if the *Network Instance* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE and in the *PDU Session Resource Modification Info – SN terminated* IE and the *Common Network Instance* IE is not present, the S-NG-RAN node shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [7].

For each PDU session, if the *Common Network Instance* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE and in the *PDU Session Resource Modification Info – SN terminated* IE, the S-NG-RAN node shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [7].

For each GBR QoS flow, if the *Offered GBR QoS Flow Information* IE is included in the *QoS Flows To Be Setup List* IE contained in the *PDU Session Resource Setup Info – SN terminated* IE, the S-NG-RAN node may request the M-NG-RAN node to configure the DRB to which that QoS flow is mapped with MCG resources.

For each PDU session, if the *Non-GBR Resources Offered* IE is included in the *PDU Session Resource Modification Info – SN terminated* IE contained in the *PDU Session Resources To Be Added List* IE and set to "true", the S-NG-RAN node may request the M-NG-RAN node to configure the DRBs to which non-GBR QoS flows of the PDU session are mapped with MCG resources.

If at least one of the requested modifications is admitted by the S-NG-RAN node, the S-NG-RAN node shall modify the related part of the UE context accordingly and send the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message back to the M-NG-RAN node.

The M-NG-RAN node shall include *RLC Mode* IE for each bearer offloaded from M-NG-RAN node to S-NG-RAN node in the *DRBs to QoS Flow Mapping List* IE within the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE MODIFICATION REQUEST message, and the *RLC Mode* IE indicates the mode that the M-NG-RAN used for the DRB when it was hosted at the M-NG-RAN node.

The S-NG-RAN node shall include the PDU sessions for which resources have been either added or modified or released at the S-NG-RAN node either in the *PDU Session Resources Admitted To Be Added List* IE or the *PDU Session Resources Admitted To Be Modified List* IE or the *PDU Session Resources Admitted To Be Released List* IE. The S-NG-RAN node shall include the PDU sessions that have not been admitted in the *PDU Session Resources Not Admitted List* IE with an appropriate cause value.

If the M-NG-RAN node requests transfer of the PDCP hosting from the S-NG-RAN node to the M-NG-RAN node for a PDU session, in which case the S-NODE MODIFICATION REQUEST message contains an PDU session resource to be released which is configured with the SCG bearer option within the *PDU Session Resources To Be Released List* IE, the S-NG-RAN node shall include the *RLC Mode* IE within the *DRBs To Be Released List* IE in the *PDU Session Resources admitted to be released List – SN terminated* IE in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message. The *RLC Mode* IE indicates the RLC mode that the S-NG-RAN node uses for the DRB.

If the *QoS Flow Mapping Indication* IE is included in the S-NODE MODIFICATION REQUEST message for a QoS flow to be modified, the S-NG-RAN node may replace and take it into account that only the uplink or downlink QoS flow is mapped to the DRB.

If the S-NODE MODIFICATION REQUEST message contains for a PDU session resource to be modified which is configured with the SN terminated bearer option, the *UL NG-U UP TNL Information at UPF* IE the S-NG-RAN node shall use it as the new UL NG-U address.

If the S-NODE MODIFICATION REQUEST message contains for a PDU session resource to be modified which is configured with the MN terminated bearer option, the *MN UL PDCP UP TNL Information* IE the S-NG-RAN node shall use it as the new UL Xn-U address.

Redundant transmission:

- If the S-NODE MODIFICATION REQUEST message contains for a PDU session resource to be modified which is configured with the SN terminated bearer option, the *Redundant UL NG-U UP TNL Information at UPF* IE, the S-NG-RAN node shall, if supported, use it as the new UL NG-U address for the redundant transmission as specified in TS 23.501 [7].
- For each PDU session, if the *Redundant Common Network Instance* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE or in the *PDU Session Resource Modification Info – SN terminated* IE, the S-NG-RAN node shall, if supported, use it when selecting transport network resource for the redundant transmission as specified in TS 23.501 [7].
- For each PDU session, if the *Redundant QoS Flow Indicator* IE is set to false for all QoS flows, the S-NG-RAN node shall, if supported, stop the redundant transmission and release the redundant tunnel for the concerned PDU Session as specified in TS 23.501 [7].
- For each PDU session for which the *Redundant QoS Flow Indicator* IE is included in the *S-NODE MODIFICATION REQUEST* message, the S-NG-RAN node shall, if supported, store and use it as specified in TS 23.501 [7].

- For each PDU session, if the *Redundant PDU Session Information* IE is included in the *PDU Session Resource Setup Info - SN terminated* IE in the S-NODE MODIFICATION REQUEST message, the S-NODE-RAN node shall, if supported, store the received information in the UE context and setup the redundant user plane for the concerned PDU session, as specified in TS 23.501 [7].
- For each PDU session resource successfully setup for which the *Redundant PDU Session Information* IE is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall, if supported, include the *Used RSN Information* IE in the *PDU Session Resource Setup Response Info - SN terminated* IE in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message.

If the S-NODE MODIFICATION REQUEST message contains the *QoS flows To Be Released List* within the *PDU Session Resource Modification Info - SN terminated* IE, the S-NG-RAN node may propose to apply forwarding of UL data for the QoS flows for which in-order delivery is requested by including the *UL Forwarding Proposal* IE in the *Data Forwarding and Offloading Info from source NG-RAN node* IE within the *PDU Session Resource Modification Response Info - SN terminated* IE of the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message.

For a PDU session resource to be modified which is configured with the SN terminated bearer option the S-NG-RAN node may include in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message the *DL NG-U UP TNL Information at NG-RAN* IE.

For a PDU session resource to be modified which is configured with the MN terminated bearer option the S-NG-RAN node may include in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message the *SN DL SCG UP TNL Information* IE.

If the *PDCP Change Indication* IE is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall act as specified in TS 37.340 [8].

Upon reception of the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message the M-NG-RAN node shall stop the timer TXn_{DCprep} . If the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message has included the *S-NG-RAN node to M-NG-RAN node Container* IE, the M-NG-RAN node is then defined to have a Prepared S-NG-RAN node Modification for that Xn UE-associated signalling.

If the *SCG Configuration Query* IE is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall provide corresponding radio configuration information within the *S-NG-RAN node to M-NG-RAN node Container* IE and may provide the corresponding data forwarding related information within the *PDU Session Resources with Data Forwarding List* IE as specified in TS 37.340 [8].

For each bearer for which allocation of the PDCP entity is requested at the S-NG-RAN node:

- if applicable, the M-NG-RAN node may propose to apply forwarding of downlink data by including the *DL Forwarding* IE within the *PDU Session Resource Setup Info - SN terminated* IE of the S-NODE MODIFICATION REQUEST message. For each bearer that it has decided to admit, the S-NG-RAN node may include the *DL Forwarding GTP Tunnel Endpoint* IE within the *PDU Session Resource Setup Response Info - SN terminated* IE of the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer.
- the S-NG-RAN node may include for each bearer in the *PDU Session Resource Setup Response Info - SN terminated* IE the *UL Forwarding GTP Tunnel Endpoint* IE to indicate it requests data forwarding of uplink packets to be performed for that bearer.

The M-NG-RAN node may propose to apply forwarding of UL data when offloading QoS flows for which in-order delivery is requested by including the *UL Forwarding Proposal* IE in the *Data Forwarding and Offloading Info from source NG-RAN node* IE within the *PDU Session Resource Setup Info - SN terminated* IE or *PDU Session Resource Modification Info - SN terminated* IE of the S-NODE MODIFICATION REQUEST message. The S-NG-RAN node may include the *PDU Session Level UL Data Forwarding UP TNL Information* IE in the *Data Forwarding Info from target NG-RAN node* IE within the *PDU Session Resource Setup Response Info - SN terminated* IE or *PDU Session Resource Modification Response Info - SN terminated* IE of the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding.

If the S-NODE MODIFICATION REQUEST message contains the *Requested Split SRBs* IE, the S-NG-RAN node may use it to add split SRBs. If the S-NODE MODIFICATION REQUEST message contains the *Requested Split SRBs release* IE, the S-NG-RAN node may use it to release split SRBs.

If the *Requested Fast MCG recovery via SRB3* IE set to "true" is included in the S-NODE MODIFICATION REQUEST message and the S-NG-RAN decides to configure fast MCG link recovery via SRB3 as specified in TS 37.340 [8], the S-NG-RAN node shall, if supported, include the *Available fast MCG recovery via SRB3* IE set to "true" in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message. If the *Requested Fast MCG recovery via SRB3 Release* IE set to "true" is included in the S-NODE MODIFICATION REQUEST message and the S-NG-RAN decides to release fast MCG link recovery via SRB3, the S-NG-RAN shall, if supported, include the *Release fast MCG recovery via SRB3* IE set to "true" in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message.

If the *Lower Layer presence status change* IE set to "release lower layers" is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall act as specified in TS 37.340 [8].

If the *Lower Layer presence status change* IE set to "re-establish lower layers" is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall act as specified in TS 37.340 [8].

If the *Lower Layer presence status change* IE set to "suspend lower layers" is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall act as specified in TS 37.340 [8].

If the *Lower Layer presence status change* IE set to "resume lower layers" is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall act as specified in TS 37.340 [8].

The M-NG-RAN node may include for each bearer in the *DRBs To Be Modified List* IE in the S-NODE MODIFICATION REQUEST message the *RLC Status* IE to indicate that RLC has been reestablished at the M-NG-RAN node and the S-NG-RAN node may trigger PDCP data recovery.

If the S-NODE MODIFICATION REQUEST message contains the *PDCP SN Length* IE in the *DRBs To Be Setup List* IE, the S-NG-RAN node shall, if supported, store this information and use it for lower layer configuration of the concerned MN terminated bearer.

If the *PDCP Duplication Configuration* IE in the *PDU Session Resource Modification Info – MN terminated* IE is contained in the S-NODE MODIFICATION REQUEST message and set to "configured", the S-NG-RAN node shall, if supported, add the RLC entity of secondary path and the RLC entity of all additional path(s) for the indicated DRB. And if the S-NODE MODIFICATION REQUEST message contains the *Duplication Activation* IE, the S-NG-RAN node shall, if supported, store this information and use it for the purpose of PDCP duplication.

If the S-NODE MODIFICATION REQUEST message contains *RLC Duplication Information* IE, the S-NG-RAN node shall, if supported, store this information and use it for the purpose of PDCP duplication for the indicated DRB with more than two RLC entities.

If the *PDCP Duplication Configuration* IE in the *PDU Session Resource Modification Info – MN terminated* IE is contained in the S-NODE MODIFICATION REQUEST message and set to "de-configured", the S-NG-RAN node shall, if supported, delete the RLC entity of secondary path and the RLC entity of all additional path(s) for the indicated DRB.

The S-NG-RAN node may include for each bearer in the *DRBs To Be Setup List* IE in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message the *PDCP SN Length* IE to indicate the PDCP SN length for that DRB.

The S-NG-RAN node may include the *QoS Flow Mapping Indication* IE for a QoS flow in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message to indicate that only the uplink or downlink QoS flow is mapped to the DRB.

If the *Additional DRB IDs* IE is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall store this information and use it together with previously provided DRB IDs if any, for SN terminated bearers.

If the S-NODE MODIFICATION REQUEST message contains the *S-NG-RAN node Maximum Integrity Protected Data Rate Uplink* IE or the *S-NG-RAN node Maximum Integrity Protected Data Rate Downlink* IE, the S-NG-RAN node shall use the received information when enforcing the maximum integrity protected data rate for the UE.

If the *Security Indication* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE MODIFICATION REQUEST message, the behaviour of the S-NG-RAN node shall be the same as specified for the same IE in the *PDU Session Resources To Be Setup List* IE in the Handover Preparation procedure, for the concerned PDU session, and the S-NG-RAN node shall include the *Security Result* IE in the *PDU Session Resource Setup Response Info – SN terminated* IE. If either the S-NG-RAN node or the M-NG-RAN node is an ng-eNB, the S-NG-RAN node shall behave as specified in TS 33.501 [28].

If the *Security Result* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE of the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node may take the information into account when deciding whether to perform user plane integrity protection or ciphering for the DRBs that it establishes for the concerned PDU session, except if the *Split Session Indicator* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE and set to "split", in which case it shall perform user plane integrity protection or ciphering according to the information in the *Security Result* IE.

The S-NG-RAN node may include the *Location Information at S-NODE* IE in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message, if respective information is available at the S-NG-RAN node.

If the *Location Information at S-NODE Reporting* IE set to "pscell" is included in the S-NODE MODIFICATION REQUEST, the S-NG-RAN node shall start providing information about the current location of the UE. If the *Location Information at S-NODE* IE is included in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE, the M-NG-RAN node shall store the included information so that it may be transferred towards the AMF.

If the *S-NSSAI* IE is included in the *PDU Session Resources To Be Modified List* IE in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall replace the previously *S-NSSAI* IE by the received *S-NSSAI* IE.

If the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message contains the *MR-DC Resource Coordination Information* IE, the M-NG-RAN node may use it for the purpose of resource coordination with the S-NG-RAN node. The M-NG-RAN node shall consider the value of the received *UL Coordination Information* IE valid until reception of a new update of the IE for the same UE. The M-NG-RAN node shall consider the value of the received *DL Coordination Information* IE valid until reception of a new update of the IE for the same UE. If the *E-UTRA Coordination Assistance Information* IE or the *NR Coordination Assistance Information* IE is contained in the *MR-DC Resource Coordination Information* IE, the M-NG-RAN node shall, if supported, use the information to determine further coordination of resource utilisation between the M-NG-RAN node and the S-NG-RAN node.

If the S-NODE MODIFICATION REQUEST message contains the *PCell ID* IE, the S-NG-RAN node may search for the target cell among the neighbour cells of the PCell indicated, as specified in the TS 37.340 [8].

If the S-NG-RAN node applied a full configuration or delta configuration, e.g., as part of mobility procedure involving a change of DU, the S-NG-RAN node shall inform the M-NG-RAN node by including the *RRC config indication* IE in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message.

If the *Default DRB Allowed* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE or *PDU Session Resource Modification Info – SN terminated* IE of the S-NODE MODIFICATION REQUEST message and set to "true", the S-NG-RAN node may configure the default DRB for the PDU session.

If the *Default DRB Allowed* IE is included in the *PDU Session Resource Setup Info – SN terminated* IE or *PDU Session Resource Modification Info – SN terminated* IE of the S-NODE MODIFICATION REQUEST message and set to "false", the S-NG-RAN node shall not configure the default DRB for the PDU session and the S-NG-RAN shall reconfigure the default DRB into a normal DRB if it has configured the default DRB before.

If the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message includes the *DRB IDs taken into use* IE, the M-NG-RAN node, if applicable, shall act as specified in TS 37.340 [8].

If the *QoS Monitoring Request* IE is included in the *QoS Flow Level QoS Parameters* IE for a QoS flow contained in the *DRBs To Be Setup List* IE or the *DRBs To Be Modified List* IE within the *PDU Session Resource Setup Info – MN terminated* IE or the *PDU Session Resource Modification Info – MN terminated* IE, the S-NG-RAN node shall, if supported, use it to configure lower layers for the purpose of delay measurement and QoS monitoring as specified in TS 23.501 [7]. If the *QoS Monitoring Reporting Frequency* IE is included in the *QoS Flow Level QoS Parameters* IE for a QoS flow contained in the *DRBs To Be Setup List* IE or the *DRBs To Be Modified List* IE within the *PDU Session Resource Setup Info – MN terminated* IE or the *PDU Session Resource Modification Info – MN terminated* IE, the S-NG-RAN node shall, if supported, use it for RAN part delay reporting.

For each QoS flow which has been successfully added or modified in the S-NG-RAN node, if the *QoS Monitoring Request* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the *PDU Session Resource Setup Info – SN terminated* IE or the *PDU Session Resource Modification Info – SN terminated* IE, the S-NG-RAN node shall store this information, and, if supported, perform delay measurement and QoS monitoring as specified in TS 23.501 [7]. If the *QoS Monitoring Reporting Frequency* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the *PDU Session Resource Setup Info – SN terminated* IE or the *PDU Session Resource Modification Info – SN terminated* IE, the S-NG-RAN node shall store this information, and, if supported, use it for RAN part delay reporting. In case such a QoS flow is included in the *DRBs To Be Setup List* IE or the *DRBs To Be Modified List* IE within the *PDU Session Resource Setup Response Info – SN terminated* IE or the *PDU Session Resource Modification Response*

Info – SN terminated IE, the M-NG-RAN node shall, if supported, use it to configure lower layers for the purpose of delay measurement and QoS monitoring. If the *QoS Monitoring Reporting Frequency* IE is included in the *DRBs To Be Setup List* IE or the *DRBs To Be Modified List* IE within the *PDU Session Resource Setup Response Info – SN terminated* IE or the *PDU Session Resource Modification Response Info – SN terminated* IE, the M-NG-RAN node shall, if supported, use it for RAN part delay reporting.

If the *PDU Session Expected UE Activity Behaviour* IE is included in the *PDU Session Resources To Be Added List* IE or the *PDU Session Resources To Be Modified List* IE of the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall, if supported, use it for the concerned PDU session as specified in TS 23.501 [7].

If the M-NG-RAN node receives in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message within the *PDU Session Resource Modification Response Info – MN terminated* IE a DRBs Admitted to be Setup or Modified Item with DRB ID(s) that it has not requested to be setup or modified, the M-NG-RAN node shall ignore the contained information.

For each DRB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is included in the *DRBs Admitted List* IE in the *PDU Session Resource Setup Response Info – MN terminated* IE of the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from M-NG-RAN node to S-NG-RAN node through the GTP tunnels indicated by the *UP Transport Layer Information* IE.

For each DRB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is included in the *DRBs Admitted to be Setup or Modified List* IE in the *PDU Session Resource Modification Response Info – MN terminated* IE of the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from M-NG-RAN node to S-NG-RAN node through the GTP tunnels indicated by the *UP Transport Layer Information* IE.

For each DRB configured as SN-terminated split bearer/MCG bearer, if the *QoS Mapping Information* IE is included in the *DRBs To Be Modified List* IE in the *PDU Session Resource Modification Info – SN terminated* IE of the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from S-NG-RAN node to M-NG-RAN node through the GTP tunnels indicated by the *UP Transport Layer Information* IE.

If the *Security Indication* IE is included in the *PDU Session Resource Modification Info – SN terminated* IE of the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall, if supported, replace any existing security indication, and enable/disable ciphering or integrity protection as specified in TS 38.331 [10], for the concerned PDU session, and the S-NG-RAN node shall include the *Security Result* IE in the *PDU Session Resource Modification Response Info – SN terminated* IE. If either the S-NG-RAN node or the M-NG-RAN node is an ng-eNB, the S-NG-RAN node shall behave as specified in TS 33.501 [28].

If the *Target Node ID* IE is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall, if supported, include the *Direct Forwarding Path Availability* IE in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message if the direct forwarding path is available between the S-NG-RAN node and the indicated target node.

If for a given QoS Flow the *Source DL Forwarding IP Address* IE is included within the *Data Forwarding and Offloading Info from source NG-RAN node* IE in the *PDU Session Resource Setup Info – SN terminated* IE and/or in the *PDU Session Resource Modification Info – SN terminated* IE contained in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall, if supported, store this information and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

If for a given QoS Flow the *Source DL Forwarding IP Address* IE is included within the *QoS Flows Mapped To DRB List* IE in the *PDU Session Resource Setup Response Info – SN terminated* IE and/or in the *PDU Session Resource Modification Response Info – SN terminated* IE contained in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall, if supported, store this information and use it as part of its ACL functionality to identify source TNL address for data forwarding in case of subsequent handover preparation, if such ACL functionality is deployed.

Interactions with the S-NG-RAN node Reconfiguration Completion procedure:

If the S-NG-RAN node admits a modification of the UE context requiring the M-NG-RAN node to report about the success of the RRC connection reconfiguration procedure, the S-NG-RAN node shall start the timer $TX_{nDCoverall}$ when sending the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message to the M-NG-RAN node. The reception of the S-NG-RAN node RECONFIGURATION COMPLETE message shall stop the timer $TX_{nDCoverall}$.

Interaction with the Activity Notification procedure

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

Interaction with the Xn-U Address Indication procedure

For QoS flow mapped to DRBs configured with an SN terminated bearer option and removed from the SDAP in the S-NG-RAN node the S-NG-RAN node may provide data forwarding related information in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE within the *Data Forwarding and offloading Info from source NG-RAN node* IE, in which case the M-NG-RAN node may decide to provide data forwarding addresses to the S-NG-RAN node and trigger the Xn-U Address Indication procedure as specified in TS 37.340 [8].

For QoS flow offloading from the S-NG-RAN node to the M-NG-RAN, the S-NG-RAN node may provide the data forwarding related information in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE within the *Data Forwarding and offloading Info from source NG-RAN node* IE, in which case the M-NG-RAN node may decide to provide data forwarding addresses to the S-NG-RAN node and trigger the Xn-U Address Indication procedure as specified in TS 37.340 [8].

Interactions with the S-NG-RAN node initiated S-NG-RAN node Modification:

If the *SN triggered* IE set to "TRUE" is included in the S-NODE MODIFICATION REQUEST message, the S-NG-RAN node shall consider that the procedure has been initiated in response to the previously initiated S-NG-RAN node initiated S-NG-RAN node Modification procedure.

8.3.3.3 Unsuccessful Operation

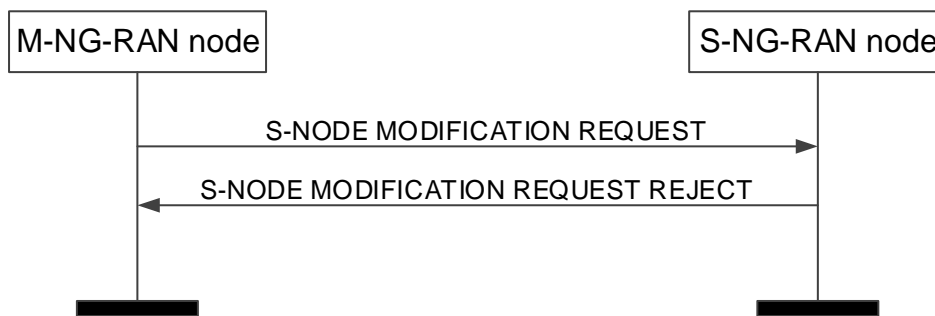


Figure 8.3.3.3-1: M-NG-RAN node initiated S-NG-RAN node Modification Preparation, unsuccessful operation

If the S-NG-RAN node does not admit any modification requested by the M-NG-RAN node, or a failure occurs during the M-NG-RAN node initiated S-NG-RAN node Modification Preparation, the S-NG-RAN node shall send the S-NODE MODIFICATION REQUEST REJECT message to the M-NG-RAN node. The message shall contain the *Cause* IE with an appropriate value.

If the S-NG-RAN node receives a S-NODE MODIFICATION REQUEST message containing the *M-NG-RAN node to S-NG-RAN node Container* IE that does not include required information as specified in TS 37.340 [8], the S-NG-RAN node shall send the S-NODE MODIFICATION REQUEST REJECT message to the M-NG-RAN node.

8.3.3.4 Abnormal Conditions

If the S-NG-RAN node receives an S-NODE MODIFICATION REQUEST message including a *PDU Session Resources To Be Added Item* IE, containing neither the *PDU Session Resource Setup Info – SN terminated* IE nor the *PDU Session Resource Setup Info – MN terminated* IE, the S-NG-RAN node shall fail the S-NG-RAN node Modification Preparation procedure indicating an appropriate cause.

If the S-NG-RAN node receives an S-NODE MODIFICATION REQUEST message including a *PDU Session Resources To Be Modified Item* IE, containing neither the *PDU Session Resource Modification Info – SN terminated* IE nor the *PDU Session Resource Modification Info – MN terminated* IE, the S-NG-RAN node shall fail the S-NG-RAN node Modification Preparation procedure indicating an appropriate cause.

If the S-NG-RAN node receives an S-NODE MODIFICATION REQUEST message containing multiple *PDU Session ID* IEs (in the *PDU Session Resources To Be Released List* IE) set to the same value, the S-NG-RAN node shall initiate the release of one corresponding PDU Session and ignore the duplication of the instances of the selected corresponding PDU Sessions.

If the supported algorithms for encryption defined in the *NR Encryption Algorithms* IE in the *NR UE Security Capabilities* IE in the *UE Context Information* IE, plus the mandated support of NEA0 in all UEs (TS 33.501 [58]), do not match any algorithms defined in the configured list of allowed encryption algorithms in the S-NG-RAN node (TS 33.501 [28]), the S-NG-RAN node shall reject the procedure using the S-NODE MODIFICATION REQUEST REJECT message.

If the supported algorithms for integrity defined in the *NR Integrity Protection Algorithms* IE in the *NR UE Security Capabilities* IE in the *UE Context Information* IE do not match any algorithms defined in the configured list of allowed integrity protection algorithms in the S-NG-RAN node (TS 33.501 [28]), the S-NG-RAN node shall reject the procedure using the S-NODE MODIFICATION REQUEST REJECT message.

If the timer $TX_{nD_{Cprep}}$ expires before the M-NG-RAN node has received the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall regard the M-NG-RAN node initiated S-NG-RAN node Modification Preparation procedure as being failed and shall release the UE Context at the S-NG-RAN node.

If the Lower Layer presence status change IE set to "re-establish lower layers" is included in the S-NODE MODIFICATION REQUEST message and was not set to "release lower layers" before, the S-NG-RAN node shall ignore the IE.

If the S-NG-RAN node receives an S-NODE MODIFICATION REQUEST message containing, for a PDU session, a *PDU Session Resource Setup Info – SN terminated* IE for which the *Split Session Indicator* IE is included and set to "split", the *Security Result* IE is not included, and either the *Integrity Protection Indication* IE or the *Confidentiality Protection Indication* IE is set to "preferred", it shall reject the PDU session.

Interactions with the S-NG-RAN node Reconfiguration Completion and S-NG-RAN node initiated S-NG-RAN node Release procedure:

If the timer $TX_{nD_{Coverall}}$ expires before the S-NG-RAN node has received the S-NODE RECONFIGURATION COMPLETE or the S-NODE RELEASE REQUEST message, the S-NG-RAN node shall regard the requested modification RRC connection reconfiguration as being not applied by the UE and shall trigger the S-NG-RAN node initiated S-NG-RAN node Release procedure.

Interaction with the S-NG-RAN node initiated S-NG-RAN node Modification Preparation procedure:

If the M-NG-RAN node, after having initiated the M-NG-RAN node initiated S-NG-RAN node Modification procedure, receives the S-NODE MODIFICATION REQUIRED message, the M-NG-RAN node shall refuse the S-NG-RAN node initiated S-NG-RAN node Modification procedure with an appropriate cause value in the *Cause* IE.

If the M-NG-RAN node has a Prepared S-NG-RAN node Modification and receives the S-NODE MODIFICATION REQUIRED message, the M-NG-RAN node shall respond with the S-NODE MODIFICATION REFUSE message to the S-NG-RAN node with an appropriate cause value in the *Cause* IE.

Interaction with the M-NG-RAN node initiated S-NG-RAN node Release procedure:

If the M-NG-RAN node receives an S-NODE MODIFICATION REQUEST ACKNOWLEDGE message including a *PDU Session Resources Admitted To Be Added Item* IE, containing neither the *PDU Session Resource Setup Response Info – SN terminated* IE nor the *PDU Session Resource Setup Response Info – MN terminated* IE, the M-NG-RAN node shall trigger the M-NG-RAN node initiated S-NG-RAN node Release procedure indicating an appropriate cause.

If the M-NG-RAN node receives an S-NODE MODIFICATION REQUEST ACKNOWLEDGE message including a *PDU Session Resources Admitted To Be Modified Item* IE, containing neither the *PDU Session Resource Modification Response Info – SN terminated* IE nor the *PDU Session Resource Modification Response Info – MN terminated* IE, the M-NG-RAN node shall trigger the M-NG-RAN node initiated S-NG-RAN node Release procedure indicating an appropriate cause.

If the timer $TX_{nD_{Cprep}}$ expires before the M-NG-RAN node has received the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message, the M-NG-RAN node shall regard the S-NG-RAN node Modification Preparation procedure as being failed and may trigger the M-NG-RAN node initiated S-NG-RAN node Release procedure.

8.3.4 S-NG-RAN node initiated S-NG-RAN node Modification

8.3.4.1 General

This procedure is used by the S-NG-RAN node to modify the UE context in the S-NG-RAN node.

The procedure uses UE-associated signalling.

8.3.4.2 Successful Operation

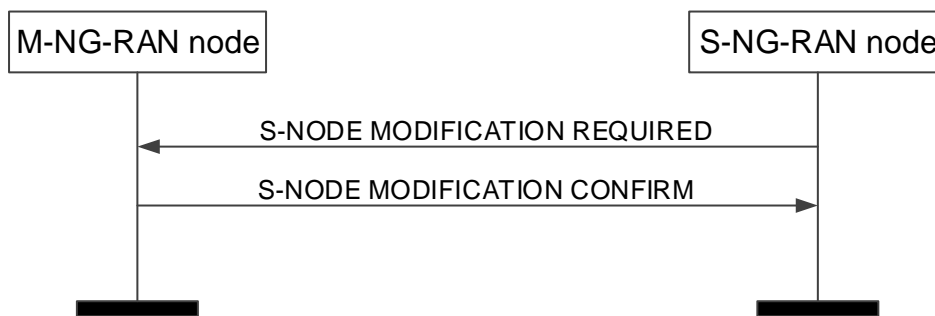


Figure 8.3.4.2-1: S-NG-RAN node initiated S-NG-RAN node Modification, successful operation.

The S-NG-RAN node initiates the procedure by sending the S-NODE MODIFICATION REQUIRED message to the M-NG-RAN node.

When the S-NG-RAN node sends the S-NODE MODIFICATION REQUIRED message, it shall start the timer $TX_{ND\text{Coverall}}$.

The S-NODE MODIFICATION REQUIRED message may contain

- the *S-NG-RAN node to M-NG-RAN node Container* IE.
- PDU session resources to be modified within the *PDU Session Resources To Be Modified Item* IE;
- PDU session resources to be released within the *PDU Session Resources To Be Released Item* IE;
- the *PDCP Change Indication* IE;
- the *Spare DRB IDs* IE;
- the *Required Number of DRB IDs* IE;
- the *QoS Flow Mapping Indication* IE;
- the *MR-DC Resource Coordination Information* IE.

If the M-NG-RAN node receives a S-NODE MODIFICATION REQUIRED message containing the *PDCP Change Indication* IE, the M-NG-RAN node shall act as specified in TS 37.340 [8].

If the S-NODE MODIFICATION REQUIRED message contains the *MR-DC Resource Coordination Information* IE, the M-NG-RAN node may use it for the purpose of resource coordination with the S-NG-RAN node. The M-NG-RAN node shall consider the value of the received *UL Coordination Information* IE valid until reception of a new update of the IE for the same UE. The M-NG-RAN node shall consider the value of the received *DL Coordination Information* IE valid until reception of a new update of the IE for the same UE. If the *E-UTRA Coordination Assistance Information* IE or the *NR Coordination Assistance Information* IE is contained in the *MR-DC Resource Coordination Information* IE, the M-NG-RAN node shall, if supported, use the information to determine further coordination of resource utilisation between the M-NG-RAN node and the S-NG-RAN node.

If the M-NG-RAN node receives an S-NODE MODIFICATION REQUIRED message containing the *Spare DRB IDs* IE, the M-NG-RAN node may take those into consideration to be used for MN-terminated bearers.

If the M-NG-RAN node receives an S-NODE MODIFICATION REQUIRED message containing the *Required Number of DRB IDs* IE, the M-NG-RAN node shall provide new DRB IDs to be used by the S-NG-RAN node for SN-

terminated bearers, if such DRB IDs are available, in the *Additional DRB IDs* IE included in the S-NODE MODIFICATION CONFIRM message.

If the M-NG-RAN node is able to perform the modifications requested by the S-NG-RAN node, the M-NG-RAN node shall send the S-NODE MODIFICATION CONFIRM message to the S-NG-RAN node. The S-NODE MODIFICATION CONFIRM message may contain the *M-NG-RAN node to S-NG-RAN node Container* IE.

If the *PDCP Duplication Configuration* IE in the *PDU Session Resource Modification Required Info – SN terminated* IE is contained in the S-NODE MODIFICATION REQUIRED message and set to "configured", the M-NG-RAN node shall, if supported, add the RLC entity of secondary path and the RLC entity of all additional path(s) for the indicated DRB. And if the S-NODE MODIFICATION REQUIRED message contains the *Duplication Activation* IE, the M-NG-RAN node shall, if supported, store this information and use it for the purpose of PDCP duplication.

If the S-NODE MODIFICATION REQUIRED message contains the *RLC Duplication Information* IE, the S-NG-RAN node shall, if supported, store this information and use it for the purpose of PDCP duplication for the indicated DRB with more than two RLC entities.

If the *PDCP Duplication Configuration* IE in the *PDU Session Resource Modification Required Info – SN terminated* IE is contained in the S-NODE MODIFICATION REQUIRED message and set to "de-configured", the M-NG-RAN node shall, if supported, delete the RLC entity of secondary path and the RLC entity of all additional path(s) for the indicated DRB.

The S-NG-RAN node may include for each DRB in the *DRBs To Be Modified List* IE in the S-NODE MODIFICATION REQUIRED message the *RLC Status* IE to indicate that RLC has been reestablished at the S-NG-RAN node and the M-NG-RAN node may trigger PDCP data recovery.

If the S-NODE MODIFICATION REQUIRED message contains the *QoS flows To Be Released List* within the *PDU Session Resource Modification Info – SN terminated* IE, the S-NG-RAN node may also propose to apply forwarding of UL data for which in-order delivery is requested by including the *UL Forwarding Proposal* IE in the *Data Forwarding and Offloading Info from source NG-RAN node* IE within the *PDU Session Resource Modification Required Info – SN terminated* IE of the S-NODE MODIFICATION REQUIRED message. The M-NG-RAN node may include the *PDU Session Level UL Data Forwarding UP TNL Information* IE in the *Data Forwarding Info from target NG-RAN node* IE within the *PDU Session Resource Modification Confirm Info – SN terminated* IE of the S-NODE MODIFICATION CONFIRM message to indicate that it accepts the proposed forwarding.

Upon reception of the S-NODE MODIFICATION CONFIRM message the S-NG-RAN node shall stop the timer $TX_{ND}Coverall$.

If the S-NODE MODIFICATION CONFIRM message contains the *MR-DC Resource Coordination Information* IE, the S-NG-RAN node should forward it to lower layers and it may use it for the purpose of resource coordination with the M-NG-RAN node, or to coordinate with sidelink resources used in the M-NG-RAN node. The S-NG-RAN node shall consider the value of the received *UL Coordination Information* IE valid until reception of a new update of the IE for the same UE. The S-NG-RAN node shall consider the value of the received *DL Coordination Information* IE valid until reception of a new update of the IE for the same UE. If the *E-UTRA Coordination Assistance Information* IE or the *NR Coordination Assistance Information* IE is contained in the *MR-DC Resource Coordination Information* IE, the S-NG-RAN node shall, if supported, use the information to determine further coordination of resource utilisation between the S-NG-RAN node and the M-NG-RAN node.

If the S-NODE MODIFICATION REQUIRED message contains a PDU session resource to be released which is configured with the SCG bearer option within the *PDU sessions to be released List – SN terminated* IE, the S-NG-RAN node shall include the *RLC Mode* IE within the *DRBs To Be Released List* IE in the *PDU Session to be released List – SN terminated* IE in the S-NODE MODIFICATION REQUIRED message. The *RLC Mode* IE indicates the RLC mode used in the S-NG-RAN node for the DRB.

If the *Location Information at S-NODE* IE is included in the S-NODE MODIFICATION REQUIRED, the M-NG-RAN node shall store the included information so that it may be transferred towards the AMF.

If the *QoS Flows Mapped To DRB List* IE is included in the S-NODE MODIFICATION REQUIRED message for a DRB to be modified, the M-NG-RAN node shall replace any existing QoS flow mapping for that DRB with the one received.

If the S-NG-RAN node applied a full configuration or delta configuration, e.g., as part of mobility procedure involving a change of DU, the S-NG-RAN node shall inform the M-NG-RAN node by including the *RRC config indication* IE in the S-NODE MODIFICATION REQUIRED message.

If the S-NODE MODIFICATION CONFIRM message includes the *DRB IDs taken into use* IE, the S-NG-RAN node shall, if applicable, act as specified in TS 37.340 [8]

If the *SCG Indicator* IE is contained in the S-NODE MODIFICATION REQUIRED message and it is set to "released", the M-NG-RAN node shall, if supported, deduce that the SCG is removed.

For each DRB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is included in the *DRBs To Be Modified List* IE in the *PDU Session Resource Modification Required Info – MN terminated* IE of the S-NODE MODIFICATION REQUIRED message, the M-NG-RAN node shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from M-NG-RAN node to S-NG-RAN node through the GTP tunnels indicated by the *UP Transport Layer Information* IE.

For each DRB configured as SN-terminated split bearer/MCG bearer, if the *QoS Mapping Information* IE is included in the *DRBs Admitted to be Setup or Modified List* IE in the *PDU Session Resource Modification Confirm Info – SN terminated* IE of the S-NODE MODIFICATION CONFIRM message, the S-NG-RAN node shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from S-NG-RAN node to M-NG-RAN node through the GTP tunnels indicated by the *UP Transport Layer Information* IE.

If the S-NG-RAN node receives in the S-NODE MODIFICATION CONFIRM message within the *PDU Session Resource Modification Confirm Info – SN terminated* IE a *DRBs Admitted to be Setup or Modified Item* IE with DRB ID(s) that it has not requested to be setup or modified, the S-NG-RAN node shall ignore the contained information.

Interaction with the M-NG-RAN node initiated S-NG-RAN node Modification Preparation procedure:

If applicable, as specified in TS 37.340 [8], the S-NG-RAN node may receive, after having initiated the S-NG-RAN node initiated S-NG-RAN node Modification procedure, the S-NODE MODIFICATION REQUEST message including the *measGapConfig* IE as defined in TS 38.331 [10] within the *M-NG-RAN node to S-NG-RAN node Container* IE.

If applicable, the S-NG-RAN node may receive, after having initiated the S-NG-RAN node initiated S-NG-RAN node Modification procedure, the S-NODE MODIFICATION REQUEST message including the *SN triggered* IE.

8.3.4.3 Unsuccessful Operation

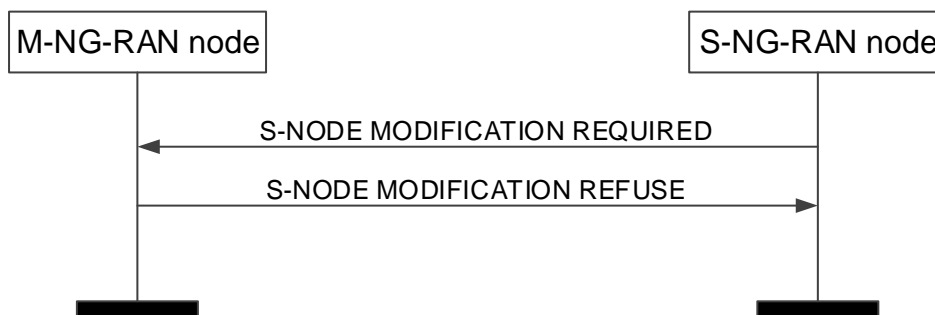


Figure 8.3.4.3-1: S-NG-RAN node initiated S-NG-RAN node Modification, unsuccessful operation.

In case the requested modification cannot be performed successfully the M-NG-RAN node shall respond with the S-NODE MODIFICATION REFUSE message to the S-NG-RAN node with an appropriate cause value in the *Cause* IE.

In case that the *Required Number of DRB IDs* IE was included in the S-NODE MODIFICATION REQUIRED message and if the M-NG-RAN node is not able to provide additional DRB IDs, the M-NG-RAN node shall respond with the S-NODE MODIFICATION REFUSE with an appropriate cause value in the *Cause* IE.

The M-NG-RAN node may also provide configuration information in the *M-NG-RAN node to S-NG-RAN node Container* IE.

8.3.4.4 Abnormal Conditions

If the M-NG-RAN node receives an S-NODE MODIFICATION REQUIRED message including a *PDU Session Resources To Be Modified Item* IE, containing neither the *PDU Session Resource Modification Required Info – SN*

terminated IE nor the *PDU Session Resource Modification Required Info – MN terminated* IE, the M-NG-RAN node shall fail the S-NG-RAN node initiated S-NG-RAN node Modification procedure indicating an appropriate cause.

If the timer $TX_{nDCoverall}$ expires before the S-NG-RAN node has received the S-NODE MODIFICATION CONFIRM or the S-NODE MODIFICATION REFUSE message, the S-NG-RAN node shall regard the requested modification as failed and may take further actions like triggering the S-NG-RAN node initiated S-NG-RAN node Release procedure to release all S-NG-RAN node resources allocated for the UE.

If the value received in the *PDU Session ID* IE of any of the *PDU Sessions Resources To Be Released Items* IE is not known at the M-NG-RAN node, the M-NG-RAN node shall regard the procedure as failed and may take appropriate actions like triggering the M-NG-RAN node initiated S-NG-RAN node Release procedure.

Interaction with the S-NG-RAN node initiated S-NG-RAN node Release procedure:

If the S-NG-RAN node receives an S-NODE MODIFICATION CONFIRM message including a *PDU Session Resources Admitted To Be Modified Item* IE, containing neither the *PDU Session Resource Modification Confirm Info – SN terminated* IE nor the *PDU Session Resource Modification Confirm Info – MN terminated* IE, the S-NG-RAN node shall trigger the S-NG-RAN node initiated S-NG-RAN node Release procedure indicating an appropriate cause.

Interaction with the M-NG-RAN node initiated S-NG-RAN node Modification Preparation procedure:

If the S-NG-RAN node, after having initiated the S-NG-RAN node initiated S-NG-RAN node Modification procedure, receives the S-NODE MODIFICATION REQUEST message including other IEs than an applicable *S-NG-RAN node Security Key* IE and/or LCID applicable for PDCP duplication and/or the *SN triggered* IE set to "TRUE", the S-NG-RAN node shall

- regard the S-NG-RAN node initiated S-NG-RAN node Modification Procedure as being failed;
- stop the $TX_{nDCoverall}$, which was started to supervise the S-NG-RAN node initiated S-NG-RAN node Modification procedure;
- be prepared to receive the S-NODE MODIFICATION REFUSE message from the M-NG-RAN node and;
- continue with the M-NG-RAN node initiated S-NG-RAN node Modification Preparation procedure as specified in section 8.3.

Interaction with the M-NG-RAN node initiated handover procedure:

If the M-NG-RAN node, after having initiated the handover procedure, receives the S-NODE MODIFICATION REQUIRED message, the M-NG-RAN node shall refuse the S-NG-RAN node modification procedure with an appropriate cause value in the *Cause* IE.

8.3.5 S-NG-RAN node initiated S-NG-RAN node Change

8.3.5.1 General

This procedure is used by the S-NG-RAN node to trigger the change of the S-NG-RAN node.

The procedure uses UE-associated signalling.

8.3.5.2 Successful Operation

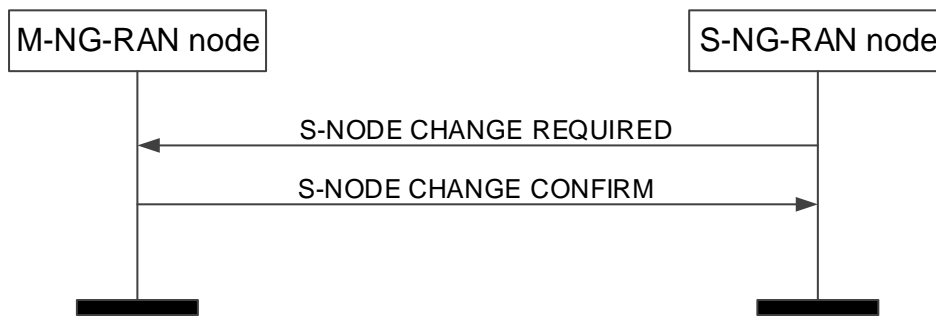


Figure 8.3.5.2-1: S-NG-RAN node initiated S-NG-RAN node Change, successful operation.

The S-NG-RAN node initiates the procedure by sending the S-NODE CHANGE REQUIRED message to the M-NG-RAN node including the *Target S-NG-RAN node ID* IE. When the S-NG-RAN node sends the S-NODE CHANGE REQUIRED message, it shall start the timer $TX_{nD}Coverall$.

The S-NODE CHANGE REQUIRED message may contain

- the *S-NG-RAN node to S-NG-RAN node Container* IE.

If the M-NG-RAN node is able to perform the change requested by the S-NG-RAN node, the M-NG-RAN node shall send the S-NODE CHANGE CONFIRM message to the S-NG-RAN node. For DRBs configured with the PDCP entity in the S-NG-RAN node, the M-NG-RAN node may include data forwarding related information in the *Data Forwarding Info from target NG-RAN node* IE.

If the S-NODE CHANGE CONFIRM message includes the *DRB IDs taken into use* IE, the S-NG-RAN node shall, if applicable, act as specified in TS 37.340 [8].

The S-NG-RAN node may start data forwarding and stop providing user data to the UE and shall stop the timer $TX_{nD}Coverall$ upon reception of the S-NODE CHANGE CONFIRM message.

8.3.5.3 Unsuccessful Operation

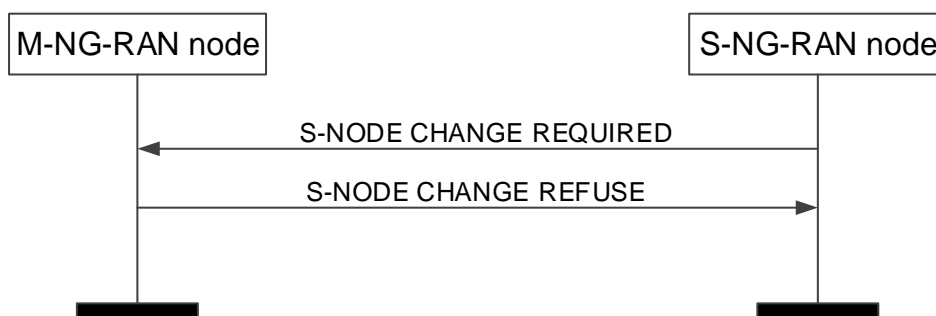


Figure 8.3.5.3-1: S-NG-RAN node initiated S-NG-RAN node Change, unsuccessful operation.

In case the request modification cannot accept the request to change the S-NG-RAN node the M-NG-RAN node shall respond with the S-NODE CHANGE REFUSE message to the S-NG-RAN node with an appropriate cause value in the *Cause* IE.

8.3.5.4 Abnormal Conditions

If the timer $TX_{nD}Coverall$ expires before the S-NG-RAN node has received the S-NODE CHANGE CONFIRM or the S-NODE CHANGE REFUSE message, the S-NG-RAN node shall regard the requested change as failed and may take further actions like triggering the S-NG-RAN node initiated S-NG-RAN node Release procedure to release all S-NG-RAN node resources allocated for the UE.

If the M-NG-RAN node receives an S-NODE CHANGE REQUIRED message including a *PDU Session SN Change Required Item IE*, not containing the *PDU Session Resource Change Required Info – SN terminated IE*, the M-NG-RAN node shall fail the S-NG-RAN node initiated S-NG-RAN node Change procedure indicating an appropriate cause.

Interaction with the M-NG-RAN node initiated Handover Preparation procedure:

If the M-NG-RAN node, after having initiated the Handover Preparation procedure, receives the S-NODE CHANGE REQUIRED message, the M-NG-RAN node shall refuse the S-NG-RAN node initiated S-NG-RAN node Change procedure with an appropriate cause value in the *Cause IE*.

Interaction with the S-NG-RAN node initiated S-NG-RAN node Release procedure:

If the S-NG-RAN node receives an S-NODE CHANGE CONFIRM message including a *PDU Session SN Change Confirm Item IE*, not containing the *PDU Session Resource Change Confirm Info – SN terminated IE*, the S-NG-RAN node shall trigger the S-NG-RAN node initiated S-NG-RAN node Release procedure indicating an appropriate cause.

8.3.6 M-NG-RAN node initiated S-NG-RAN node Release

8.3.6.1 General

The M-NG-RAN node initiated S-NG-RAN node Release procedure is triggered by the M-NG-RAN node to initiate the release of the resources for a specific UE.

The procedure uses UE-associated signalling.

8.3.6.2 Successful Operation

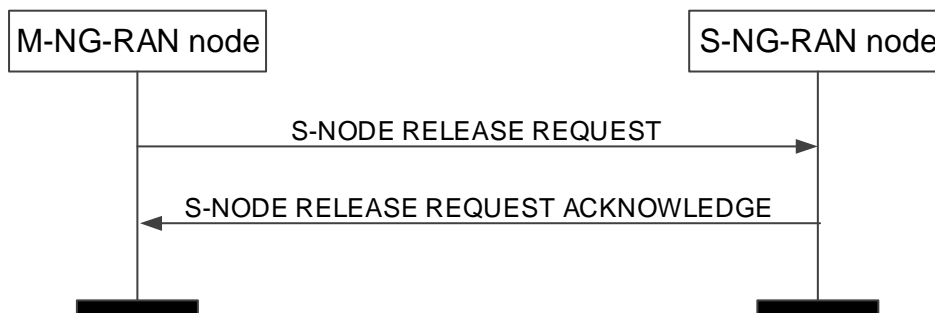


Figure 8.3.6.2-1: M-NG-RAN node initiated S-NG-RAN node Release, successful operation

The M-NG-RAN node initiates the procedure by sending the S-NODE RELEASE REQUEST message. Upon reception of the S-NODE RELEASE REQUEST message the S-NG-RAN node shall stop providing user data to the UE.

The *S-NG-RAN node UE XnAP ID IE* shall be included if it has been obtained from the S-NG-RAN node. The M-NG-RAN node shall provide appropriate information within the *Cause IE*. The M-NG-RAN node may also provide appropriate information per PDU session resource within the *Cause IE* of the *PDU Session Resources To Be Released List IE*.

Upon reception of the S-NODE RELEASE REQUEST message containing *UE Context Kept Indicator IE* set to "True", the S-NG-RAN node shall, if supported, only initiate the release of the resources related to the UE-associated signalling connection between the M-NG-RAN node and the S-NG-RAN node.

If the S-NG-RAN node confirms the request to release S-NG-RAN node resources, it shall send the S-NODE RELEASE REQUEST ACKNOWLEDGE message to the M-NG-RAN node.

If the S-NODE RELEASE REQUEST message contains a PDU session resource to be released which is configured with the SCG bearer option within the *PDU Session Resources To Be Released List IE*, the S-NG-RAN node shall include the *RLC Mode IE* within the *DRBs To Be Released List IE* in the S-NODE RELEASE REQUEST ACKNOWLEDGE message. The *RLC Mode IE* indicates the RLC mode used in the S-NG-RAN node for the DRB.

Interaction with the Xn-U Address Indication procedure

If the S-NG-RAN node provides data forwarding related information in the S-NODE RELEASE REQUEST ACKNOWLEDGE message for QoS flows mapped to DRBs configured with an SN terminated bearer option in the *PDU Sessions To Be Released List - SN terminated* IE, the M-NG-RAN node may decide to provide data forwarding addresses to the S-NG-RAN node and trigger the Xn-U Address Indication procedure as specified in TS 37.340 [8].

Interaction with the SN Status Transfer procedure

If the *UE Context Kept Indicator* IE set to "True" and the *DRBs transferred to MN* IE are included in the S-NODE RELEASE REQUEST message, the S-NG-RAN node shall, if supported, provide the uplink/downlink PDCP SN and HFN status for the listed DRBs, as specified in TS 37.340 [8].

8.3.6.3 Unsuccessful Operation

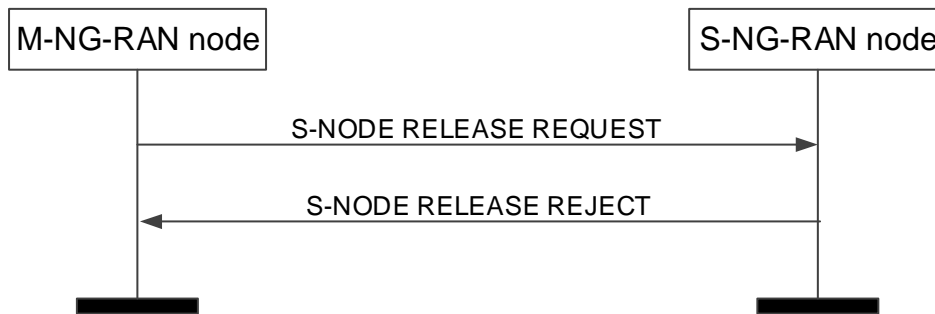


Figure 8.3.6.3-1: M-NG-RAN node initiated S-NG-RAN node Release, unsuccessful operation

If the S-NG-RAN node cannot confirm the request to release S-NG-RAN node resources, it shall send the S-NODE RELEASE REJECT message to the M-NG-RAN node with an appropriate cause indicated in the *Cause* IE.

8.3.6.4 Abnormal Conditions

If the S-NODE RELEASE REQUEST message refer to a context that does not exist, the S-NG-RAN node shall ignore the message.

When the M-NG-RAN node has initiated the procedure and did not include the *S-NG-RAN node UE XnAP ID* IE the M-NG-RAN node shall regard the resources for the UE at the S-NG-RAN node as being fully released.

Interactions with the UE Context Release procedure:

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

8.3.7 S-NG-RAN node initiated S-NG-RAN node Release

8.3.7.1 General

This procedure is triggered by the S-NG-RAN node to initiate the release of the resources for a specific UE.

The procedure uses UE-associated signalling.

8.3.7.2 Successful Operation

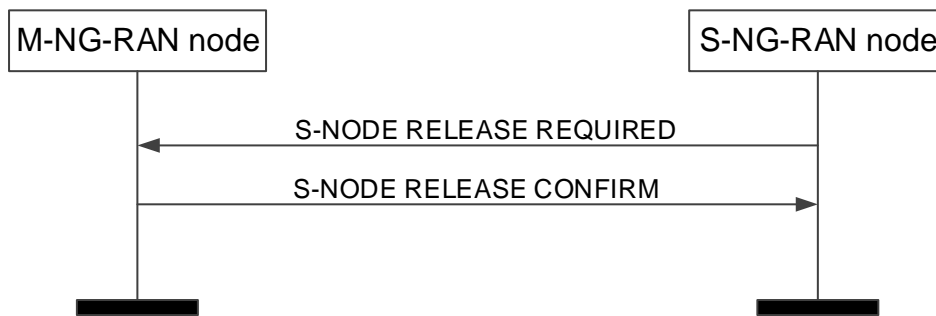


Figure 8.3.7.2-1: S-NG-RAN node initiated S-NG-RAN node Release, successful operation.

The S-NG-RAN node initiates the procedure by sending the S-NODE RELEASE REQUIRED message to the M-NG-RAN node.

Upon reception of the S-NODE RELEASE REQUIRED message, the M-NG-RAN node replies with the S-NODE RELEASE CONFIRM message.

For each SN-terminated PDU session resource, the M-NG-RAN node may include the *DL Forwarding UP Address IE* and the *UL Forwarding UP Address IE* within the *PDU Session Resources To Be Released Item IE* to indicate that it requests data forwarding of uplink and downlink packets to be performed for that bearer.

The S-NG-RAN node may start data forwarding and stop providing user data to the UE upon reception of the S-NODE RELEASE CONFIRM message,

If the S-NODE RELEASE REQUIRED message contains an PDU session resource to be released which is configured with the SCG bearer option within the *PDU sessions to be released List – SN terminated IE*, the S-NG-RAN node shall include the *RLC Mode IE* within the *DRBs To Be Released List IE* in the *PDU Session to be released List – SN terminated IE* in the S-NODE RELEASE REQUIRED message. The *RLC Mode IE* indicates the RLC mode used in the S-NG-RAN node for the DRB.

If the S-NODE RELEASE CONFIRM message includes the *DRB IDs taken into use IE*, the S-NG-RAN node shall, if applicable, act as specified in TS 37.340 [8].

If the *S-NG-RAN node to M-NG-RAN node Container IE* is included in the S-NODE RELEASE REQUIRED message, the M-NG-RAN node may use the contained information to apply delta configuration.

8.3.7.3 Unsuccessful Operation

Not applicable.

8.3.7.4 Abnormal Conditions

Void.

8.3.8 S-NG-RAN node Counter Check

8.3.8.1 General

This procedure is initiated by the S-NG-RAN node to request the M-NG-RAN node to execute a counter check procedure to verify the value of the PDCP COUNTs associated with SCG bearers established in the S-NG-RAN node.

The procedure uses UE-associated signalling.

8.3.8.2 Successful Operation

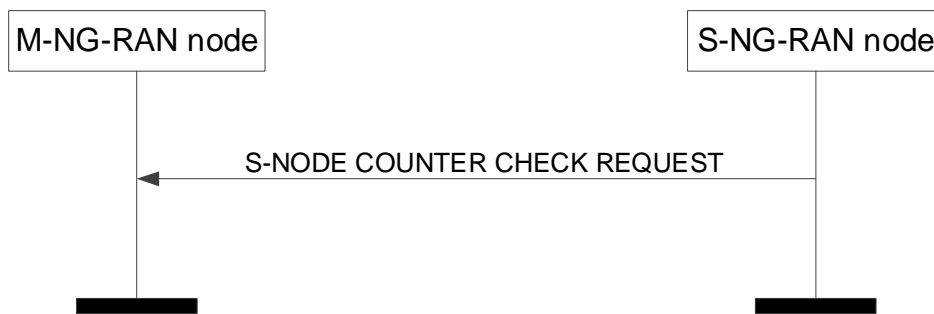


Figure 8.3.8.2-1: S-NG-RAN node Counter Check procedure, successful operation.

The S-NG-RAN node initiates the procedure by sending the S-NODE COUNTER CHECK REQUEST message to the M-NG-RAN node.

Upon reception of the S-NODE COUNTER CHECK REQUEST message, the M-NG-RAN node may perform the RRC counter check procedure as specified in TS 33.401 [29] and 33.501 [28].

8.3.8.3 Unsuccessful Operation

Not applicable.

8.3.8.4 Abnormal Conditions

Void.

8.3.9 RRC Transfer

8.3.9.1 General

The purpose of the RRC Transfer procedure is to deliver a PDCP-C PDU encapsulating an LTE RRC message or NR RRC message to the S-NG-RAN-NODE that it may then be forwarded to the UE, or from the S-NG-RAN-NODE, if it was received from the UE. The delivery status may also be provided from the S-NG-RAN-NODE to the M-NG-RAN-NODE using the RRC Transfer.

The procedure is also used to enable transfer one of the following messages from the M-NG-RAN-NODE to the S-NG-RAN-NODE, when received from the UE:

- the NR RRC message container with the NR measurements;
- the E-UTRA RRC message container with the E-UTRA measurements;
- the NR RRC message container with the NR failure information;
- the NR RRC message container with the *RRCReconfigurationComplete* message;
- the NR RRC message container with the UE assistance information.

The procedure uses UE-associated signalling.

8.3.9.2 Successful Operation

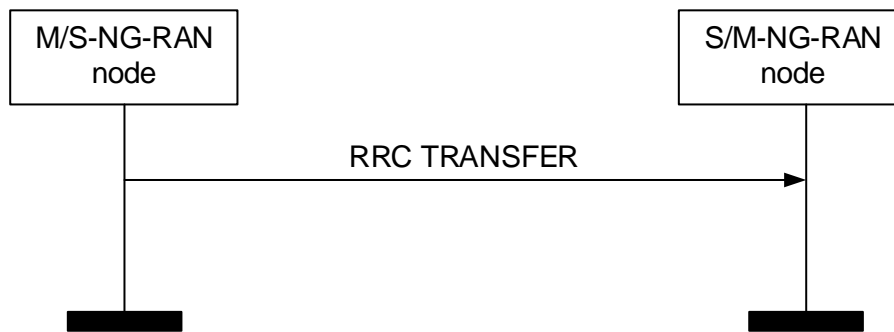


Figure 8.3.9.2-1: RRC Transfer procedure, successful operation.

The M-NG-RAN-NODE initiates the procedure by sending the RRC TRANSFER message to the S-NG-RAN-NODE or the S-NG-RAN-NODE initiates the procedure by sending the RRC TRANSFER message to the M-NG-RAN-NODE.

If the S-NG-RAN-NODE receives an RRC TRANSFER message which does not include the *RRC Container IE* in the *Split SRB IE*, or the *RRC Container IE* in the *NR UE Report IE*, or the *RRC Container IE* in the *Fast MCG Recovery via SRB3 from MN to SN IE*, or the *RRC Container IE* in the *Fast MCG Recovery via SRB3 from SN to MN IE*, it shall ignore the message. If the S-NG-RAN-NODE receives an RRC TRANSFER message with the *Delivery Status IE* in the *Split SRB IE*, it shall ignore the message. If the S-NG-RAN-NODE receives the *RRC Container IE* in the *Split SRB IE*, it shall deliver the contained PDCP-C PDU encapsulating an RRC message to the UE. If the S-NG-RAN-NODE receives the *RRC Container IE* in the *Fast MCG Recovery via SRB3 from MN to SN IE*, the S-NG-RAN-NODE shall deliver the contained RRC container encapsulating an RRC message to the UE.

If the M-NG-RAN-NODE receives the *Delivery Status IE* in the *Split SRB IE*, the M-NG-RAN-NODE shall consider RRC messages up to the indicated NR PDCP SN as having been successfully delivered to UE by S-NG-RAN-NODE. If the M-NG-RAN-NODE receives the *RRC Container IE* in the *Fast MCG Recovery via SRB3 from SN to MN IE*, the M-NG-RAN-NODE shall consider MCG link failure detected at the UE as specified in TS 37.340 [8].

8.3.9.3 Unsuccessful Operation

Not applicable.

8.3.9.4 Abnormal Conditions

In case of the split SRBs, the receiving node may ignore the message, if the M-NG-RAN-NODE has not indicated possibility of RRC transfer at the bearer setup.

8.3.10 Notification Control Indication

8.3.10.1 General

The purpose of the Notification Control indication procedure is to provide information that for already established GBR QoS flow(s) for which notification control has been requested, the NG-RAN node involved in Dual Connectivity cannot fulfil the GFBR anymore or that it can fulfil the GFBR again.

The procedure uses UE-associated signalling.

8.3.10.2 Successful Operation – M-NG-RAN node initiated



Figure 8.3.10.2-1: Notification Control Indication procedure, M-NG-RAN node initiated, successful operation.

The M-NG-RAN node initiates the procedure by sending the NOTIFICATION CONTROL INDICATION message to the S-NG-RAN node.

This procedure is triggered to notify the S-NG-RAN node for SN-terminated bearers, that resources requested from the M-NG-RAN node can either not fulfil the GFBR anymore or that the GFBR can be fulfilled again, as specified in TS 37.340 [8]. For a QoS flow indicated as not fulfilled anymore the M-NG-RAN node may also indicate an alternative QoS parameter set which it can currently fulfil in the *Current QoS Parameters Set Index* IE.

8.3.10.3 Successful Operation – S-NG-RAN node initiated



Figure 8.3.10.3-1: Notification Control Indication procedure, S-NG-RAN node initiated, successful operation.

The S-NG-RAN node initiates the procedure by sending the NOTIFICATION CONTROL INDICATION message to the M-NG-RAN node.

This procedure is triggered to notify the M-NG-RAN node that for MN-terminated bearers resources requested from the S-NG-RAN node can either not fulfil the GFBR anymore or that the GFBR can be fulfilled again, as specified in TS 37.340 [8]. For a QoS flow indicated as not fulfilled anymore the S-NG-RAN node may also indicate an alternative QoS parameters set which it can currently fulfil in the *Current QoS Parameters Set Index* IE.

This procedure is triggered to notify the M-NG-RAN node that resources requested for SN-terminated bearers can either not fulfil the GFBR anymore or that the GFBR can be fulfilled again, as specified in TS 37.340 [8]. For a QoS flow indicated as not fulfilled anymore the S-NG-RAN node may also indicate an alternative QoS parameters set which it can currently fulfil in the *Current QoS Parameters Set Index* IE.

8.3.10.4 Abnormal Conditions

Void.

8.3.11 Activity Notification

8.3.11.1 General

The purpose of the Activity Notification procedure is to allow an NG-RAN node to send notification to another NG-RAN node concerning:

- user data traffic activity for the UE, or
- user data traffic activity of already established QoS flows or PDU sessions, or
- RAN Paging failure.

The procedure uses UE-associated signalling.

8.3.11.2 Successful Operation

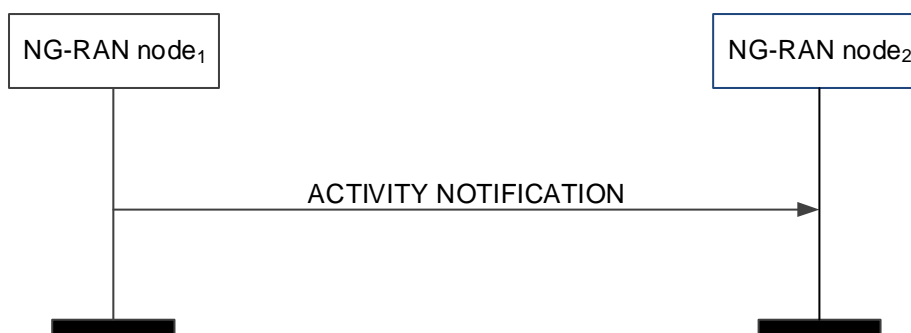


Figure 8.3.11.2-1: Activity Notification

NG-RAN node₁ initiates the procedure by sending the ACTIVITY NOTIFICATION message to NG-RAN node₂.

The ACTIVITY NOTIFICATION message may contain one or more of the below:

- notification for UE context level user plane activity in the *UE Context level user plane activity report IE*.
- notification of user plane activity for the already established PDU sessions within the *PDU Session Resource Activity Notify List IE*.
- notification of user plane activity for the already established QoS flows within the *PDU Session Resource Activity Notify List IE*.
- notification of RAN Paging failure.

If the ACTIVITY NOTIFICATION message contains the *RAN Paging Failure IE*, NG-RAN node₂ shall consider that RAN Paging has failed in NG-RAN node₁ for the UE. NG-RAN node₂ may discard the user plane data for that UE and consider that the UE context is unchanged.

NOTE: As specified in TS 37.340 [8], in case of user data activity notification, NG-RAN node₁ acts as a Secondary Node, while in case of RAN Paging failure indication, NG-RAN node₁ acts as a Master Node.

8.3.11.3 Abnormal Conditions

If the *User Plane traffic activity report IE* for a reporting object is reported by NG-RAN node₁ as "re-activated" and the reporting object was not reported as "inactive", the report for the concerned reporting object shall be ignored by NG-RAN node₂.

8.3.12 E-UTRA – NR Cell Resource Coordination

8.3.12.1 General

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

The procedure uses non-UE-associated signalling.

8.3.12.2 Successful Operation

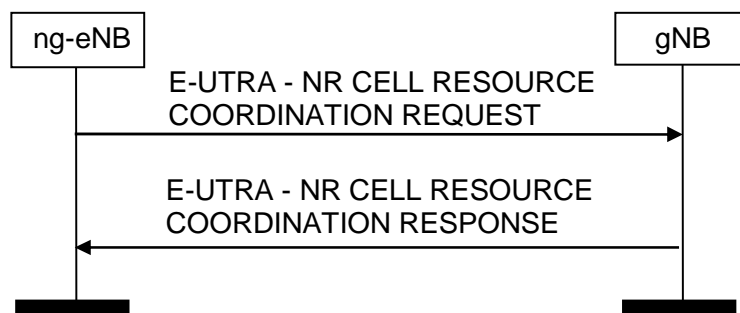


Figure 8.3.12.2-1: ng-eNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation

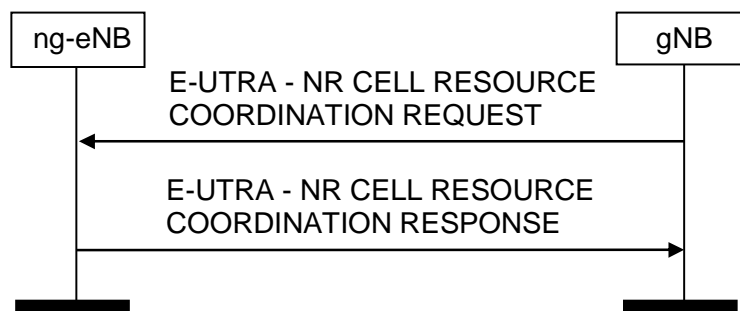


Figure 8.3.12.2-2: gNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message and the E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

ng-eNB initiated E-UTRA – NR Cell Resource Coordination:

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

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

gNB initiated E-UTRA – NR Cell Resource Coordination:

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

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

8.3.13 Secondary RAT Data Usage Report

8.3.13.1 General

This procedure is initiated by the S-NG-RAN node to provide information on the used resources of the secondary RAT (e.g. NR resources during MR-DC operation) as specified in TS 23.501 [7].

The procedure uses UE-associated signalling.

8.3.13.2 Successful Operation

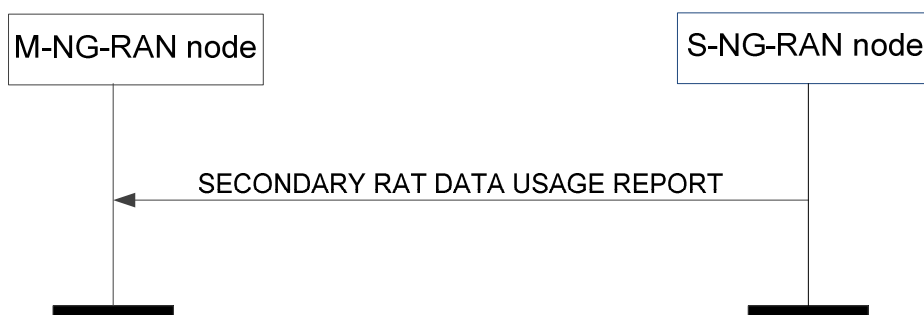


Figure 8.3.13.2-1: Secondary RAT Data Usage Report procedure, successful operation.

The S-NG-RAN node initiates the procedure by sending the SECONDARY RAT DATA USAGE REPORT message to the M-NG-RAN node.

8.3.13.3 Unsuccessful Operation

Not applicable.

8.3.13.4 Abnormal Conditions

Not applicable.

8.3.14 Trace Start

8.3.14.1 General

The purpose of the Trace Start procedure is to allow the M-NG-RAN node to request the S-NG-RAN node to initiate a trace session for a UE. The procedure uses UE-associated signalling.

8.3.14.2 Successful Operation



Figure 8.3.14.2-1: Trace Start, successful operation

The Trace Start procedure is initiated by the M-NG-RAN sending the TRACE START message to the S-NG-RAN for that specific UE. Upon reception of the TRACE START message, the S-NG-RAN shall initiate the requested trace session as described in TS 32.422 [23].

If the *Trace Activation IE* includes

- the *MDT Activation IE* set to "Immediate MDT and Trace", and if the S-NG-RAN node is a gNB, it shall, if supported, initiate the requested trace session and MDT session as described in TS 32.422[23].
- the *MDT Activation IE* set to "Immediate MDT Only" or "Logged MDT only", and if the S-NG-RAN node is a gNB, it shall, if supported, initiate the requested MDT session as described in TS 32.422[23] and the S-NG-RAN node shall ignore the *Interfaces To Trace IE* and the *Trace Depth IE*.
- the *MDT Location Information IE*, within the *MDT Configuration IE*, and if the S-NG-RAN node is a gNB, it shall, if supported, store this information and take it into account in the requested MDT session.
- the *MDT Activation IE* set to "Immediate MDT Only" or "Logged MDT only", and if the *Signalling based MDT PLMN List IE* is included in the *MDT Configuration IE*, and if the S-NG-RAN node is gNB, it may use it to propagate the MDT Configuration as described in TS 37.320 [43].
- the *Bluetooth Measurement Configuration IE*, within the *MDT Configuration IE*, and if the S-NG-RAN node is a gNB, it shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [43].
- the *WLAN Measurement Configuration IE*, within the *MDT Configuration IE*, and if the S-NG-RAN node is a gNB, it shall, if supported, take it into account for MDT Configuration as described in TS 37.320 [43].
- the *Sensor Measurement Configuration IE*, within the *MDT Configuration IE*, the S-NG-RAN node shall take it into account for MDT Configuration as described in TS 37.320 [43].
- the *MDT Configuration IE*, and if the S-NG-RAN Node is a gNB at least the *MDT Configuration-NR IE* shall be present, while if the S-NG-RAN Node is an ng-eNB at least the *MDT Configuration-EUTRA IE* shall be present.

If the *Area Scope IE* is not present in the *MDT Configuration IE*, the S-NG-RAN node shall consider that the MDT Configuration is applied to all PLMNs indicated in the MDT PLMN List, as described in TS 32.422 [23].

8.3.14.3 Abnormal Conditions

If the *Trace Activation IE* is not included in the TRACE START message, the S-NG-RAN node shall ignore the message.

8.3.15 Deactivate Trace

8.3.15.1 General

The purpose of the Deactivate Trace procedure is to allow the M-NG-RAN node to request the S-NG-RAN node to stop the trace session for the indicated trace reference. The procedure uses UE-associated signalling.

8.3.15.2 Successful Operation



Figure 8.3.15.2-1: Deactivate Trace, successful operation

The Deactivate Trace procedure is initiated by the M-NG-RAN by sending the DEACTIVATE TRACE to the S-NG-RAN for that specific UE. Upon reception of the DEACTIVATE TRACE message, the S-NG-RAN shall stop the trace session for the indicated trace reference in the *NG-RAN Trace ID IE*.

8.3.15.3 Abnormal Conditions

Void.

8.4 Global procedures

8.4.1 Xn Setup

8.4.1.1 General

The purpose of the Xn Setup procedure is to exchange application level configuration data needed for two NG-RAN nodes to interoperate correctly over the Xn-C interface.

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

NOTE 2: Exchange of application level configuration data also applies between two NG-RAN nodes in case the SN (i.e. the gNB) does not broadcast system information other than for radio frame timing and SFN, as specified in the TS 37.340 [8]. How to use this information when this option is used is not explicitly specified.

The procedure uses non UE-associated signalling.

8.4.1.2 Successful Operation

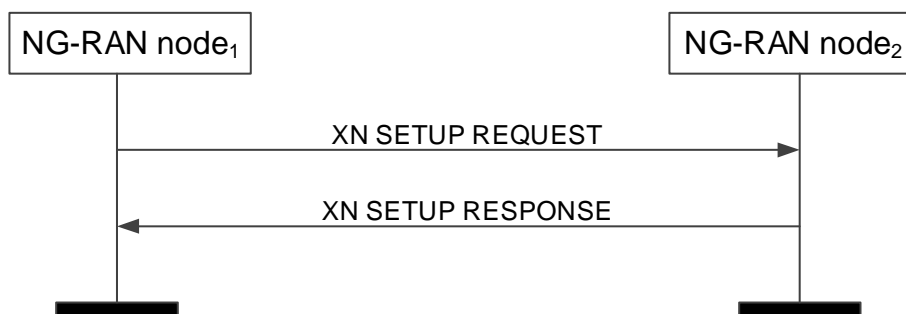


Figure 8.4.1.2: Xn Setup, successful operation

The NG-RAN node₁ initiates the procedure by sending the XN SETUP REQUEST message to the candidate NG-RAN node₂. The candidate NG-RAN node₂ replies with the XN SETUP RESPONSE message.

The *AMF Region Information* IE in the XN SETUP REQUEST message shall contain a complete list of Global AMF Region IDs to which the NG-RAN node₁ belongs. The *AMF Region Information* IE in the XN SETUP RESPONSE message shall contain a complete list of Global AMF Region IDs to which the NG-RAN node₂ belongs.

The *List of Served Cells NR* IE and the *List of Served Cells E-UTRA* IE, if contained in the XN SETUP REQUEST message, shall contain a complete list of cells served by NG-RAN node₁ or, if supported, a partial list of served cells together with the *Partial List Indicator* IE. The *List of Served Cells NR* IE and the *List of Served Cells E-UTRA* IE, if contained in the XN SETUP RESPONSE message, shall contain a complete list of cells served by NG-RAN node₂ or, if supported, a partial list of served cells together with the *Partial List Indicator* IE.

If Supplementary Uplink is configured at the NG-RAN node₁, the NG-RAN node₁ shall include in the XN SETUP REQUEST message the *SUL Information* IE and the *Supported SUL band List* IE for each served cell where supplementary uplink is configured.

If Supplementary Uplink is configured at the NG-RAN node₂, the candidate NG-RAN node₂ shall include in the XN 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 NG-RAN node₁ is an ng-eNB, it may include the *Protected E-UTRA Resource Indication* IE into the XN SETUP REQUEST. If the XN SETUP REQUEST sent by an ng-eNB contains the *Protected E-UTRA Resource Indication* IE, the receiving gNB should take this into account for cell-level resource coordination with the ng-eNB. The 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 ng-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.

In case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the XN SETUP REQUEST message and the XN SETUP RESPONSE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

If the *Intended TDD DL-UL Configuration NR* IE is included in the XN SETUP REQUEST or XN SETUP RESPONSE message, the receiving NG-RAN node should take this information into account for cross-link interference management and/or NR-DC power coordination with the sending NG-RAN node. The receiving NG-RAN node shall consider the received *Intended TDD DL-UL Configuration NR* IE content valid until reception of an update of the IE for the same cell(s).

If the *TNL Configuration Info* IE is contained in the XN SETUP REQUEST message, the NG-RAN node₂ shall, if supported, take this IE into account for IPsec establishment.

If the *TNL Configuration Info* IE is contained in the XN SETUP RESPONSE message, the NG-RAN node₁ shall, if supported, take this IE into account for IPsec establishment.

If the *Partial List Indicator NR* IE or the *Partial List Indicator NR* IE is set to "partial" in the XN SETUP REQUEST message the candidate NG-RAN node₂ shall, if supported, assume that the *List of Served Cells NR* IE or the *List of Served Cells E-UTRA* IE in the XN SETUP REQUEST message includes a partial list of cells.

If the *Partial List Indicator NR* IE or the *Partial List Indicator NR* IE is set to "partial" in the XN SETUP RESPONSE message from the candidate NG-RAN node₂, the NG-RAN node₁ shall, if supported, assume that the *List of Served Cells NR* IE or the *List of Served Cells E-UTRA* IE in the XN SETUP RESPONSE message includes a partial list of cells.

If the *Cell and Capacity Assistance Information NR* IE or the *Cell and Capacity Assistance Information E-UTRA* IE is present in the XN SETUP REQUEST message the candidate NG-RAN node₂ shall, if supported, use it when generating the list of NG-RAN served cell information to include in the XN SETUP RESPONSE message.

If the *Cell and Capacity Assistance Information NR* IE or the *Cell and Capacity Assistance Information E-UTRA* IE is present in the XN SETUP RESPONSE message from the candidate NG-RAN node₂, the NG-RAN node₁ shall, if supported, store the collected information to be used for future NG-RAN node interface management.

If the *CSI-RS Transmission Indication* IE is contained in the XN SETUP REQUEST message, the NG-RAN node₂ shall, if supported, take this IE into account for neighbour cell's CSI-RS measurement.

If the *CSI-RS Transmission Indication* IE in the XN SETUP RESPONSE message, the NG-RAN node₁ shall, if supported, take this IE into account for neighbour cell's CSI-RS measurement.

The initiating NG-RAN node₁ may include the *PRACH Configuration* IE (for served E-UTRA cells) or the *NR Cell PRACH Configuration* IE (for served NR cells) or the *NPRACH Configuration* IE (for served NB-IoT cells) in the XN SETUP REQUEST message. The candidate NG-RAN node₂ may also include the *PRACH Configuration* IE (for served E-UTRA cells) or *NR Cell PRACH Configuration* IE (for served NR cells) or the *NPRACH Configuration* IE (for served NB-IoT cells) in the XN SETUP RESPONSE message. The NG-RAN node receiving the IE may use this information for RACH optimisation.

The XN SETUP REQUEST message may contain for each cell served by NG-RAN node₁ NPN related broadcast information. The XN SETUP RESPONSE message may contain for each cell served by NG-RAN node₂ NPN related broadcast information.

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

8.4.1.3 Unsuccessful Operation

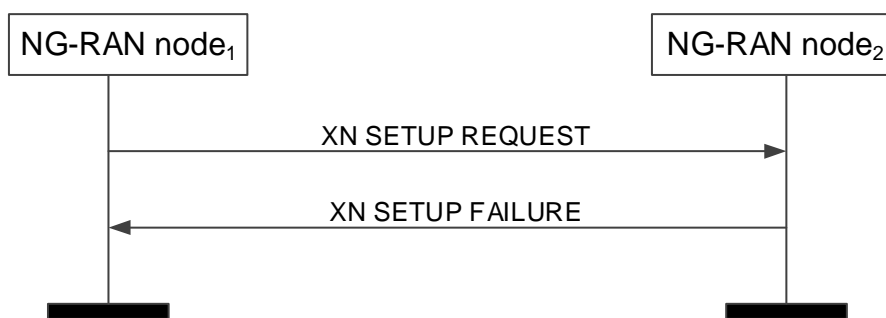


Figure 8.4.1.3-1: Xn Setup, unsuccessful operation

If the candidate NG-RAN node₂ cannot accept the setup it shall respond with the XN SETUP FAILURE message with appropriate cause value.

If the XN SETUP FAILURE message includes the *Time To Wait* IE, the initiating NG-RAN node₁ shall wait at least for the indicated time before reinitiating the Xn Setup procedure towards the same NG-RAN node₂.

If case of network sharing with multiple Cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the XN SETUP REQUEST message and the XN SETUP REQUEST FAILURE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

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

8.4.1.4 Abnormal Conditions

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

If the initiating NG-RAN node₁ does not receive either XN SETUP RESPONSE message or XN SETUP FAILURE message, the NG-RAN node₁ may reinitiate the Xn Setup procedure towards the same NG-RAN node, provided that the content of the new XN SETUP REQUEST message is identical to the content of the previously unacknowledged XN SETUP REQUEST message.

If the initiating NG-RAN node₁ receives an XN SETUP REQUEST message from the peer entity on the same Xn interface:

- In case the NG-RAN node₁ answers with an XN SETUP RESPONSE message and receives a subsequent Xn SETUP FAILURE message, the NG-RAN node₁ shall consider the Xn interface as non operational and the procedure as unsuccessfully terminated according to sub clause 8.4.1.3.
- In case the NG-RAN node₁ answers with an XN SETUP FAILURE message and receives a subsequent XN SETUP RESPONSE message, the NG-RAN node₁ shall ignore the XN SETUP RESPONSE message and consider the Xn interface as non operational.

8.4.2 NG-RAN node Configuration Update

8.4.2.1 General

The purpose of the NG-RAN node Configuration Update procedure is to update application level configuration data needed for two NG-RAN nodes to interoperate correctly over the Xn-C interface.

NOTE: Update of application level configuration data also applies between two NG-RAN nodes in case the SN (i.e. the gNB) does not broadcast system information other than for radio frame timing and SFN, as specified in the TS 37.340 [8]. How to use this information when this option is used is not explicitly specified.

The procedure uses non UE-associated signalling.

8.4.2.2 Successful Operation

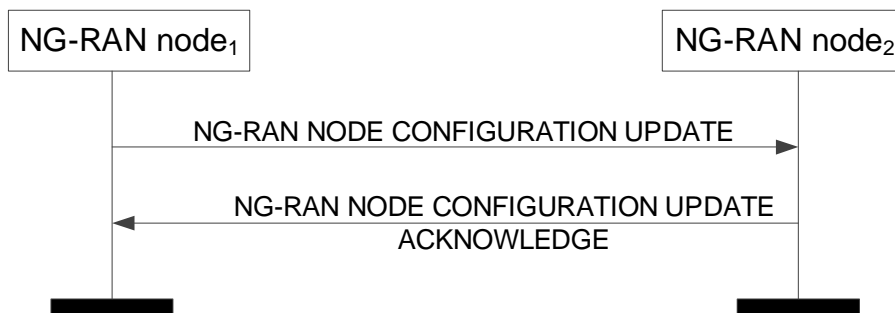


Figure 8.4.2.2-1: NG-RAN node Configuration Update, successful operation

The NG-RAN node₁ initiates the procedure by sending the NG-RAN NODE CONFIGURATION UPDATE message to a peer NG-RAN node₂.

If Supplementary Uplink is configured at the NG-RAN node₁, the NG-RAN node₁ shall include in the NG-RAN NODE CONFIGURATION UPDATE 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 Supplementary Uplink is configured at the NG-RAN node₂, the NG-RAN node₂ shall include in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message the *SUL Information IE* and the *Supported SUL band List IE* for each cell added in the *Served NR Cells IE* if any.

If the *TAI Support List IE* is included in the NG-RAN NODE CONFIGURATION UPDATE message, the receiving node shall replace the previously provided *TAI Support List IE* by the received *TAI Support List IE*.

If the *Cell Assistance Information NR IE* is present, the NG-RAN node₂ shall, if supported, use it to generate the *Served NR Cells IE* and include the list in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message.

If the *Cell Assistance Information E-UTRA IE* is present, the NG-RAN node₂ shall, if supported, use it to generate the *Served E-UTRA Cells IE* and include the list in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message.

If the *Partial List Indicator NR IE* is included in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message and set to "partial" the NG-RAN node₁ shall, if supported, assume that the *Served NR Cells IE* in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message includes a partial list of NR cells.

If the *Partial List Indicator E-UTRA* IE is included in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message and set to "partial" the NG-RAN node₁ shall, if supported, assume that the *Served E-UTRA Cells* IE in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message includes a partial list of NR cells.

If the *Cell and Capacity Assistance Information NR* IE is present in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message from the candidate NG-RAN node₂, the NG-RAN node₁ shall, if supported, store the collected information to be used for future NG-RAN node interface management.

If the *Cell and Capacity Assistance Information E-UTRA* IE is present in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message from the candidate NG-RAN node₂, the NG-RAN node₁ shall, if supported, store the collected information to be used for future NG-RAN node interface management.

Upon reception of the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node₂ shall update the information for NG-RAN node₁ as follows:

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the NG-RAN NODE CONFIGURATION UPDATE message and the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

If the *TNL Configuration Info* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node₂ shall take this IE into account for IPsec establishment.

If the *TNL Configuration Info* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message, the NG-RAN node₁ shall take this IE into account for IPsec establishment.

If the *CSI-RS Transmission Indication* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node₂ shall take this IE into account for neighbour cell's CSI-RS measurement.

The NG-RAN NODE CONFIGURATION UPDATE message may contain for each cell served by NG-RAN node₁ NPN related broadcast information. The NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message may contain for each cell served by NG-RAN node₂ NPN related broadcast information.

Update of Served Cell Information NR:

- If *Served Cells NR To Add* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node₂ shall add cell information according to the information in the *Served Cell Information NR* IE.
- If *Served Cells NR To Modify* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node₂ shall modify information of cell indicated by *Old NR-CGI* IE according to the information in the *Served Cell Information NR* IE.
- When either served cell information or neighbour information of an existing served cell in NG-RAN node₁ need to be updated, the whole list of neighbouring cells, if any, shall be contained in the *Neighbour Information NR* IE. The NG-RAN node₂ shall overwrite the served cell information and the whole list of neighbour cell information for the affected served cell.
- If the *Deactivation Indication* IE is contained in the *Served Cells NR To Modify* IE, it indicates that the concerned cell was switched off to lower energy consumption.
- If *Served Cells NR To Delete* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node₂ shall delete information of cell indicated by *Old NR-CGI* IE.
- If the *Intended TDD DL-UL Configuration NR* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node₂ should take this information into account for cross-link interference management and/or NR-DC power coordination with the NG-RAN node₁. The NG-RAN node₂ shall consider the received *Intended TDD DL-UL Configuration NR* IE content valid until reception of a new update of the IE for the same NG-RAN node₂.
- If the *NR Cell PRACH Configuration* IE is contained in the *Served Cell Information NR* IE in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node receiving the IE may use this information for RACH optimisation.

- If the *SFN Offset* IE is contained in the *Served Cell Information NR* IE in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node receiving the IE shall, if supported, use this information to update the SFN0 time offset of the reported cell.

Update of Served Cell Information E-UTRA:

- If *Served Cells E-UTRA To Add* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node₂ shall add cell information according to the information in the *Served Cell Information E-UTRA* IE.
- If *Served Cells E-UTRA To Modify* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node₂ shall modify information of cell indicated by *Old ECGI* IE according to the information in the *Served Cell Information E-UTRA* IE.
- When either served cell information or neighbour information of an existing served cell in NG-RAN node₁ need to be updated, the whole list of neighbouring cells, if any, shall be contained in the *Neighbour Information E-UTRA* IE. The NG-RAN node₂ shall overwrite the served cell information and the whole list of neighbour cell information for the affected served cell.
- If the *Deactivation Indication* IE is contained in the *Served Cells E-UTRA To Modify* IE, it indicates that the concerned cell was switched off to lower energy consumption.
- If the *Served Cells E-UTRA To Delete* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node₂ shall delete information of cell indicated by *Old ECGI* IE.
- If the *Protected E-UTRA Resource Indication* IE is included into the NG-RAN NODE CONFIGURATION UPDATE (inside the *Served Cell Information E-UTRA* IE), the receiving gNB should take this into account for cell-level resource coordination with the ng-eNB. The 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 ng-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 (contained in E-UTRA - NR CELL RESOURCE COORDINATION REQUEST messages), 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 *PRACH Configuration* IE is contained in the *Served Cell Information E-UTRA* IE in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node receiving the IE may use this information for RACH optimisation.
- If the *NPRACH Configuration* IE is contained in the *Served Cell Information E-UTRA* IE in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node receiving the IE may use this information for RACH optimisation.
- If the *SFN Offset* IE is contained in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node receiving the IE shall, if supported, use this information to update the SFN0 time offset of the reported cell.

Update of TNL addresses for SCTP associations:

If the *TNLA To Add List* IE is included in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node₂ shall, if supported, use it to establish the TNL association(s) with the NG-RAN node₁. If the *TNLA To Add List* IE does not include the *Port Number* IE, the NG-RAN node₂ shall assume that port number value 38422 is used for the endpoint. The NG-RAN node₂ shall report to the NG-RAN node₁, in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message, the successful establishment of the TNL association(s) with the NG-RAN node₁ as follows:

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

If the *TNLA To Remove List* IE is included in the NG-RAN NODE CONFIGURATION UPDATE message the NG-RAN node₂ shall, if supported, initiate removal of the TNL association(s) indicated by the received Transport Layer information towards the NG-RAN node₁.

- If the received *TNLA Transport Layer Address* IE includes the *Port Number* IE, the NG-RAN node₁ TNL endpoint is identified by the *Endpoint IP Address* IE and the *Port Number* IE. Otherwise, the NG-RAN node₁

TNL endpoints correspond to all NG-RAN node₁ TNL endpoints identified by the *Endpoint IP Address IE* and any Port Number(s).

If the *TNLA To Update List IE* is included in the NG-RAN NODE CONFIGURATION UPDATE message the NG-RAN node₂ shall, if supported, update the TNL association(s) indicated by the received Transport Layer information towards the NG-RAN node₁.

- If the received *TNLA Transport Layer Address IE* includes the *Port Number IE*, the NG-RAN node₁ TNL endpoint is identified by the *Endpoint IP Address IE* and the *Port Number IE*. Otherwise, the NG-RAN node₁ TNL endpoints correspond to all NG-RAN node₁ TNL endpoints identified by the *Endpoint IP Address IE* and any Port Number(s).

Update of AMF Region Information:

- If *AMF Region Information To Add IE* is contained in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node₂ shall add the AMF Regions to its AMF Region List.
- If *AMF Region Information To Delete IE* is contained in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN node₂ shall remove the AMF Regions from its AMF Region List.

8.4.2.3 Unsuccessful Operation

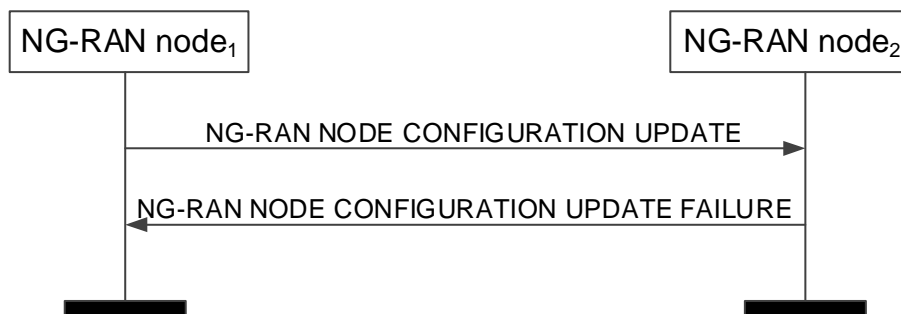


Figure 8.4.2.3-1: NG-RAN node Configuration Update, unsuccessful operation

If the NG-RAN node₂ cannot accept the update it shall respond with the NG-RAN NODE CONFIGURATION UPDATE FAILURE message and appropriate cause value.

If the NG-RAN NODE CONFIGURATION UPDATE FAILURE message includes the *Time To Wait IE*, the NG-RAN node₁ shall wait at least for the indicated time before reinitiating the NG-RAN Node Configuration Update procedure towards the same NG-RAN node₂. Both nodes shall continue to operate the Xn with their existing configuration data.

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the NG-RAN NODE CONFIGURATION UPDATE message and the NG-RAN NODE CONFIGURATION UPDATE FAILURE message shall include the *Interface Instance Indication IE* to identify the corresponding interface instance.

8.4.2.4 Abnormal Conditions

If the NG-RAN node₁ after initiating NG-RAN node Configuration Update procedure receives neither NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message nor NG-RAN NODE CONFIGURATION UPDATE FAILURE message, the NG-RAN node₁ may reinitiate the NG-RAN node Configuration Update procedure towards the same NG-RAN node₂, provided that the content of the new NG-RAN NODE CONFIGURATION UPDATE message is identical to the content of the previously unacknowledged NG-RAN NODE CONFIGURATION UPDATE message.

8.4.3 Cell Activation

8.4.3.1 General

The purpose of the Cell Activation procedure is to enable an NG-RAN node to request a neighbouring NG-RAN node to switch on one or more cells, previously reported as inactive due to energy saving.

The procedure uses non UE-associated signalling.

8.4.3.2 Successful Operation

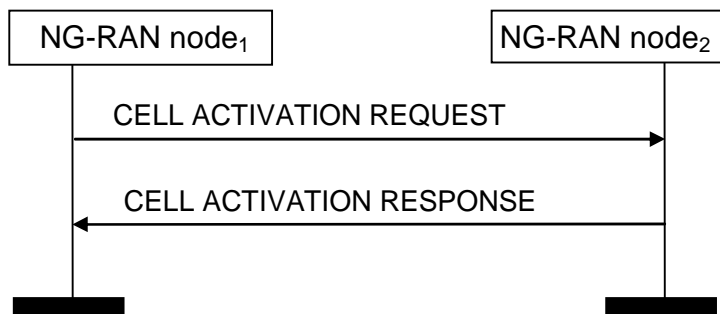


Figure 8.4.3.2-1: Cell Activation, successful operation

The NG-RAN node₁ initiates the procedure by sending the CELL ACTIVATION REQUEST message to the peer NG-RAN node₂.

Upon receipt of this message, the NG-RAN node₂ should activate the cell/s indicated in the CELL ACTIVATION REQUEST message and shall indicate in the CELL ACTIVATION RESPONSE message for which cells the request was fulfilled.

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the CELL ACTIVATION REQUEST message and the CELL ACTIVATION RESPONSE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

Interactions with NG-RAN Configuration Update procedure:

The NG-RAN node₂ shall not send the NG-RAN CONFIGURATION UPDATE message to the NG-RAN node₁ just for the reason of the cell/s indicated in the CELL ACTIVATION REQUEST message changing cell activation state, as the receipt of the CELL ACTIVATION RESPONSE message by the NG-RAN node₁ is used to update the information about the activation state of NG-RAN node₂ cells in the NG-RAN node₁.

8.4.3.3 Unsuccessful Operation

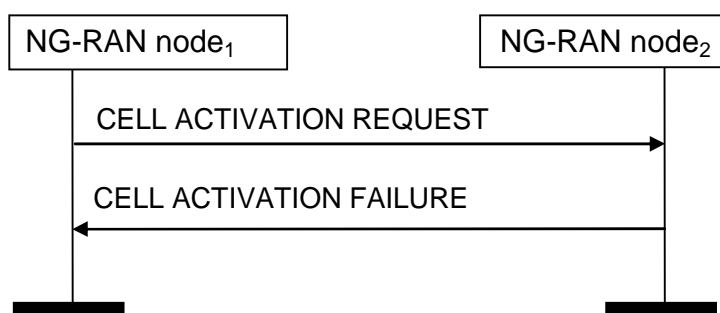


Figure 8.4.3.3-1: Cell Activation, unsuccessful operation

If the NG-RAN node₂ cannot activate any of the cells indicated in the CELL ACTIVATION REQUEST message, it shall respond with the CELL ACTIVATION FAILURE message with an appropriate cause value.

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the CELL ACTIVATION REQUEST message and the CELL ACTIVATION FAILURE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

8.4.3.4 Abnormal Conditions

Void.

8.4.4 Reset

8.4.4.1 General

The purpose of the Reset procedure is to align the resources in the NG-RAN node₁ and the NG-RAN node₂ in the event of an abnormal failure. The procedure either resets the Xn interface or selected UE contexts. This procedure doesn't affect the application level configuration data exchanged during, e.g., the Xn Setup procedure.

The procedure uses non UE-associated signalling.

8.4.4.2 Successful Operation

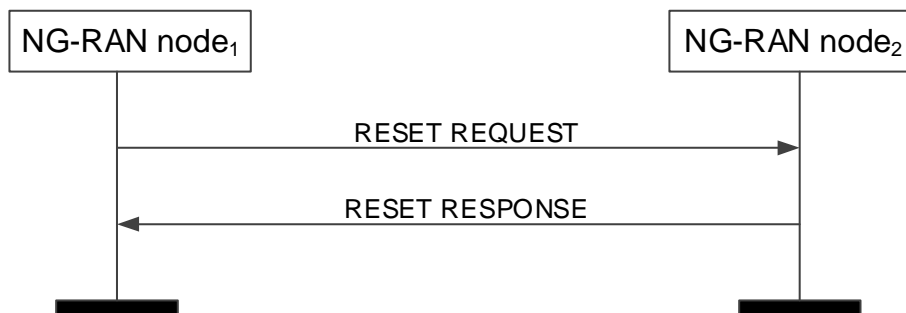


Figure 8.4.4.2-1: Reset, successful operation

The procedure is initiated with the RESET REQUEST message sent from the NG-RAN node₁ to the NG-RAN node₂. Upon receipt of this message,

- if the RESET REQUEST message indicates full reset the NG-RAN node₂ shall abort any other ongoing procedures over Xn between the NG-RAN node₁ and the NG-RAN node₂. The NG-RAN node₂ shall delete all the context information related to the NG-RAN node₁, except the application level configuration data exchanged during the Xn Setup or the NG-RAN node Configuration Update procedures and release the corresponding resources. After completion of release of the resources, the NG-RAN node₂ shall respond with the RESET RESPONSE message.
- if the RESET REQUEST message indicates partial reset, the NG-RAN node₂ shall abort any other ongoing procedures only for the indicated UE associated signalling connections identified either by the *NG-RAN node1 UE XnAP ID* IE or the *NG-RAN node1 UE XnAP ID* IE or both, for which the NG-RAN node₂ shall delete all the context information related to the NG-RAN node₁ and release the corresponding resources. After completion of release of the resources, the NG-RAN node₂ shall respond with the RESET RESPONSE message indicating the UE contexts admitted to be released. The NG-RAN node₂ receiving the request for partial reset does not need to wait for the release or reconfiguration of radio resources to be completed before returning the RESET RESPONSE message. The NG-RAN node₂ receiving the request for partial reset shall include in the RESET RESPONSE message, for each UE association to be released, the same list of UE-associated logical Xn-connections over Xn. The list shall be in the same order as received in the RESET REQUEST message and shall include also unknown UE-associated logical Xn-connections.

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the RESET REQUEST message and the RESET RESPONSE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

Interactions with other procedures:

If the RESET REQUEST message indicates full reset, the NG-RAN node₂ shall abort any other ongoing procedure (except for a Reset procedures).

If the RESET REQUEST message indicates partial reset, the NG-RAN node₂ shall abort any other ongoing procedure (except for a Reset procedures) on the same Xn interface related to a UE associated signalling connection indicated in the RESET REQUEST message.

8.4.4.3 Unsuccessful Operation

Void.

8.4.4.4 Abnormal Conditions

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

If the Reset procedure is ongoing and the responding node receives the RESET REQUEST message from the peer entity on the same Xn interface, it shall respond with the RESET RESPONSE message as specified in 8.4.4.2.

If the initiating node does not receive the RESET RESPONSE message, the initiating node may reinitiate the Reset procedure towards the same NG-RAN node, provided that the content of the new RESET REQUEST message is identical to the content of the previously unacknowledged RESET REQUEST message.

8.4.5 Error Indication

8.4.5.1 General

The Error Indication procedure is initiated by an NG-RAN node to report detected errors in one incoming message, provided they cannot be reported by an appropriate failure message.

If the error situation arises due to reception of a message utilising UE associated signalling, then the Error Indication procedure uses UE-associated signalling. Otherwise the procedure uses non UE-associated signalling.

8.4.5.2 Successful Operation

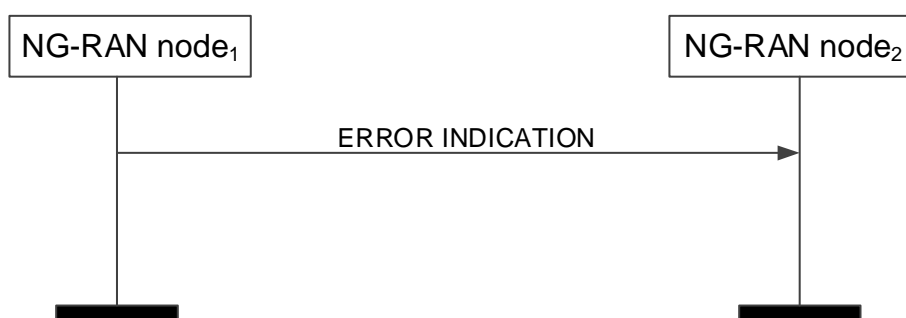


Figure 8.4.5.2-1: Error Indication, successful operation.

When the conditions defined in clause 10 are fulfilled, the Error Indication procedure is initiated by the ERROR INDICATION message sent from the node detecting the error situation.

The ERROR INDICATION message shall contain at least either the *Cause* IE or the *Criticality Diagnostics* IE.

In case the Error Indication procedure is triggered by UE associated signalling, in the course of handover signalling and signalling for dual connectivity, the *Old NG-RAN node UE XnAP ID* IE and the *New NG-RAN node UE XnAP ID* IE shall be included in the ERROR INDICATION message. If any of the *Old NG-RAN node UE XnAP ID* IE and the *New NG-RAN node UE XnAP ID* IE is not correct, the cause shall be set to an appropriate value.

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the ERROR INDICATION message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

8.4.5.3 Unsuccessful Operation

Not applicable.

8.4.5.4 Abnormal Conditions

Void.

8.4.6 Xn Removal

8.4.6.1 General

The purpose of the Xn Removal procedure is to remove the interface instance between two NG-RAN nodes in a controlled manner. If successful, this procedure erases any existing application level configuration data in the two nodes.

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

The procedure uses non UE-associated signaling.

8.4.6.2 Successful Operation

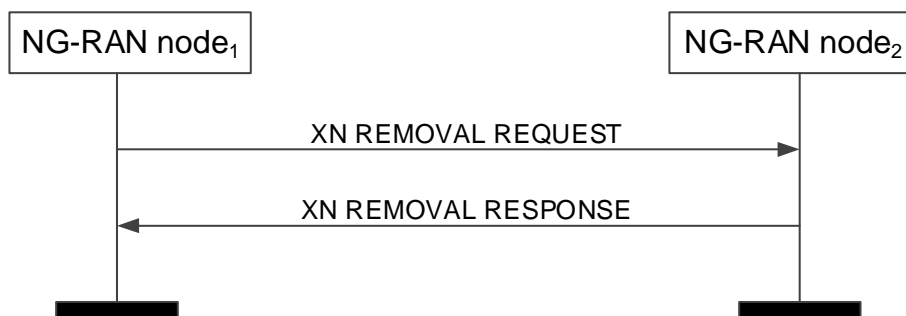


Figure 8.4.6.2-1: Xn Removal, successful operation

An NG-RAN node₁ initiates the procedure by sending the XN REMOVAL REQUEST message to a candidate NG-RAN node₂. Upon reception of the XN REMOVAL REQUEST message the candidate NG-RAN node₂ shall reply with the XN REMOVAL RESPONSE message. After receiving the XN REMOVAL RESPONSE message, the initiating NG-RAN node₁ shall initiate removal of the TNL association towards NG-RAN node₂ and may remove all resources associated with that interface instance. The candidate NG-RAN node₂ may then remove all resources associated with that interface instance.

If the *Xn Removal Threshold* IE is included in the XN REMOVAL REQUEST message, the candidate NG-RAN node₂ shall, if supported, accept to remove the interface instance with NG-RAN node₁ if the Xn Benefit Value of the interface instance determined at the candidate NG-RAN node₂ is lower than the value of the *Xn Removal Threshold* IE.

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the XN REMOVAL REQUEST message and the XN REMOVAL RESPONSE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

8.4.6.3 Unsuccessful Operation

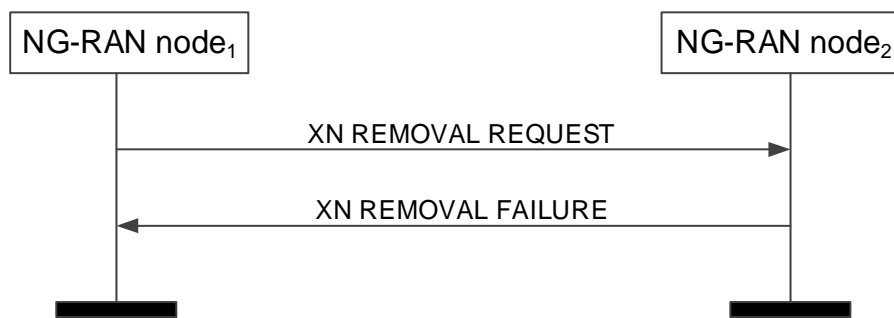


Figure 8.4.6.3-1: Xn Removal, unsuccessful operation

If the candidate NG-RAN node₂ cannot accept to remove the interface instance with NG-RAN node₁ it shall respond with an XN REMOVAL FAILURE message with an appropriate cause value.

If case of network sharing with multiple cell ID broadcast with shared Xn-C signalling transport, as specified in TS 38.300 [9], the XN REMOVAL REQUEST message and the XN REMOVAL FAILURE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

8.4.6.4 Abnormal Conditions

Void.

8.4.7 Failure Indication

8.4.7.1 General

The purpose of the Failure Indication procedure is to transfer information regarding RRC re-establishment attempts, or received RLF Reports, between NG-RAN nodes. The signalling takes place from the NG-RAN node at which a re-establishment attempt is made, or an RLF Report is received, to an NG-RAN node to which the UE concerned may have previously been attached prior to the connection failure. This may aid the detection of radio link failure, handover failure cases.

The procedure uses non UE-associated signalling.

8.4.7.2 Successful Operation



Figure 8.4.7.2-1: Failure Indication, successful operation

NG-RAN node₂ initiates the procedure by sending the FAILURE INDICATION message to NG-RAN node₁, following a re-establishment attempt or an RLF Report reception from a UE at NG-RAN node₂, when NG-RAN node₂ considers that the UE may have previously suffered a connection failure at a cell controlled by NG-RAN node₁.

If the *UE RLF Report Container* IE is included in the FAILURE INDICATION message, NG-RAN node₁ shall use it to derive failure case information.

8.4.7.3 Unsuccessful Operation

Not applicable.

8.4.7.4 Abnormal Conditions

Void.

8.4.8 Handover Report

8.4.8.1 General

The purpose of the Handover Report procedure is to transfer mobility related information between NG-RAN nodes.

The procedure uses non UE-associated signalling.

8.4.8.2 Successful Operation



Figure 8.4.8.2-1: Handover Report, successful operation

NG-RAN node₁ initiates the procedure by sending the HANOVER REPORT message to NG-RAN node₂. When receiving the message NG-RAN node₂ shall assume 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 NG-RAN node₁ indicates to NG-RAN node₂ that, following a successful handover from a cell of NG-RAN node₂ to a cell of NG-RAN node₁, a radio link failure occurred and the UE attempted RRC Re-establishment or re-connected either at the original cell of NG-RAN node₂ (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 38.300 [9].

The HANOVER REPORT message may include:

- the *Mobility Information* IE, if the *Mobility Information* IE was sent for this handover from NG-RAN node₂;
- the *Source cell C-RNTI* IE.

If received, NG-RAN node₂ uses the above information according to TS 38.300 [9].

If the *Handover Report Type* IE is set to "Inter-system ping-pong", then NG-RAN node₂ shall deduce that a completed handover from a cell of NG-RAN node₂ to a cell in another system might have resulted in an inter-system ping-pong and the UE was successfully handed over to a cell of NG-RAN node₁ (indicated with *Target cell CGI* IE).

Interaction with the Failure Indication procedure:

If NG-RAN node₁ receives a UE RLF Report from an NG-RAN node via the FAILURE INDICATION message, as described in TS 38.300 [9], NG-RAN node₁ may also include it in the *UE RLF Report Container* IE included in the HANOVER REPORT message.

8.4.8.3 Unsuccessful Operation

Not applicable.

8.4.8.4 Abnormal Conditions

Void.

8.4.9 Mobility Settings Change

8.4.9.1 General

This procedure enables an NG-RAN node to negotiate the handover trigger settings with a peer NG-RAN node controlling neighbouring cells.

The procedure uses non UE-associated signalling.

8.4.9.2 Successful Operation

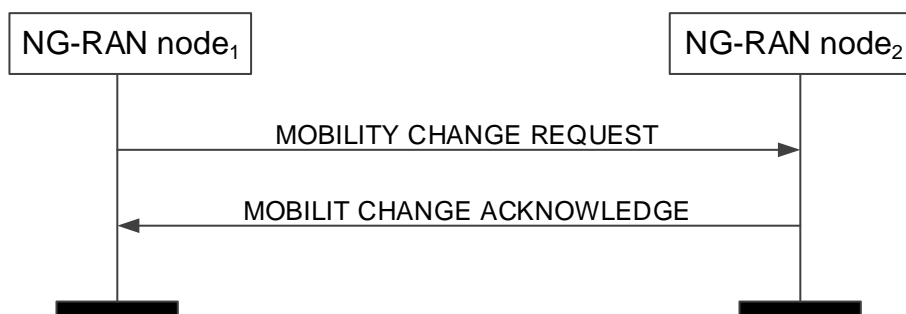


Figure 8.4.9.2-1: Mobility Settings Change, successful operation

NG-RAN node₁ initiates the procedure by sending the MOBILITY CHANGE REQUEST message to NG-RAN node₂.

Upon receipt, NG-RAN node₂ shall evaluate if the proposed NG-RAN node₂ handover trigger modification may be accepted. If NG-RAN node₂ is able to successfully complete the request it shall reply with MOBILITY CHANGE ACKNOWLEDGE message.

8.4.9.3 Unsuccessful Operation

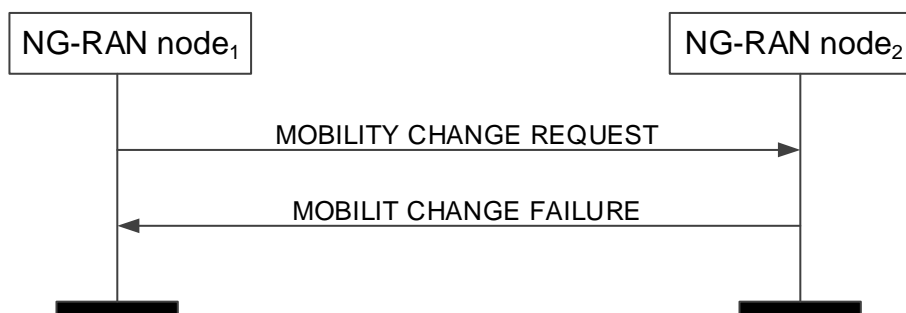


Figure 8.4.9.3-1: Mobility Settings Change, unsuccessful operation

If the requested parameter modification is refused by NG-RAN node₂, or if NG-RAN node₂ is not able to complete the procedure, NG-RAN node₂ shall send the MOBILITY CHANGE FAILURE message with the *Cause* IE set to an appropriate value. NG-RAN node₂ may include the *Mobility Parameters Modification Range* IE in the MOBILITY CHANGE FAILURE message, for example in cases when the proposed change is out of the permitted range.

8.4.9.4 Abnormal Conditions

Void.

8.4.10 Resource Status Reporting Initiation

8.4.10.1 General

This procedure is used by an NG-RAN node to request the reporting of load measurements to another NG-RAN node.

The procedure uses non UE-associated signalling.

8.4.10.2 Successful Operation

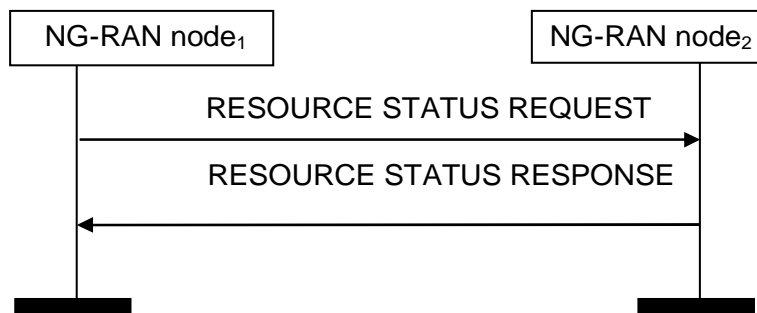


Figure 8.4.10.2-1: Resource Status Reporting Initiation, successful operation

NG-RAN node₁ initiates the procedure by sending the RESOURCE STATUS REQUEST message to NG-RAN node₂ to start a measurement, stop a measurement or add cells to report for a measurement. Upon receipt, NG-RAN node₂:

- 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 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.

If the *Registration Request* IE is set to "start" in the RESOURCE STATUS REQUEST message and the *Report Characteristics* IE indicates cell specific measurements, the *Cell To Report List* IE shall be included.

If *Registration Request* IE is set to "add" in the RESOURCE STATUS REQUEST message, the *Cell To Report List* IE shall be included.

If NG-RAN node₂ is capable to provide all requested resource status information, it shall initiate the measurement as requested by NG-RAN node₁ and respond with the RESOURCE STATUS RESPONSE message.

Interaction with other procedures

When starting a measurement, the *Report Characteristics* IE in the RESOURCE STATUS REQUEST indicates the type of objects NG-RAN node₂ shall perform measurements on. For each cell, NG-RAN node₂ 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 NG-RAN node₂ is a gNB and 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 received *TNL Capacity Indicator* IE represents the lowest TNL capacity available for the cell.

- 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 the *Cell Capacity Class Value IE* is included within the *Composite Available Capacity Group IE*, this IE is used to assign weights to the available capacity indicated in the *Capacity Value IE*. If NG-RAN node₂ is a gNB and if the cell for which *Composite Available Capacity Group IE* is requested to be reported supports more than one SSB, the *Composite Available Capacity Group IE* for such cell shall include the *SSB Area Capacity Value List* for all SSB areas supported by the cell, providing the SSB area capacity with respect to the *Cell Capacity Class Value*. 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*.

If the cell for which *Composite Available Capacity Group IE* is requested to be reported supports more than one slice, and if the *Slice To Report List IE* is included for a cell, the *Slice Available Capacity IE* for such cell shall include the requested *Slice Available Capacity Value Downlink IE* and *Slice Available Capacity Value Uplink IE*, providing the slice capacity with respect to the Cell Capacity Class Value.

- the *Number of Active UEs IE*, if the fourth bit, "Number of Active UEs" of the *Report Characteristics IE* included in the RESOURCE STATUS REQUEST message is set to "1";
- the *RRC Connections IE*, if the fifth bit, "RRC Connections" of the *Report Characteristics IE* included in the RESOURCE STATUS REQUEST message is set to "1".

If the *Reporting Periodicity IE* in the RESOURCE STATUS REQUEST is present, this indicates the periodicity for the reporting of periodic measurements. the NG-RAN node₂ shall report only once, unless otherwise requested within the *Reporting Periodicity IE*.

8.4.10.3 Unsuccessful Operation

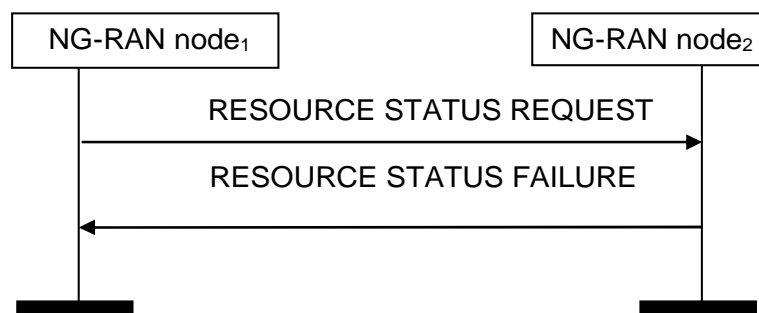


Figure 8.4.10.3-1: Resource Status Reporting Initiation, unsuccessful operation

If any of the requested measurements cannot be initiated, NG-RAN node₂ shall send the RESOURCE STATUS FAILURE message with an appropriate cause value.

8.4.10.4 Abnormal Conditions

For the same Measurement ID, if the initiating NG-RAN node₁ does not receive either the RESOURCE STATUS RESPONSE message or the RESOURCE STATUS FAILURE message, the NG-RAN node₁ may reinitiate the Resource Status Reporting Initiation procedure towards the same NG-RAN node, provided that the content of the new RESOURCE STATUS REQUEST message is identical to the content of the previously unacknowledged RESOURCE STATUS REQUEST message.

If the NG-RAN node₂ receives a RESOURCE STATUS REQUEST message which includes the *Registration Request IE* set to "add" or "stop" and if the NG-RAN node₂ Measurement ID value received in the RESOURCE STATUS REQUEST message is not used, the NG-RAN node₂ shall initiate RESOURCE STATUS FAILURE message with an appropriate cause value.

If the *Report Characteristics IE* bitmap is set to "0" (all bits are set to "0") in the RESOURCE STATUS REQUEST message then NG-RAN node₂ shall initiate a RESOURCE STATUS FAILURE message with an appropriate cause value.

If the NG-RAN node₂ receives a RESOURCE STATUS REQUEST message which includes the *Registration Request IE* set to "start" and the *NG-RAN node1 Measurement ID IE* corresponding to an existing on-going load measurement

reporting, then NG-RAN node₂ shall initiate a RESOURCE STATUS FAILURE message with an appropriate cause value.

8.4.11 Resource Status Reporting

8.4.11.1 General

This procedure is initiated by an NG-RAN node to report the result of measurements admitted by the NG-RAN node following a successful Resource Status Reporting Initiation procedure.

The procedure uses non UE-associated signalling.

8.4.11.2 Successful Operation

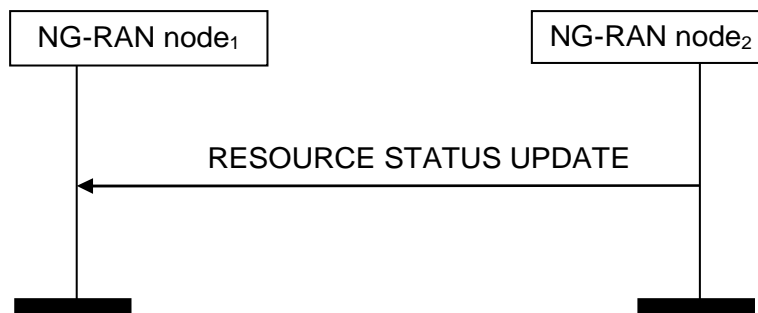


Figure 8.4.11.2-1: Resource Status Reporting, successful operation

NG-RAN node₂ shall report the results of the admitted measurements in RESOURCE STATUS UPDATE message. The admitted measurements are the measurements that were successfully initiated during the preceding Resource Status Reporting Initiation procedure.

8.4.11.3 Unsuccessful Operation

Not applicable.

8.4.11.4 Abnormal Conditions

Void

8.4.12 Access And Mobility Indication

8.4.12.1 General

The purpose of the Access and Mobility Indication procedure is to transfer Access and Mobility related information between NG-RAN nodes.

8.4.12.2 Successful Operation

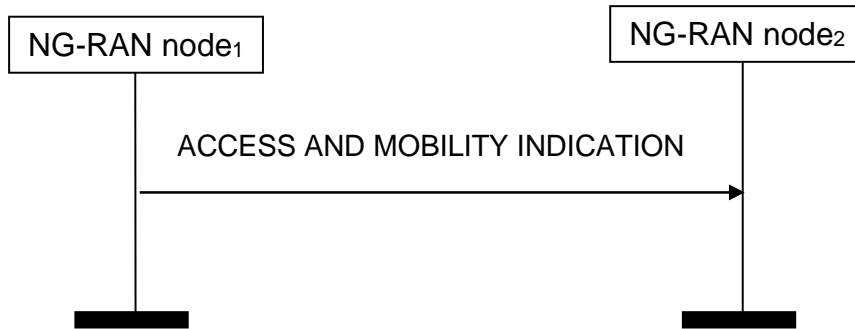


Figure 8.2.12.2-1: Access And Mobility Indication. Successful operation

NG-RAN node₁ initiates the procedure by sending the ACCESS AND MOBILITY INDICATION message sent to NG-RAN node₂.

8.4.12.3 Abnormal Conditions

Not applicable.

9 Elements for XnAP Communication

9.0 General

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

The following attributes are used for the tabular description of the messages and information elements: Presence, Range Criticality and Assigned Criticality. Their definition and use can be found in TS 38.413 [5].

NOTE: The messages have been defined in accordance to the guidelines specified in TR 25.921 [6].

9.1 Message Functional Definition and Content

9.1.1 Messages for Basic Mobility Procedures

9.1.1.1 HANDOVER REQUEST

This message is sent by the source NG-RAN node to the target NG-RAN node to request the preparation of resources for a handover.

Direction: source NG-RAN node → target NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|--|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Source NG-RAN node UE XnAP ID reference | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the source NG-RAN node | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | reject |
| Target Cell Global ID | M | | 9.2.3.25 | Includes either an E-UTRA CGI or an NR CGI | YES | reject |
| GUAMI | M | | 9.2.3.24 | | YES | reject |
| UE Context Information | | 1 | | | YES | reject |
| >NG-C UE associated Signalling reference | M | | AMF UE NGAP ID 9.2.3.26 | Allocated at the AMF on the source NG-C connection. | – | |
| >Signalling TNL association address at source NG-C side | M | | CP Transport Layer Information 9.2.3.31 | This IE indicates the AMF's IP address of the SCTP association used at the source NG-C interface instance. Note: If no UE TNLA binding exists at the source NG-RAN node, the source NG-RAN node indicates the TNL association address it would have selected if it would have had to create a UE TNLA binding. | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|----------------------------|---|-------------|----------------------|
| >UE Security Capabilities | M | | 9.2.3.49 | | – | |
| >AS Security Information | M | | 9.2.3.50 | | – | |
| >Index to RAT/Frequency Selection Priority | O | | 9.2.3.23 | | – | |
| >UE Aggregate Maximum Bit Rate | M | | 9.2.3.17 | | – | |
| >PDU Session Resources To Be Setup List | | 1 | 9.2.1.1 | Similar to NG-C signalling, containing UL tunnel information per PDU Session Resource; and in addition, the source side QoS flow ↔ DRB mapping | – | |
| >RRC Context | M | | OCTET STRING | Either includes the <i>HandoverPreparationInformation</i> message as defined in subclause 10.2.2. of TS 36.331 [14], or the <i>HandoverPreparationInformation-NB</i> message as defined in subclause 10.6.2 of TS 36.331 [14], if the target NG-RAN node is an ng-eNB, or the <i>HandoverPreparationInformation</i> message as defined in subclause 11.2.2 of TS 38.331 [10], if the target NG-RAN node is a gNB. | – | |
| >Location Reporting Information | O | | 9.2.3.47 | Includes the necessary parameters for location reporting. | – | |
| >Mobility Restriction List | O | | 9.2.3.53 | | – | |
| >Management Based MDT PLMN List | O | | MDT PLMN List 9.2.3.133 | | YES | ignore |
| >5GC Mobility Restriction List Container | O | | 9.2.3.100 | | YES | ignore |
| >NR UE Sidelink Aggregate Maximum Bit Rate | O | | 9.2.3.107 | This IE applies only if the UE is authorized for NR V2X services. | YES | ignore |
| >LTE UE Sidelink Aggregate Maximum Bit Rate | O | | 9.2.3.108 | This IE applies only if the UE is authorized for | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|------------|-------|---|---|-------------|----------------------|
| | | | | LTE V2X services. | | |
| >UE Radio Capability ID | O | | 9.2.3.138 | | YES | reject |
| Trace Activation | O | | 9.2.3.55 | | YES | ignore |
| Masked IMEISV | O | | 9.2.3.32 | | YES | ignore |
| UE History Information | M | | 9.2.3.64 | | YES | ignore |
| UE Context Reference at the S-NG-RAN node | O | | | | YES | ignore |
| >Global NG-RAN Node ID | M | | 9.2.2.3 | | – | |
| >S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | | – | |
| Conditional Handover Information Request | O | | | | YES | reject |
| >CHO Trigger | M | | ENUMERATED (CHO-initiation, CHO-replace, ...) | | – | |
| >Target NG-RAN node UE XnAP ID | C-ifCHOmod | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the target NG-RAN node | – | |
| >Estimated Arrival Probability | O | | INTEGER (1..100) | | – | |
| NR V2X Services Authorized | O | | 9.2.3.105 | | YES | ignore |
| LTE V2X Services Authorized | O | | 9.2.3.106 | | YES | ignore |
| PC5 QoS Parameters | O | | 9.2.3.109 | This IE applies only if the UE is authorized for NR V2X services. | YES | ignore |
| Mobility Information | O | | BIT STRING (SIZE (32)) | Information related to the handover; the source NG-RAN node provides it in order to enable later analysis of the conditions that led to a wrong HO. | YES | ignore |
| UE History Information from the UE | O | | 9.2.3.110 | | YES | ignore |
| IAB Node Indication | O | | ENUMERATED (true, ...) | | YES | reject |

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

| Range bound | Explanation |
|-----------------|---|
| maxnoofMDTPLMNs | PLMNs in the Management Based MDT PLMN list. Value is 16. |

9.1.1.2 HANDOVER REQUEST ACKNOWLEDGE

This message is sent by the target NG-RAN node to inform the source NG-RAN node about the prepared resources at the target.

Direction: target NG-RAN node → source NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|------------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the source NG-RAN node | YES | ignore |
| Target NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the target NG-RAN node | YES | ignore |
| PDU Session Resources Admitted List | M | | 9.2.1.2 | | YES | ignore |
| PDU Session Resources Not Admitted List | O | | 9.2.1.3 | | YES | ignore |
| Target NG-RAN node To Source NG-RAN node Transparent Container | M | | OCTET STRING | Either includes the <i>HandoverCommand</i> message as defined in subclause 10.2.2 of TS 36.331 [14], if the target NG-RAN node is an ng-eNB, or the <i>HandoverCommand</i> message as defined in subclause 11.2.2 of TS 38.331 [10], if the target NG-RAN node is a gNB. | YES | ignore |
| UE Context Kept Indicator | O | | 9.2.3.68 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| DRBs transferred to MN | O | | DRB List 9.2.1.29 | In case of DC, indicates that SN Status is needed for the listed DRBs from the S-NG-RAN node. | YES | ignore |
| DAPS Response Information | O | | 9.2.1.34 | | YES | reject |
| Conditional Handover Information Acknowledge | O | | | | YES | reject |
| >Requested Target Cell ID | M | | Target Cell Global ID 9.2.3.25 | Target cell indicated in the corresponding HANDOVER REQUEST message | – | |
| >Maximum Number of CHO Preparations | O | | 9.2.3.101 | | – | |

9.1.1.3 HANDOVER PREPARATION FAILURE

This message is sent by the target NG-RAN node to inform the source NG-RAN node that the Handover Preparation has failed.

Direction: target NG-RAN node → source NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|---------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the source NG-RAN node | YES | ignore |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Requested Target Cell ID | O | | Target Cell Global ID 9.2.3.25 | Target cell indicated in the corresponding HANDOVER REQUEST message | YES | reject |

9.1.1.4 SN STATUS TRANSFER

This message is sent by the source NG-RAN node to the target NG-RAN node to transfer the uplink/downlink PDCP SN and HFN status during a handover or for dual connectivity.

Direction: source NG-RAN node → target NG-RAN node(handover),
 NG-RAN node from which the DRB context is transferred → NG-RAN node to which the DRB context is transferred (RRC connection re-establishment or dual connectivity).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|-------|---------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the source NG-RAN node and for dual connectivity at the NG-RAN node from which the DRB context is transferred. | YES | reject |
| Target NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the target NG-RAN node and for dual connectivity at the NG-RAN node to which the DRB context is transferred. | YES | reject |
| DRBs Subject To Status Transfer List | M | | 9.2.1.14 | | YES | ignore |

9.1.1.5 UE CONTEXT RELEASE

This message is sent by the target NG-RAN node to the source NG-RAN node to indicate that resources can be released.

Direction: target NG-RAN node → source NG-RAN node, M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|---------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the source NG-RAN node or for dual connectivity at the S-NG-RAN node. | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|---------------------------------|---|-------------|----------------------|
| Target NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the target NG-RAN node or for dual connectivity at the M-NG-RAN node. | YES | reject |

9.1.1.6 HANDOVER CANCEL

This message is sent by the source NG-RAN node to the target NG-RAN node to cancel an ongoing handover.

Direction: source NG-RAN node → target NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|---------------------------------|--------------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the source NG-RAN node. | YES | reject |
| Target NG-RAN node UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the target NG-RAN node. | YES | ignore |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Candidate Cells To Be Cancelled List | | <i>0 .. <maxnoof CellsinCH O></i> | | | YES | reject |
| >Target Cell ID | M | | Target Cell Global ID 9.2.3.25 | | – | |

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

9.1.1.7 RAN PAGING

This message is sent by the NG-RAN node₁ to NG-RAN node₂ to page a UE.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------|----------|-------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE UE Identity Index Value | M | | | | YES | reject |
| >Length-10 | | | | | | |
| >>Index Length-10 | M | | BIT STRING (SIZE(10)) | Coded as specified in TS 38.304 [33] and TS 36.304 [34]. | – | |
| UE RAN Paging Identity | M | | 9.2.3.43 | | YES | ignore |
| Paging DRX | M | | 9.2.3.66 | Includes the RAN paging cycle as defined in TS 36.304 [34] and 38.304 [33]. | YES | ignore |
| RAN Paging Area | M | | 9.2.3.38 | | YES | reject |
| Paging Priority | O | | 9.2.3.44 | | YES | ignore |
| Assistance Data for | O | | 9.2.3.41 | | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------------------|----------|-------|-----------------------|---|-------------|----------------------|
| RAN Paging | | | | | | |
| UE Radio Capability for Paging | O | | 9.2.3.91 | | YES | ignore |
| Extended UE Identity Index Value | O | | 9.2.3.141 | Coded as specified in TS 36.304 [34]. | YES | ignore |
| Paging eDRX Information | O | | 9.2.3.142 | | YES | ignore |
| UE specific DRX | O | | 9.2.3.143 | Includes the UE specific paging cycle as defined in TS 36.304 [34] and 38.304 [33]. | YES | ignore |
| Hashed UE Identity Index Value | O | | 9.2.3.144a | | YES | ignore |

9.1.1.8 RETRIEVE UE CONTEXT REQUEST

This message is sent by the new NG-RAN node to request the old NG-RAN node to transfer the UE Context to the new NG-RAN.

Direction: new NG-RAN node → old NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|-------|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| New NG-RAN node UE XnAP ID reference | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the new NG-RAN node | YES | reject |
| UE Context ID | M | | 9.2.3.40 | | YES | reject |
| Integrity protection | M | | BIT STRING (SIZE (16)) | RRC Resume: <i>ResumeMAC-I</i> either contained in the <i>RRC ResumeRequest</i> or the <i>RRCResumeRequest1</i> message as defined in TS 38.331 [10]) or the <i>ShortResumeMAC-I</i> in the <i>RRCConnectionResumeRequest</i> message as defined in TS 36.331 [14]) RRC Reestablishment : <i>ShortMAC-I</i> contained in the <i>RRCReestablishmentRequest</i> as defined in TS 38.331 [10]) | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------|----------|-------|------------------------------|--|-------------|----------------------|
| | | | | or the <i>ShortMAC-I</i> in the <i>RRConnection ReestablishmentRequest</i> message as defined in TS 36.331 [14]. RRC Resume for UP ClIoT Optimization: <i>ShortResumeMAC-I</i> in the <i>RRConnection ResumeRequest</i> message or <i>RRConnection ResumeRequest-NB</i> message as defined in TS 36.331 [14]. | | |
| New Cell Identifier | M | | NG-RAN Cell Identity 9.2.2.9 | RRC Resume: Corresponds to the <i>targetCellIdentity</i> within the <i>VarResumeMAC-Input</i> as specified in TS 38.331 [10] or the <i>cellIdentity</i> within the <i>VarShortINACTIV E-MAC-Input</i> as specified in TS 36.331 [14]. RRC Reestablishment : Corresponds to the <i>targetCellIdentity</i> within the <i>VarShortMAC-Input</i> as specified in TS 38.331 [10] or the <i>cellIdentity</i> within the <i>VarShortMAC-Input</i> as specified in TS 36.331 [14]. RRC Resume for UP ClIoT Optimization: Corresponds to the <i>cellIdentity</i> within the <i>VarShortResumeMAC-Input</i> or <i>VarShortResumeMAC-Input-NB</i> as specified in TS 36.331 [14]. | YES | reject |
| RRC Resume Cause | O | | 9.2.3.61 | In case of RNA Update, contains the cause value provided by the UE in the | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------|----------|-------|-----------------------|---|-------------|----------------------|
| | | | | <i>RRCResumeRequest</i> or the <i>RRCResumeRequest1</i> message, as defined in TS 38.331 [10], or in the <i>RRCConnectionResumeRequest</i> message, as defined in TS 36.331 [14]. | | |

9.1.1.9 RETRIEVE UE CONTEXT RESPONSE

This message is sent by the old NG-RAN node to transfer the UE context to the new NG-RAN node.

Direction: old NG-RAN node → new NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| New NG-RAN node UE XnAP ID reference | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the new NG-RAN node | YES | ignore |
| Old NG-RAN node UE XnAP ID reference | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the old NG-RAN node | YES | ignore |
| GUAMI | M | | 9.2.3.24 | | YES | reject |
| UE Context Information – Retrieve UE Context Response | M | | 9.2.1.13 | | YES | reject |
| Trace Activation | O | | 9.2.3.55 | | YES | ignore |
| Masked IMEISV | O | | 9.2.3.32 | | YES | ignore |
| Location Reporting Information | O | | 9.2.3.47 | Includes the necessary parameters for location reporting. | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| NR V2X Services Authorized | O | | 9.2.3.105 | | YES | ignore |
| LTE V2X Services Authorized | O | | 9.2.3.106 | | YES | ignore |
| PC5 QoS Parameters | O | | 9.2.3.109 | This IE applies only if the UE is authorized for NR V2X services. | YES | ignore |
| UE History Information | O | | 9.2.3.64 | | YES | ignore |
| UE History Information from the UE | O | | 9.2.3.110 | | YES | ignore |
| Management Based MDT PLMN List | O | | MDT PLMN List 9.2.3.133 | | YES | ignore |

| Range bound | Explanation |
|-----------------|---|
| maxnoofMDTPLMNs | PLMNs in the Management Based MDT PLMN list. Value is 16. |

9.1.1.10 RETRIEVE UE CONTEXT FAILURE

This message is sent by the old NG-RAN node to inform the new NG-RAN node that the Retrieve UE Context procedure has failed.

Direction: old NG-RAN node → new NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|---------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| New NG-RAN node UE XnAP ID reference | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the new NG-RAN node | YES | ignore |
| Old NG-RAN node To New NG-RAN node Resume Container | O | | OCTET STRING | Includes either the <i>RRCRelease</i> message as defined in TS 38.331 [10], or the <i>RRCConnectionRelease</i> message as defined in TS 36.331 [14], encapsulated in a PDCP-C PDU. | YES | ignore |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.1.11 XN-U ADDRESS INDICATION

This message is either sent by the new NG-RAN node to transfer data forwarding information to the old NG-RAN node, or by the M-NG-RAN node to provide either data forwarding or Xn-U bearer address related information for SN terminated bearers to the S-NG-RAN node.

Direction: new NG-RAN node → old NG-RAN node, M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---------------------------|---|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| New NG-RAN node UE XnAP ID reference | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the new NG-RAN node | YES | ignore |
| Old NG-RAN node UE XnAP ID reference | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the old NG-RAN node | YES | ignore |
| Xn-U Address Information per PDU Session Resources List | | 1 | | | YES | reject |
| >Xn-U Address Information per PDU Session Resources Item | | 1..<maxno of PDUSessions> | | | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>Data Forwarding Info from target NG-RAN node | O | | Data Forwarding Info from target NG-RAN node 9.2.1.16 | | – | |
| >>Secondary Data Forwarding Info from target NG-RAN node List | O | | 9.2.1.31 | This IE would be present only when the target M-NG-RAN node decide to split a PDU session between MN and SN | YES | ignore |
| >>PDU Session Resource Setup Complete Info – SN terminated | O | | 9.2.1.30 | | – | |
| >>DRB IDs taken into use | O | | DRB List 9.2.1.29 | Indicating the DRB IDs taken into use | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|------------------------|---|-------------|----------------------|
| | | | | by the target NG-RAN node, as specified in TS 37.340 [8]. | | |
| >>Data Forwarding Info from target E-UTRAN node | O | | 9.2.1.35 | | YES | ignore |
| CHO MR-DC Indicator | O | | ENUMERATED (true, ...) | Indicating that the XN-U ADDRESS INDICATION message is for Conditional Handover, as specified in TS 37.340 [8]. | YES | reject |
| CHO MR-DC Early Data Forwarding Indicator | O | | ENUMERATED (stop, ...) | | YES | ignore |

| Range bound | Explanation |
|---------------------|---|
| maxnoofPDUSsessions | Maximum no. of PDU sessions. Value is 256 |

9.1.1.12 HANDOVER SUCCESS

This message is sent by the target NG-RAN node to the source NG-RAN node to indicate the successful access of the UE toward the target NG-RAN node.

Direction: target NG-RAN node → source NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|---------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the source NG-RAN node. | YES | reject |
| Target NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the target NG-RAN node. | YES | reject |
| Requested Target Cell ID | M | | Target Cell Global ID 9.2.3.25 | Target cell indicated in the corresponding Handover Preparation procedure | YES | reject |

9.1.1.13 CONDITIONAL HANDOVER CANCEL

This message is sent by the target NG-RAN node to the source NG-RAN node to cancel an already prepared conditional handover.

Direction: target NG-RAN node → source NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|---------------------------------|--------------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the source NG-RAN node. | YES | reject |
| Target NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the target NG-RAN node. | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------------------------------------|--------------------------------------|-----------------------|-------------|----------------------|
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Candidate Cells To Be Cancelled List | | 0 .. <maxnoof CellsInCH O> | | | YES | reject |
| >Target Cell ID | M | | Target Cell Global ID 9.2.3.25 | | – | |

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

9.1.1.14 EARLY STATUS TRANSFER

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

For MR-DC with 5GC, the message is also used, during a Conditional Handover, to transfer from the source S-NG-RAN node to the source M-NG-RAN node, the COUNT value related to the forwarded downlink SDUs.

Direction: source NG-RAN node → target NG-RAN node (DAPS Handover or Conditional Handover).

Direction: source S-NG-RAN node → source M-NG-RAN node (Conditional Handover)

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------------|---|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| Source NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the source NG-RAN node. | YES | reject |
| Target NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the target NG-RAN node. | YES | reject |
| CHOICE <i>Procedure Stage</i> | M | | | | YES | reject |
| > <i>First DL COUNT</i> | | | | | | |
| >> DRBs Subject To Early Status Transfer List | M | 1 | | | – | |
| >>> DRBs Subject To Early Status Transfer Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>>>DRB ID | M | | 9.2.3.33 | | – | |
| >>>>CHOICE <i>First DL COUNT</i> | M | | | | – | |
| >>>>>12 bits | | | | | | |
| >>>>>>FIRST DL COUNT Value | M | | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper frame number of the first DL SDU that the source NG-RAN node forwards to the target NG- RAN node in case of 12 bit long PDCP-SN | – | |
| >>>>>>18 bits | | | | | | |
| >>>>>>>FIRST DL COUNT | M | | COUNT Value for PDCP SN | PDCP-SN and Hyper frame | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------------------------|----------|------------------------|--|--|-------------|----------------------|
| Value | | | Length 18 9.2.3.37 | number of the first DL SDU that the source NG-RAN node forwards to the target NG-RAN node in case of 18 bit long PDCP-SN | | |
| >DL Discarding | | | | | | |
| >>DRBs Subject To DL Discarding List | M | 1 | | | – | |
| >>>DRBs Subject To DL Discarding Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>>>DRB ID | M | | 9.2.3.33 | | – | |
| >>>>CHOICE DL Discarding | M | | | | – | |
| >>>>> 12 bits | | | | | | |
| >>>>>> DISCARD DL COUNT Value | M | | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper frame number for which the target NG-RAN node should discard forwarded DL SDUs associated with lower values in case of 12 bit long PDCP-SN | – | |
| >>>>>>> 18 bits | | | | | | |
| >>>>>>>> DISCARD DL COUNT Value | M | | COUNT Value for PDCP SN Length 18 9.2.3.37 | PDCP-SN and Hyper frame number for which the target NG-RAN node should discard forwarded DL SDUs associated with lower values in case of 18 bit long PDCP-SN | – | |

| Range bound | Explanation |
|-------------|--|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |

9.1.2 Messages for Dual Connectivity Procedures

9.1.2.1 S-NODE ADDITION REQUEST

This message is sent by the M-NG-RAN node to the S-NG-RAN node to request the preparation of resources for dual connectivity operation for a specific UE.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| UE Security Capabilities | M | | 9.2.3.49 | | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---------------------------------------|--|--|-------------|----------------------|
| S-NG-RAN node Security Key | M | | 9.2.3.51 | | YES | reject |
| S-NG-RAN node UE Aggregate Maximum Bit Rate | M | | UE Aggregate Maximum Bit Rate 9.2.3.17 | The UE Aggregate Maximum Bit Rate is split into M-NG-RAN node UE Aggregate Maximum Bit Rate and S-NG-RAN node UE Aggregate Maximum Bit Rate which are enforced by M-NG-RAN node and S-NG-RAN node respectively. | YES | reject |
| Selected PLMN | O | | PLMN Identity 9.2.2.4 | The selected PLMN of the SCG in the S-NG-RAN node. | YES | ignore |
| Mobility Restriction List | O | | 9.2.3.53 | | YES | ignore |
| Index to RAT/Frequency Selection Priority | O | | 9.2.3.23 | | YES | reject |
| PDU Session Resources To Be Added List | | 1 | | | YES | reject |
| >PDU Session Resources To Be Added Item | | 1 .. <maxnoof PDU Sessi ons> | | NOTE: If neither the <i>PDU Session Resource Setup Info – SN terminated</i> IE nor the <i>PDU Session Resource Setup Info – MN terminated</i> IE is present in a <i>PDU Session Resources To Be Added Item</i> IE, abnormal conditions as specified in clause 8.3.1.4 apply. | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>S-NSSAI | M | | 9.2.3.21 | | – | |
| >>S-NG-RAN node PDU Session Aggregate Maximum Bit Rate | O | | PDU Session Aggregate Maximum Bit Rate 9.2.3.69 | | – | |
| >>PDU Session Resource Setup Info – SN terminated | O | | 9.2.1.5 | | – | |
| >>PDU Session Resource Setup Info – MN terminated | O | | 9.2.1.7 | | – | |
| M-NG-RAN node to S-NG-RAN node Container | M | | OCTET STRING | Includes the <i>CG-ConfigInfo</i> message as defined in subclause 11.2.2 of TS 38.331 [10] | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|--------------------------|-------|---|---|-------------|----------------------|
| S-NG-RAN node UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Expected UE Behaviour | O | | 9.2.3.81 | | YES | ignore |
| Requested Split SRBs | O | | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRBs are requested. | YES | reject |
| PCell ID | O | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | reject |
| Desired Activity Notification Level | O | | 9.2.3.77 | | YES | ignore |
| Available DRB IDs | C- ifSNtermin ated | | DRB List 9.2.1.29 | Indicates the list of DRB IDs that the S-NG-RAN node may use for SN-terminated bearers. | YES | reject |
| S-NG-RAN node Maximum Integrity Protected Data Rate Uplink | O | | Bit Rate 9.2.3.4 | The S-NG-RAN node Maximum Integrity Protected Data Rate Uplink is a portion of the UE's Maximum Integrity Protected Data Rate in the Uplink, which is enforced by the S-NG-RAN node for the UE's SN terminated PDU sessions. If the <i>S-NG-RAN node Maximum Integrity Protected Data Rate Downlink</i> IE is not present, this IE applies to both UL and DL. | YES | reject |
| S-NG-RAN node Maximum Integrity Protected Data Rate Downlink | O | | Bit Rate 9.2.3.4 | The S-NG-RAN node Maximum Integrity Protected Data Rate Downlink is a portion of the UE's Maximum Integrity Protected Data Rate in the Downlink, which is enforced by the S-NG-RAN node for the UE's SN terminated PDU sessions. | YES | reject |
| Location Information at S-NODE reporting | O | | ENUMERATED (pscell, ...) | Indicates that the user's Location Information at S-NODE is to be provided. | YES | ignore |
| MR-DC Resource Coordination Information | O | | 9.2.2.33 | Information used to coordinate resource utilisation between M-NG-RAN node and S-NG-RAN node. | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|-------|---|--|-------------|----------------------|
| Masked IMEISV | O | | 9.2.3.32 | | YES | ignore |
| NE-DC TDM Pattern | O | | 9.2.2.38 | | YES | ignore |
| SN Addition Trigger Indication | O | | ENUMERATED (SN change, inter-MN HO, intra-MN HO, ...) | This IE indicates the trigger for S-NG-RAN node Addition Preparation procedure | YES | reject |
| Trace Activation | O | | 9.2.3.55 | | YES | ignore |
| Requested Fast MCG recovery via SRB3 | O | | ENUMERATED (true, ...) | Indicates that the resources for fast MCG recovery via SRB3 are requested. | YES | ignore |
| UE Radio Capability ID | O | | 9.2.3.138 | | YES | reject |
| Source NG-RAN Node ID | O | | Global NG-RAN Node ID 9.2.2.3 | The NG-RAN Node ID of the source NG-RAN node or the source SN. | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

| Condition | Explanation |
|----------------|---|
| ifSNterminated | This IE shall be present if there is at least one <i>PDU Session Resource Setup Info – SN terminated</i> in the <i>PDU Session Resources To Be Added List</i> IE. |

9.1.2.2 S-NODE ADDITION REQUEST ACKNOWLEDGE

This message is sent by the S-NG-RAN node to confirm the M-NG-RAN node about the S-NG-RAN node addition preparation.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|----------------------------|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| PDU Session Resources Admitted To Be Added List | | 1 | | | YES | ignore |
| >PDU Session Resources Admitted To Be Added Item | | 1 .. <maxnoof PDUSessions> | | NOTE: If neither the <i>PDU Session Resource Setup Response Info – SN terminated</i> IE nor the <i>PDU Session Resource Setup Response Info – MN terminated</i> IE is present in a <i>PDU Session</i> | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|---|--|-------------|----------------------|
| | | | | <i>Resources Admitted to be Added Item IE, abnormal conditions as specified in clause 8.3.1.4 apply.</i> | | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>PDU Session Resource Setup Response Info – SN terminated | O | | 9.2.1.6 | | – | |
| >>PDU Session Resource Setup Response Info – MN terminated | O | | 9.2.1.8 | | – | |
| PDU Session Resources Not Admitted List | O | | | | YES | ignore |
| >PDU Session Resources Not Admitted List – SN terminated | O | | PDU Session Resources Not Admitted List 9.2.1.3 | | – | |
| >PDU Session Resources Not Admitted List – MN terminated | O | | PDU Session Resources Not Admitted List 9.2.1.3 | | – | |
| S-NG-RAN node to M-NG-RAN node Container | M | | OCTET STRING | Includes the <i>CG-Config</i> message as defined in subclause 11.2.2 of TS 38.331 [10]. | YES | reject |
| Admitted Split SRBs | O | | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs | YES | reject |
| RRC Config Indication | O | | 9.2.3.72 | | YES | reject |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Location Information at S-NODE | O | | Target Cell Global ID 9.2.3.25 | Contains information to support localisation of the UE | YES | ignore |
| MR-DC Resource Coordination Information | O | | 9.2.2.33 | Information used to coordinate resource utilisation between M-NG-RAN node and S-NG-RAN node. | YES | ignore |
| Available fast MCG recovery via SRB3 | O | | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 is enabled. | YES | ignore |
| Direct Forwarding Path Availability | O | | ENUMERATED (direct path available, ...) | Indicates direct forwarding path is available between the target S-NG-RAN node and source NG-RAN node for intra-system handover or between the target S-NG-RAN node and the source SN. | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.3 S-NODE ADDITION REQUEST REJECT

This message is sent by the S-NG-RAN node to inform the M-NG-RAN node that the S-NG-RAN node Addition Preparation has failed.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.2.4 S-NODE RECONFIGURATION COMPLETE

This message is sent by the M-NG-RAN node to the S-NG-RAN node to indicate whether the configuration requested by the S-NG-RAN node was applied by the UE.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Response Information | M | | | | YES | ignore |
| >CHOICE <i>Response Type</i> | M | | | | – | |
| >> <i>Configuration successfully applied</i> | | | | | – | |
| >>>M-NG-RAN node to S-NG-RAN node Container | O | | OCTET STRING | Includes the <i>RRCReconfigurationComplete</i> message as defined in subclause 6.2.2 of TS 38.331 [10] or the <i>RRCCofigurationComplete</i> message as defined in subclause 6.2.2 of TS 36.331 [14]. | – | |
| >> <i>Configuration rejected by the M-NG-RAN node</i> | | | | | – | |
| >>>Cause | M | | 9.2.3.2 | | – | |
| >>>M-NG-RAN node to S-NG-RAN | O | | OCTET STRING | Includes the <i>CG-ConfigInfo</i> | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------|----------|-------|-----------------------|---|-------------|----------------------|
| node Container | | | | message as defined in as defined in subclause 11.2.2 of TS 38.331 [10]. | | |

9.1.2.5 S-NODE MODIFICATION REQUEST

This message is sent by the M-NG-RAN node to the S-NG-RAN node to either request the preparation to modify S-NG-RAN node resources for a specific UE, or to query for the current SCG configuration, or to provide the S-RLF-related information to the S-NG-RAN node.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------------------------|---|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| PDCP Change Indication | O | | 9.2.3.74 | | YES | ignore |
| Selected PLMN | O | | PLMN Identity 9.2.2.4 | The selected PLMN of the SCG in the S-NG-RAN node. | YES | ignore |
| Mobility Restriction List | O | | 9.2.3.53 | | YES | ignore |
| SCG Configuration Query | O | | 9.2.3.27 | | YES | ignore |
| UE Context Information | | 0..1 | | | YES | reject |
| >UE Security Capabilities | O | | 9.2.3.49 | | – | |
| >S-NG-RAN node Security Key | O | | 9.2.3.51 | | – | |
| >S-NG-RAN node UE Aggregate Maximum Bit Rate | O | | UE Aggregate Maximum Bit Rate 9.2.3.17 | | – | |
| >Index to RAT/Frequency Selection Priority | O | | 9.2.3.23 | | – | |
| >Lower Layer presence status change | O | | 9.2.3.60 | | – | |
| >PDU Session Resources To Be Added List | | 0..1 | | | – | |
| >>PDU Session Resources To Be Added Item | | 1 .. <maxnoof PDU Sessi ons> | | NOTE: If neither the PDU Session Resource Setup Info – SN terminated IE nor the PDU Session Resource Setup Info – MN terminated IE is present in a | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|--------------------------------|--|---|-------------|----------------------|
| | | | | <i>PDU Session Resources To Be Added Item</i> IE, abnormal conditions as specified in clause 8.3.3.4 apply. | | |
| >>>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>>S-NSSAI | M | | 9.2.3.21 | | – | |
| >>>S-NG-RAN node PDU Session Aggregate Maximum Bit Rate | O | | PDU Session Aggregate Maximum Bit Rate 9.2.3.69 | | – | |
| >>>PDU Session Resource Setup Info – SN terminated | O | | 9.2.1.5 | | – | |
| >>>PDU Session Resource Setup Info – MN terminated | O | | 9.2.1.7 | | – | |
| >>>PDU Session Expected UE Activity Behaviour | O | | Expected UE Activity Behaviour 9.2.3.82 | Expected UE Activity Behaviour for the PDU Session. | YES | ignore |
| >PDU Session Resources To Be Modified List | | 0..1 | | | – | |
| >>PDU Session Resources To Be Modified Item | | 1 .. <maxnoof PDU Sessions> | | NOTE: If neither the <i>PDU Session Resource Modification Info – SN terminated</i> IE nor the <i>PDU Session Resource Modification Info – MN terminated</i> IE is present in a <i>PDU Session Resources To Be Modified Item</i> IE, abnormal conditions as specified in clause 8.3.3.4 apply. | – | |
| >>>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>>S-NG-RAN node PDU Session Aggregate Maximum Bit Rate | O | | PDU Session Aggregate Maximum Bit Rate 9.2.3.69 | | – | |
| >>>PDU Session Resource Modification Info – SN terminated | O | | 9.2.1.9 | | – | |
| >>>PDU Session Resource Modification Info – MN terminated | O | | 9.2.1.11 | | – | |
| >>>S-NSSAI | O | | 9.2.3.21 | | YES | reject |
| >>>PDU Session | O | | Expected UE | Expected UE | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|---|---|-------------|----------------------|
| Expected UE Activity Behaviour | | | Activity Behaviour 9.2.3.82 | Activity Behaviour for the PDU Session. | | |
| >PDU Session Resources To Be Released List | O | | PDU session List with Cause 9.2.1.26 | | – | |
| M-NG-RAN node to S-NG-RAN node Container | O | | OCTET STRING | Includes the <i>CG-ConfigInfo</i> message as defined in subclause 11.2.2. of TS 38.331 [10]. | YES | ignore |
| Requested Split SRBs | O | | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRBs are requested. | YES | ignore |
| Requested Split SRBs release | O | | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRBs are requested to be released. | YES | ignore |
| Desired Activity Notification Level | O | | 9.2.3.77 | | YES | ignore |
| Additional DRB IDs | O | | DRB List 9.2.1.29 | Indicates additional list of DRB IDs that the S-NG-RAN node may use for SN-terminated bearers. | YES | reject |
| S-NG-RAN node Maximum Integrity Protected Data Rate Uplink | O | | Bit Rate 9.2.3.4 | The S-NG-RAN node Maximum Integrity Protected Data Rate Uplink is a portion of the UE's Maximum Integrity Protected Data Rate in the Uplink, which is enforced by the S-NG-RAN node for the UE's SN terminated PDU sessions. If the <i>S-NG-RAN node Maximum Integrity Protected Data Rate Downlink</i> IE is not present, this IE applies to both UL and DL. | YES | reject |
| S-NG-RAN node Maximum Integrity Protected Data Rate Downlink | O | | Bit Rate 9.2.3.4 | The S-NG-RAN node Maximum Integrity Protected Data Rate Downlink is a portion of the UE's Maximum Integrity Protected Data Rate in the Downlink, which is enforced by the S-NG-RAN node for the UE's SN terminated PDU sessions. | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|---|--|-------------|----------------------|
| Location Information at S-NODE reporting | O | | ENUMERATED (pscell, ...) | Indicates that the user's Location Information at S-NODE is to be provided. | YES | ignore |
| MR-DC Resource Coordination Information | O | | 9.2.2.33 | Information used to coordinate resource utilisation between M-NG-RAN node and S-NG-RAN node. | YES | ignore |
| PCell ID | O | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | reject |
| NE-DC TDM Pattern | O | | 9.2.2.38 | | YES | ignore |
| Requested Fast MCG recovery via SRB3 | O | | ENUMERATED (true, ...) | Indicates that the resources for fast MCG recovery via SRB3 are requested. | YES | ignore |
| Requested Fast MCG recovery via SRB3 Release | O | | ENUMERATED (true, ...) | Indicates that resources for fast MCG recovery via SRB3 are requested to be released. | YES | ignore |
| SN triggered | O | | ENUMERATED (TRUE ...) | | YES | ignore |
| Target Node ID | O | | Global NG-RAN Node ID 9.2.2.3 | Indicates the target node ID of the handover procedure decided by the M-NG-RAN node. | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.6 S-NODE MODIFICATION REQUEST ACKNOWLEDGE

This message is sent by the S-NG-RAN node to confirm the M-NG-RAN node's request to modify the S-NG-RAN node resources for a specific UE.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---------------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| PDU Session Resources Admitted List | | 0..1 | | | YES | ignore |
| >PDU Session Resources Admitted To Be Added List | | 0..1 | | | – | |
| >>PDU Session Resources | | 1 .. <maxnoof | | NOTE: If neither the | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--|-----------------------|--|-------------|----------------------|
| Admitted To Be Added Item | | <i>PDU Sessions</i> | | <i>PDU Session Resource Setup Response Info – SN terminated</i> IE nor the <i>PDU Session Resource Setup Response Info – MN terminated</i> IE is present in a <i>PDU Session Resources Admitted To Be Added Item</i> IE, abnormal conditions as specified in clause 8.3.3.4 apply. | | |
| >>>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>>PDU Session Resource Setup Response Info – SN terminated | O | | 9.2.1.6 | | – | |
| >>>PDU Session Resource Setup Response Info – MN terminated | O | | 9.2.1.8 | | – | |
| >PDU Session Resources Admitted To Be Modified List | | <i>0..1</i> | | | – | |
| >>PDU Session Resources Admitted To Be Modified Item | | <i>1 .. <maxnoof PDU Sessions></i> | | NOTE: If neither the <i>PDU Session Resource Modification Response Info – SN terminated</i> IE nor the <i>PDU Session Resource Modification Response Info – MN terminated</i> IE is present in a <i>PDU Session Resources Admitted To Be Modified Item</i> IE, abnormal conditions as specified in clause 8.3.3.4 apply. | – | |
| >>>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>>PDU Session Resource Modification Response Info – SN terminated | O | | 9.2.1.10 | | – | |
| >>>PDU Session Resource Modification Response Info – MN terminated | O | | 9.2.1.12 | | – | |
| >PDU Session | | <i>0..1</i> | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|---|--|-------------|----------------------|
| Resources Admitted To Be Released List | | | | | | |
| >>PDU Session Resources admitted to be released List – SN terminated | O | | PDU session List with data forwarding request info 9.2.1.24 | | – | |
| >>PDU Session Resources admitted to be released List – MN terminated | O | | PDU session List with data Cause 9.2.1.26 | | – | |
| PDU Session Resources Not Admitted to be Added List | O | | PDU session List 9.2.1.27 | | YES | ignore |
| S-NG-RAN node to M-NG-RAN node Container | O | | OCTET STRING | Includes the <i>CG-Config</i> message as defined in subclause 11.2.2 of TS 38.331 [10]. | YES | ignore |
| Admitted Split SRBs | O | | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs | YES | ignore |
| Admitted Split SRBs release | O | | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs release | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Location Information at S-NODE | O | | Target Cell Global ID 9.2.3.25 | Contains information to support localisation of the UE | YES | ignore |
| MR-DC Resource Coordination Information | O | | 9.2.2.33 | Information used to coordinate resource utilisation between M-NG-RAN node and S-NG-RAN node. | YES | ignore |
| PDU Session Resources with Data Forwarding List | | 0..1 | | | YES | ignore |
| >PDU Session Resources with Data Forwarding List – SN terminated | M | | PDU session List with data forwarding request info 9.2.1.24 | | – | |
| RRC Config Indication | O | | 9.2.3.72 | | YES | reject |
| Available fast MCG recovery via SRB3 | O | | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 is enabled. | YES | ignore |
| Release fast MCG recovery via SRB3 | O | | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 is released. | YES | ignore |
| Direct Forwarding Path Availability | O | | ENUMERATED (direct path available,...) | Indicates direct path is available between the S-NG-RAN node and the target NG-RAN node. | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.7 S-NODE MODIFICATION REQUEST REJECT

This message is sent by the S-NG-RAN node to inform the M-NG-RAN node that the M-NG-RAN node initiated S-NG-RAN node Modification Preparation has failed.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.2.8 S-NODE MODIFICATION REQUIRED

This message is sent by the S-NG-RAN node to the M-NG-RAN node to request the modification of S-NG-RAN node resources for a specific UE.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------------------------|------------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| PDCP Change Indication | O | | 9.2.3.74 | | YES | ignore |
| PDU Session Resources To Be Modified List | | 0..1 | | | YES | ignore |
| >PDU Session Resources To Be Modified Item | | 1 .. <maxnoof PDU Sessions> | | NOTE: If neither the <i>PDU Session Resource Modification Required Info – SN terminated IE</i> nor the <i>PDU Session Resource Modification Required Info – MN terminated IE</i> is present in a <i>PDU Session Resources To Be Modified Item IE</i> , abnormal conditions as specified in clause 8.3.4.4 apply. | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>PDU Session Resource | O | | 9.2.1.20 | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|----------------------------|---|--|-------------|----------------------|
| Modification Required Info – SN terminated | | | | | | |
| >>PDU Session Resource Modification Required Info – MN terminated | O | | 9.2.1.22 | | – | |
| PDU Session Resources To Be Released List | | 0..1 | | | YES | ignore |
| >PDU Session Resources To Be Released Item | | 1 .. <maxnoof PDUSessions> | | | – | |
| >PDU sessions to be released List – SN terminated | O | | PDU session List with data forwarding request info 9.2.1.24 | | – | |
| >PDU sessions to be released List – MN terminated | O | | PDU session List with Cause 9.2.1.26 | | – | |
| S-NG-RAN node to M-NG-RAN node Container | O | | OCTET STRING | Includes the CG-Config message as defined in subclause 11.2.2 of TS 38.331 [10]. | YES | ignore |
| Spare DRB IDs | O | | DRB List 9.2.1.29 | Indicates the list of unnecessary DRB IDs that had been used by the S-NG-RAN node. | YES | ignore |
| Required Number of DRB IDs | O | | Number of DRBs 9.2.3.78 | Indicates the number of DRB IDs that the S-NG-RAN node requests more. | YES | ignore |
| Location Information at S-NODE | O | | Target Cell Global ID 9.2.3.25 | Contains information to support localisation of the UE | YES | ignore |
| MR-DC Resource Coordination Information | O | | 9.2.2.33 | Information used to coordinate resource utilisation between M-NG-RAN node and S-NG-RAN node. | YES | ignore |
| RRC Config Indication | O | | 9.2.3.72 | | YES | reject |
| SCG Indicator | O | | ENUMERATED (released,...) | | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.9 S-NODE MODIFICATION CONFIRM

This message is sent by the M-NG-RAN node to inform the S-NG-RAN node about the successful modification.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---------------------------------------|---|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| PDU sessions Admitted To Be Modified List | | 0..1 | | | YES | ignore |
| >PDU sessions Admitted To Be Modified Item | | 1 .. <maxnoof PDU sessi ons> | | NOTE: If neither the <i>PDU Session Resource Modification Confirm Info – SN terminated</i> IE nor the <i>PDU Session Resource Modification Confirm Info – MN terminated</i> IE is present in a <i>PDU Session Resources Admitted To Be Modified Item</i> IE, abnormal conditions as specified in clause 8.3.4.4 apply. | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>PDU Session Resource Modification Confirm Info – SN terminated | O | | 9.2.1.21 | | – | |
| >>PDU Session Resource Modification Confirm Info – MN terminated | O | | 9.2.1.23 | | – | |
| PDU sessions Released List | | 0..1 | | | YES | ignore |
| >PDU sessions released List – SN terminated | O | | PDU Session List with data forwarding info from the target node 9.2.1.25 | | – | |
| >PDU sessions released List – MN terminated | O | | PDU session List 9.2.1.27 | | – | |
| M-NG-RAN node to S-NG-RAN node Container | O | | OCTET STRING | Includes the <i>RRCReconfigurationComplete</i> message as defined in subclause 6.2.2 of TS 38.331 [10] or the <i>RRCConnectionReconfigurationComplete</i> message as defined in subclause 6.2.2 of TS 36.331 [14]. | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|-----------------------|--|-------------|----------------------|
| Additional DRB IDs | O | | DRB List 9.2.1.29 | Indicates additional list of DRB IDs that the S-NG-RAN node may use for SN-terminated bearers. | YES | reject |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| MR-DC Resource Coordination Information | O | | 9.2.2.33 | Information used to coordinate resource utilisation between M-NG-RAN node and S-NG-RAN node. | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.10 S-NODE MODIFICATION REFUSE

This message is sent by the M-NG-RAN node to inform the S-NG-RAN node that the S-NG-RAN node initiated S-NG-RAN node Modification has failed.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| M-NG-RAN node to S-NG-RAN node Container | O | | OCTET STRING | Includes the <i>CG-ConfigInfo</i> message as defined in subclause 11.2.2 of TS 38.331 [10]. | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.2.11 S-NODE CHANGE REQUIRED

This message is sent by the S-NG-RAN node to the M-NG-RAN node to trigger the change of the S-NG-RAN node.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Target S-NG-RAN node ID | M | | Global NG-RAN Node ID | | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------------------------------|-----------------------|---|-------------|----------------------|
| | | | 9.2.2.3 | | | |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| PDU Session SN Change Required List | | 0..1 | | | YES | ignore |
| >PDU Session SN Change Required Item | | 1 .. <maxnoof PDUsessions> | | NOTE: If the PDU Session Resource Change Required Info – SN terminated IE is not present in a PDU Session SN Change Required Item IE, abnormal conditions as specified in clause 8.3.5.4 apply. | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>PDU Session Resource Change Required Info – SN terminated | O | | 9.2.1.18 | | – | |
| S-NG-RAN node to M-NG-RAN node Container | M | | OCTET STRING | Includes the CG-Config message as defined in subclause 11.2.2 of TS 38.331 [10]. | YES | reject |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUsessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.12 S-NODE CHANGE CONFIRM

This message is sent by the M-NG-RAN node to inform the S-NG-RAN node that the preparation of the S-NG-RAN node initiated S-NG-RAN node change was successful.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------------------------------|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| PDU Session SN Change Confirm List | | 0..1 | | | YES | ignore |
| >PDU Session SN Change Confirm Item | | 1 .. <maxnoof PDUsessions> | | NOTE: If the PDU Session Resource Change Confirm Info – SN terminated IE is not present in a PDU Session SN Change Confirm Item IE, abnormal conditions as specified in clause 8.3.5.4 apply. | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>PDU Session | O | | 9.2.1.19 | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Resource Change Confirm Info – SN terminated | | | | | | |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUsessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.13 S-NODE CHANGE REFUSE

This message is sent by the M-NG-RAN node to inform the S-NG-RAN node that the preparation of the S-NG-RAN node initiated S-NG-RAN node change has failed.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.2.14 S-NODE RELEASE REQUEST

This message is sent by the M-NG-RAN node to the S-NG-RAN node to request the release of resources.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|---|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| PDU Session Resources To Be Released List | O | | PDU session List with Cause 9.2.1.26 | | YES | ignore |
| UE Context Kept Indicator | O | | 9.2.3.68 | | YES | ignore |
| M-NG-RAN node to S-NG-RAN node Container | O | | OCTET STRING | Includes the <i>CG-ConfigInfo</i> message as defined in subclause 11.2.2 of TS 38.331 [10]. | YES | ignore |
| DRBs transferred to MN | O | | DRB List 9.2.1.29 | Indicates that the target M-NG-RAN node reconfigured the listed DRBs as MN-terminated bearers. | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.15 S-NODE RELEASE REQUEST ACKNOWLEDGE

This message is sent by the S-NG-RAN node to the M-NG-RAN node to confirm the request to release S-NG-RAN node resources.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|--|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| PDU sessions To Be Released List | | 0..1 | | | YES | ignore |
| >PDU Session Resources To Be Released List – SN terminated | O | | PDU Session List with data forwarding request info 9.2.1.24 | | – | |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.2.16 S-NODE RELEASE REJECT

This message is sent by the S-NG-RAN node to the M-NG-RAN node to reject the request to release S-NG-RAN node resources.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.2.17 S-NODE RELEASE REQUIRED

This message is sent by the S-NG-RAN node to request the release of all resources for a specific UE at the S-NG-RAN node.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID | Allocated at the M-NG-RAN node | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|---|--|-------------|----------------------|
| | | | 9.2.3.16 | | | |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| PDU sessions To Be Released | | 0..1 | | | YES | ignore |
| >PDU Session Resources to be released List – SN terminated | O | | PDU session List with data forwarding request info 9.2.1.24 | | – | |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| S-NG-RAN node to M-NG-RAN node Container | O | | OCTET STRING | Includes the CG-Config message as defined in TS 38.331 [10]. | YES | ignore |

9.1.2.18 S-NODE RELEASE CONFIRM

This message is sent by the M-NG-RAN node to confirm the release of all resources for a specific UE at the S-NG-RAN node.

Direction: M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|--|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| PDU Session Resources Released | | 0..1 | | | YES | ignore |
| >PDU sessions released List – SN terminated | O | | PDU Session List with data forwarding info from the target node 9.2.1.25 | | – | |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.1.2.19 S-NODE COUNTER CHECK REQUEST

This message is sent by the S-NG-RAN node to request the verification of the value of the PDCP COUNTs associated with SN terminated bearers established in the S-NG-RAN node.

Direction: S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|---------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE | M | | NG-RAN node | Allocated at the S- | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|------------------------------------|------------------------|---|-------------|----------------------|
| XnAP ID | | | UE XnAP ID 9.2.3.16 | NG-RAN node | | |
| Bearer Subject to Counter Check List | | 1 | | | YES | ignore |
| >Bearer Subject to Counter Check Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>UL COUNT | M | INTEGER (0.. 42949672 95) | | Indicates the value of uplink COUNT associated to this DRB. | – | |
| >>DL COUNT | M | INTEGER (0.. 42949672 95) | | Indicates the value of downlink COUNT associated to this DRB. | – | |

| Range bound | Explanation |
|-------------|----------------------------------|
| maxnoofDRBs | Maximum no. of DRBs. Value is 32 |

9.1.2.20 RRC TRANSFER

This message is sent by the M-NG-RAN-NODE to the S-NG-RAN-NODE to transfer an RRC message or from the S-NG-RAN-NODE to the M-NG-RAN-NODE to report the DL RRC message delivery status.

Direction: M-NG-RAN node → S-NG-RAN node or S-NG-RAN node → M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| Split SRB | | 0..1 | | | YES | reject |
| >RRC Container | O | | OCTET STRING | Contains a PDCP-C PDU encapsulating an RRC message as defined in subclause 6.2.1 of TS 38.331 [10] or TS 36.331 [14] and ciphered with the key of the M-NG-RAN node | – | |
| >SRB Type | M | | ENUMERATED (srb1, srb2, ...) | The SRB type to be used | – | |
| >Delivery Status | O | | 9.2.3.45 | DL RRC delivery status of split SRB | – | |
| UE Report | | 0..1 | | | YES | reject |
| >RRC Container | M | | OCTET STRING | For NGEN-DC and NR-DC, includes the <i>UL-DCCCH-Message</i> as defined in subclause 6.2.1 of TS 38.331 [10] containing the | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|-----------------------|---|-------------|----------------------|
| | | | | <i>MeasurementReport</i> message or the <i>RRCReconfigurationComplete</i> message or the <i>FailureInformation</i> message or the <i>UEAssistanceInformation</i> message. For NE-DC, includes the <i>UL-DCCH-Message</i> as defined in subclause 6.2.1 of TS 36.331 [14] containing the <i>MeasurementReport</i> message. | | |
| Fast MCG Recovery via SRB3 from SN to MN | | 0..1 | | | YES | ignore |
| >RRC Container | M | | OCTET STRING | For NR-DC, includes the <i>UL-DCCH-Message</i> as defined in subclause 6.2.1 of TS 38.331 [10] containing the <i>MCGFailureInformation</i> , message. For NGEN-DC, includes the <i>UL-DCCH-Message</i> as defined in subclause 6.2.1 of TS 36.331 [14] containing the <i>MCGFailureInformation</i> message. | – | |
| Fast MCG Recovery via SRB3 from MN to SN | | 0..1 | | | YES | ignore |
| >RRC Container | M | | OCTET STRING | For NR-DC, includes the <i>DL-DCCH-Message</i> as defined in subclause 6.2.1 of TS 38.331 [10] containing the <i>RRCReconfiguration</i> message, or the <i>RRCRelease</i> message, or the <i>MobilityFromNRCommand</i> message. For NGEN-DC, includes the <i>DL-DCCH-Message</i> as defined in subclause 6.2.1 of TS 36.331 [14] containing the <i>RRCConnectionReconfiguration</i> | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------|----------|-------|-----------------------|--|-------------|----------------------|
| | | | | message, or the <i>RRConnectionRelease</i> message, or the <i>MobilityFromEUTRACCommand</i> message. | | |

9.1.2.21 NOTIFICATION CONTROL INDICATION

This message is sent to notify that the QoS requirements of already established GBR QoS flow(s) for a given UE for which notification control has been requested are either not fulfilled anymore or fulfilled again.

Direction: S-NG-RAN node → M-NG-RAN node and M-NG-RAN node → S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|----------------------------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| PDU Session Resource Notify List | | 0..1 | | | YES | reject |
| >PDU Session Resource Notify Item | | 1..<maxno of PDU Sessions> | | | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>QoS Flow Notification Control Indication Info | M | | 9.2.3.57 | | – | |

| Range bound | Explanation |
|---------------------|---|
| maxnoofPDU Sessions | Maximum no. of PDU sessions allowed towards one UE. Value is 256. |

9.1.2.22 ACTIVITY NOTIFICATION

This message is sent by a NG-RAN node to send notification to another NG-RAN node for one or several QoS flows or PDU sessions already established for a given UE.

Direction: NG-RAN node → NG-RAN node

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------|--|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | ignore |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | ignore |
| UE Context level user plane activity report | O | | User plane traffic activity report 9.2.3.59 | | YES | ignore |
| PDU Session Resource Activity Notify List | | 0..1 | | | YES | ignore |
| >PDU Session | | 1..<maxno | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|------------------------------------|--|-----------------------|-------------|----------------------|
| Resource Activity Notify Item | | <i>ofPDU Sessions</i> | | | | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>PDU Session level user plane activity report | O | | User plane traffic activity report 9.2.3.59 | | – | |
| >>QoS Flows Activity Notify List | | <i>0..1</i> | | | – | |
| >>>QoS Flows Activity Notify Item | | <i>1..<maxno ofQoSflows></i> | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>User plane traffic activity report | M | | 9.2.3.59 | | – | |
| RAN Paging Failure | O | | ENUMERATED (true, ...) | | YES | ignore |

| Range bound | Explanation |
|---------------------|---|
| maxnoofPDU Sessions | Maximum no. of PDU sessions. Value is 256 |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.1.2.23 E-UTRA – NR CELL RESOURCE COORDINATION REQUEST

This message is sent by a neighbouring ng-eNB to a peer gNB or by a neighbouring gNB to a peer ng-eNB, both nodes able to interact, to express the desired resource allocation for data traffic, for the sake of E-UTRA - NR Cell Resource Coordination.

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|---------------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE <i>Initiating Node Type</i> | M | | | | YES | reject |
| >ng-eNB | | | | | | |
| >>Data Traffic Resource Indication | M | | 9.2.2.30 | Indicates resource allocations for data traffic. | – | |
| >>Spectrum Sharing Group ID | M | | INTEGER (1..maxnoofCellsinNG-RANnode) | Indicates the E-UTRA cells involved in resource coordination with the NR cells affiliated with the same <i>Spectrum Sharing Group ID</i> . | – | |
| >>List of E-UTRA Cells in E-UTRA Coordination Request | | <i>1.. <maxnoofCellsinNG-RANnode></i> | | List of applicable E-UTRA cells. | – | |
| >>>EUTRA Cell ID | M | | E-UTRA CGI 9.2.2.8 | | – | |
| >gNB | | | | | | |
| >>Data Traffic Resource Indication | M | | 9.2.2.30 | Indicates resource allocations for data traffic. | – | |
| >>List of E-UTRA | | <i>0.. <</i> | | List of applicable | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|---------------------------------------|--|-------------|----------------------|
| Cells in NR Coordination Request | | <i>maxnoofCellsinNG-RANnode</i> > | | E-UTRA cells | | |
| >>>E-UTRA Cell ID | M | | E-UTRA CGI 9.2.2.8 | | – | |
| >>Spectrum Sharing Group ID | M | | INTEGER (1..maxnoofCellsinNG-RANnode) | Indicates the NR cells involved in resource coordination with the E-UTRA cells affiliated with the same <i>Spectrum Sharing Group ID</i> . | – | |
| >>List of NR Cells in NR Coordination Request | | 1.. < <i>maxnoNRcellsSpectrumSharingwithE-UTRA</i> > | | List of applicable NR cells | – | |
| >>>NR-Cell ID | M | | NR CGI 9.2.2.7 | | – | |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

| Range bound | Explanation |
|---------------------------------------|--|
| maxnoNRcellsSpectrumSharingwithE-UTRA | Maximum no. of NR cells affiliated to a <i>Spectrum Sharing Group ID</i> involved in cell resource coordination with a number of E-UTRA cells affiliated with the same <i>Spectrum Sharing Group ID</i> . Value is 64. |
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.1.2.24 E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE

This message is sent by a neighbouring ng-eNB to a peer gNB or by a neighbouring gNB to a peer ng-eNB, both nodes able to interact, as a response to the E-UTRA – NR CELL RESOURCE COORDINATION REQUEST.

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--|---------------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE <i>Responding NodeType</i> | M | | | | YES | reject |
| >ng-eNB | | | | | | |
| >>Data Traffic Resource Indication | M | | 9.2.2.30 | Indicates resource allocations for data traffic. | – | |
| >>Spectrum Sharing Group ID | M | | INTEGER (1..maxnoofCellsinNG-RANnode) | Indicates the E-UTRA cells involved in resource coordination with the NR cells affiliated with the same <i>Spectrum Sharing Group ID</i> . | – | |
| >>List of E-UTRA Cells in E-UTRA Coordination Response | | 1.. < <i>maxnoofCellsinNG-RANnode</i> > | | List of applicable E-UTRA cells | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--|---|--|-------------|----------------------|
| >>>EUTRA Cell ID | M | | E-UTRA CGI 9.2.2.8 | | – | |
| >gNB | | | | | | |
| >>Data Traffic Resource Indication | M | | 9.2.2.30 | Indicates resource allocations for data traffic. | – | |
| >>Spectrum Sharing Group ID | M | | INTEGER (1.. maxnoofCellsin NG-RANnode) | Indicates the NR cells involved in resource coordination with the E-UTRA cells affiliated with the same <i>Spectrum Sharing Group ID</i> . | – | |
| >>List of NR Cells in NR Coordination Response | | 1.. < maxnoNR cellsSpect rumSharin gwithE- UTRA > | | List of applicable NR cells | – | |
| >>>NR Cell ID | M | | NR CGI 9.2.2.7 | | – | |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

| Range bound | Explanation |
|---------------------------------------|--|
| maxnoNRcellsSpectrumSharingwithE-UTRA | Maximum no. of NR cells affiliated to a <i>Spectrum Sharing Group ID</i> involved in cell resource coordination with a number of E-UTRA cells affiliated with the same <i>Spectrum Sharing Group ID</i> . Value is 64. |
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.1.2.25 SECONDARY RAT DATA USAGE REPORT

This message is sent by the S-NG-RAN node to report data volumes for secondary RAT.

Direction: S-NG-RAN node → M-NG-RAN node

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------------------------|------------------------------------|--------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node | YES | reject |
| PDU Session Resource Secondary RAT Usage List | | 1 | | | YES | reject |
| > PDU Session Resource Secondary RAT Usage Item | | 1..<maxno ofPDUsessions> | | | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>Secondary RAT Usage Information | M | | 9.2.3.87 | | – | |

| Range bound | Explanation |
|--------------------|--|
| maxnoofPDUsessions | Maximum no. of PDU sessions. Value is 256. |

9.1.2.26 TRACE START

This message is sent by the M-NG-RAN node to initiate a trace session for a UE.

Direction: M-NG-RAN node → S-NG-RAN node

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|---------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node. | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node. | YES | reject |
| Trace Activation | O | | 9.2.3.55 | This IE is always present. | YES | ignore |

9.1.2.27 DEACTIVATE TRACE

This message is sent by the M-NG-RAN node to deactivate a trace session.

Direction: M-NG-RAN node → S-NG-RAN node

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|------------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| M-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the M-NG-RAN node. | YES | reject |
| S-NG-RAN node UE XnAP ID | M | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the S-NG-RAN node. | YES | reject |
| NG-RAN Trace ID | M | | OCTET STRING (SIZE(8)) | As per NG-RAN Trace ID in <i>Trace Activation</i> IE | YES | ignore |

9.1.3 Messages for Global Procedures

9.1.3.1 XN SETUP REQUEST

This message is sent by a NG-RAN node to a neighbouring NG-RAN node to transfer application data for an Xn-C interface instance.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------|----------|-------------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Global NG-RAN Node ID | M | | 9.2.2.3 | | YES | reject |
| TAI Support List | M | | 9.2.3.20 | List of supported TAs and associated characteristics. | YES | reject |
| AMF Region Information | M | | 9.2.3.83 | Contains a list of all the AMF Regions to which the NG-RAN node belongs. | YES | reject |
| List of Served Cells NR | | 0 .. <maxnoof CellsinNG | | Contains a list of cells served by the gNB. If a partial list | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|------------------------------------|--|-------------|----------------------|
| | | <i>-RAN node></i> | | of cells is signalled, it contains at least one cell per carrier configured at the gNB | | |
| >Served Cell Information NR | M | | 9.2.2.11 | | – | |
| >Neighbour Information NR | O | | 9.2.2.13 | | – | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| List of Served Cells E-UTRA | | <i>0 .. <maxnoof CellsinNG -RAN node></i> | | Contains a list of cells served by the ng-eNB. If a partial list of cells is signalled, it contains at least one cell per carrier configured at the ng-eNB | YES | reject |
| >Served Cell Information E-UTRA | M | | 9.2.2.12 | | – | |
| >Neighbour Information NR | O | | 9.2.2.13 | | – | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| >SFN Offset | O | | 9.2.2.75 | Associated with the <i>ECGI</i> IE in the <i>Served Cell Information E-UTRA</i> IE | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |
| TNL Configuration Info | O | | 9.2.3.96 | | YES | ignore |
| Partial List Indicator NR | O | | Partial List Indicator 9.2.2.46 | Value "partial" indicates that a partial list of cells is included in the <i>List of Served Cells NR</i> IE. | YES | ignore |
| Cell and Capacity Assistance Information NR | O | | 9.2.2.41 | Contains NR cell related assistance information. | YES | ignore |
| Partial List Indicator E-UTRA | O | | Partial List Indicator 9.2.2.46 | Value "partial" indicates that a partial list of cells is included in the <i>List of Served Cells E-UTRA</i> . | YES | ignore |
| Cell and Capacity Assistance Information E-UTRA | O | | 9.2.2.42 | Contains E-UTRA cell related assistance information. | YES | ignore |

| Range bound | Explanation |
|---------------------------|--|
| maxnoofCellsinNG-RAN node | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.1.3.2 XN SETUP RESPONSE

This message is sent by a NG-RAN node to a neighbouring NG-RAN node to transfer application data for an Xn-C interface instance.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|--|------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Global NG-RAN Node ID | M | | 9.2.2.3 | | YES | reject |
| TAI Support List | M | | 9.2.3.20 | List of supported TAs and associated characteristics. | YES | reject |
| List of Served Cells NR | | 0 .. <maxnoof CellsinNG -RAN node> | | Contains a list of cells served by the gNB. If a partial list of cells is signalled, it contains at least one cell per carrier configured at the gNB | YES | reject |
| >Served Cell Information NR | M | | 9.2.2.11 | | – | |
| >Neighbour Information NR | O | | 9.2.2.13 | | – | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| List of Served Cells E-UTRA | | 0 .. <maxnoof CellsinNG -RAN node> | | Contains a list of cells served by the ng-eNB. If a partial list of cells is signalled, it contains at least one cell per carrier configured at the gNB | YES | reject |
| >Served Cell Information E-UTRA | M | | 9.2.2.12 | | – | |
| >Neighbour Information NR | O | | 9.2.2.13 | | – | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| >SFN Offset | O | | 9.2.2.75 | Associated with the ECGI IE in the Served Cell Information E-UTRA IE | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| AMF Region Information | O | | 9.2.3.83 | Contains a list of all the AMF Regions to which the NG-RAN node belongs. | YES | reject |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |
| TNL Configuration Info | O | | 9.2.3.96 | | YES | ignore |
| Partial List Indicator NR | O | | Partial List Indicator 9.2.2.46 | Value "partial" indicates that a partial list of cells is included in the List of Served Cells NR IE. | YES | ignore |
| Cell and Capacity Assistance Information NR | O | | 9.2.2.41 | Contains NR cell related assistance information. | YES | ignore |
| Partial List Indicator E-UTRA | O | | Partial List Indicator 9.2.2.46 | Value "partial" indicates that a partial list of cells is included in the | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|-----------------------|--|-------------|----------------------|
| | | | | <i>List of Served Cells E-UTRA.</i> | | |
| Cell and Capacity Assistance Information E-UTRA | O | | 9.2.2.42 | Contains E-UTRA cell related assistance information. | YES | ignore |

| Range bound | Explanation |
|---------------------------|--|
| maxnoofCellsinNG-RAN node | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.1.3.3 XN SETUP FAILURE

This message is sent by the neighbouring NG-RAN node to indicate Xn Setup failure.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Time To Wait | O | | 9.2.3.56 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |
| Message Oversize Notification | O | | 9.2.2.45 | | YES | ignore |

9.1.3.4 NG-RAN NODE CONFIGURATION UPDATE

This message is sent by a NG-RAN node to a neighbouring NG-RAN node to transfer updated information for an Xn-C interface instance.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|--------------------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| TAI Support List | O | | 9.2.3.20 | List of supported TAs and associated characteristics. | GLOBAL | reject |
| CHOICE <i>Initiating NodeType</i> | M | | | | YES | ignore |
| > <i>gNB</i> | | | | | | |
| >>Served Cells To Update NR | O | | 9.2.2.15 | | YES | ignore |
| >>Cell Assistance Information NR | O | | 9.2.2.17 | | YES | ignore |
| >>Cell Assistance Information E-UTRA | O | | 9.2.2.43 | | YES | ignore |
| > <i>ng-eNB</i> | | | | | | |
| >>Served Cells to Update E-UTRA | O | | 9.2.2.16 | | YES | ignore |
| >>Cell Assistance Information NR | O | | 9.2.2.17 | | YES | ignore |
| >>Cell Assistance Information E-UTRA | O | | 9.2.2.43 | | YES | ignore |
| TNLA To Add List | | 0..1 | | | YES | ignore |
| >TNLA To Add Item | | 1..<maxno ofTNLAss | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------------------------|----------|------------------------------|---|---|-------------|----------------------|
| | | <i>ociations></i> | | | | |
| >>TNLA Transport Layer Information | M | | CP Transport Layer Information 9.2.3.31 | CP Transport Layer Information of NG-RAN node ₁ | – | |
| >> TNL Association Usage | M | | 9.2.3.84 | | – | |
| TNLA To Update List | | 0..1 | | | YES | ignore |
| >TNLA To Update Item | | 1..<maxno ofTNLAssociations> | | | – | |
| >>TNLA Transport Layer Information | M | | CP Transport Layer Information 9.2.3.31 | CP Transport Layer Information of NG-RAN node ₁ | – | |
| >> TNL Association Usage | O | | 9.2.3.84 | | – | |
| TNLA To Remove List | | 0..1 | | | YES | ignore |
| >TNLA To Remove Item | | 1..<maxno ofTNLAssociations> | | | – | |
| >>TNLA Transport Layer Information | M | | CP Transport Layer Information 9.2.3.31 | CP Transport Layer Information of NG-RAN node ₁ | – | |
| Global NG-RAN Node ID | O | | 9.2.2.3 | | YES | reject |
| AMF Region Information To Add | O | | AMF Region Information 9.2.3.83 | List of all added AMF Regions to which the NG-RAN node belongs. | YES | reject |
| AMF Region Information To Delete | O | | AMF Region Information 9.2.3.83 | List of all deleted AMF Regions to which the NG-RAN node belongs. | YES | reject |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |
| TNL Configuration Info | O | | 9.2.3.96 | | YES | ignore |

| Range bound | Explanation |
|------------------------|--|
| maxnoofTNLAssociations | Maximum numbers of TNL Associations between the NG RAN nodes. Value is 32. |

9.1.3.5 NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a neighbouring NG-RAN node to a peer node to acknowledge update of information for a TNL association.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE Responding NodeType | M | | | | YES | ignore |
| >ng-eNB | | | | | | |
| >gNB | | | | | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|--|---|---|-------------|----------------------|
| >>Served E-UTRA Cells | | $0 \dots < \max\text{noofCellsinNG-RANnode} >$ | | Complete or limited list of cells served by an ng-eNB, if requested by NG-RAN node ₁ . | YES | ignore |
| >>>Served Cell Information E-UTRA | M | | 9.2.2.12 | | – | |
| >>>Neighbour Information NR | O | | 9.2.2.13 | NR neighbours. | – | |
| >>>Neighbour Information E-UTRA | O | | 9.2.2.14 | E-UTRA neighbours | – | |
| >>>SFN Offset | O | | 9.2.2.75 | Associated with the <i>ECGI</i> IE in the <i>Served Cell Information E-UTRA</i> IE | YES | ignore |
| >>Partial List Indicator E-UTRA | O | | Partial List Indicator 9.2.2.46 | Value "partial" indicates that a partial list of cells is included in the <i>Served E-UTRA Cells</i> IE | YES | ignore |
| >>Cell and Capacity Assistance Information E-UTRA | O | | 9.2.2.42 | Contains E-UTRA cell related assistance information. | YES | ignore |
| >>Served NR Cells | | $0 \dots < \max\text{noofCellsinNG-RANnode} >$ | | Complete or limited list of cells served by a gNB, if requested by NG-RAN node ₁ . | – | |
| >>>Served Cell Information NR | M | | 9.2.2.11 | | – | |
| >>>Neighbour Information NR | O | | 9.2.2.13 | NR neighbours. | – | |
| >>>Neighbour Information E-UTRA | O | | 9.2.2.14 | E-UTRA neighbours | – | |
| >>Partial List Indicator NR | O | | Partial List Indicator 9.2.2.46 | Value "partial" indicates that a partial list of cells is included in the <i>Served NR Cells</i> IE | YES | ignore |
| >>Cell and Capacity Assistance Information NR | O | | 9.2.2.41 | Contains NR cell related assistance information. | YES | ignore |
| TNLA Setup List | | $0..1$ | | | YES | ignore |
| >TNLA Setup Item | | $1..<\max\text{noofTNLAAssociations}>$ | | | – | |
| >>TNLA Transport Layer Address | M | | CP Transport Layer Information 9.2.3.31 | CP Transport Layer Information as received from NG-RAN node ₁ | – | |
| TNLA Failed to Setup List | | $0..1$ | | | YES | ignore |
| >TNLA Failed To Setup Item | | $1..<\max\text{noofTNLAAssociations}>$ | | | – | |
| >>TNLA Transport Layer Address | M | | CP Transport Layer Information | CP Transport Layer Information as received from | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|-----------------------|--------------------------|-------------|----------------------|
| | | | 9.2.3.31 | NG-RAN node ₁ | | |
| >>Cause | M | | 9.2.3.2 | | – | |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |
| TNL Configuration Info | O | | 9.2.3.96 | | YES | ignore |

| Range bound | Explanation |
|-------------------------|---|
| maxnoofCellsinNGRANnode | Maximum no. cells that can be served by an NG-RAN node. Value is 16384. |
| maxnoofTNLAssociations | Maximum numbers of TNL Associations between NG-RAN nodes. Value is 32. |

9.1.3.6 NG-RAN NODE CONFIGURATION UPDATE FAILURE

This message is sent by the neighbouring NG-RAN node to indicate NG-RAN node Configuration Update failure.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Time To Wait | O | | 9.2.3.56 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

9.1.3.7 CELL ACTIVATION REQUEST

This message is sent by the NG-RAN node₁ to the peer NG-RAN node₂ to request a previously switched-off cell/s to be re-activated.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------------------------------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE <i>Served Cells To Activate</i> | M | | | | YES | reject |
| >NR Cells | | | | | | |
| >>NR Cells List | | 1 | | | – | |
| >>>NR Cells item | | 1 .. < maxnoofCellsinNG-RANnode > | | | – | |
| >>>>NR CGI | M | | 9.2.2.7 | | – | |
| >E-UTRA Cells | | | | | | |
| >>E-UTRA Cells List | | 1 | | | – | |
| >>>E-UTRA Cells item | | 1 .. < maxnoofCellsinNG-RANnode > | | | – | |
| >>>>E-UTRA CGI | M | | 9.2.2.8 | | – | |
| Activation ID | M | | INTEGER (0..255) | Allocated by the NG-RAN node ₁ | YES | reject |
| Interface Instance | O | | 9.2.2.39 | | YES | reject |

| | | | | | | |
|------------|--|--|--|--|--|--|
| Indication | | | | | | |
|------------|--|--|--|--|--|--|

| Range bound | Explanation |
|--------------------------|---|
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by an NG-RAN node. Value is 16384. |

9.1.3.8 CELL ACTIVATION RESPONSE

This message is sent by an NG-RAN node₂ to a peer NG-RAN node₁ to indicate that one or more cell(s) previously switched-off has (have) been activated.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-----------------------------------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE Activated Served Cells | M | | | | YES | reject |
| >NR Cells | | | | | | |
| >>NR Cells List | | 1 | | | – | |
| >>>NR Cells Item | | 1 .. < maxnoofCellsinNG-RANnode > | | | – | |
| >>>>NR CGI | M | | 9.2.2.7 | | – | |
| >E-UTRA Cells | | | | | | |
| >>E-UTRA Cells List | | 1 | | | – | |
| >>>E-UTRA Cells Item | | 1 .. < maxnoofCellsinNG-RANnode > | | | – | |
| >>>>E-UTRA CGI | M | | 9.2.2.8 | | – | |
| Activation ID | M | | INTEGER (0..255) | Allocated by the NG-RAN node ₁ | YES | reject |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

| Range bound | Explanation |
|--------------------------|---|
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by an NG-RAN node. Value is 16384. |

9.1.3.9 CELL ACTIVATION FAILURE

This message is sent by an NG-RAN node₂ to a peer NG-RAN node₁ to indicate cell activation failure.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Activation ID | M | | INTEGER (0..255) | Allocated by the NG-RAN node ₁ | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

9.1.3.10 RESET REQUEST

This message is sent from one NG-RAN node to another NG-RAN node and is used to request the Xn interface to be reset.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|------------------------------|---------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE <i>Reset Request TypeInfo</i> | M | | | | YES | reject |
| > <i>Full Reset</i> | | | | | | |
| > <i>Partial Reset</i> | | | | | | |
| >>UE contexts to be released List | | 1 | | | – | |
| >>>UE Contexts to be released Item | | 1 .. <maxnoof UEcontexts> | | | – | |
| >>>>NG-RAN node1 UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the NG-RAN node ₁ | – | |
| >>>>NG-RAN node2 UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the NG-RAN node ₂ | – | |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

| Range bound | Explanation |
|-------------------|--|
| maxnoofUEContexts | Maximum no. of UE Contexts. Value is 8192. |

9.1.3.11 RESET RESPONSE

This message is sent by an NG-RAN node as a response to a RESET REQUEST message.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|------------------------------|---------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| CHOICE <i>Reset Response Type Info</i> | M | | | | YES | ignore |
| > <i>Full Reset</i> | | | | | | |
| > <i>Partial Reset</i> | | | | | | |
| >>Admitted UE contexts to be released List | | 1 | | | – | |
| >>>Admitted UE Contexts to be released Item | | 1 .. <maxnoof UEcontexts> | | | – | |
| >>>>NG-RAN node1 UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the NG-RAN node ₁ | – | |
| >>>>NG-RAN node2 UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the NG-RAN node ₂ | – | |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

| Range bound | Explanation |
|-------------------|--|
| maxnoofUEContexts | Maximum no. of UE Contexts. Value is 8192. |

9.1.3.12 ERROR INDICATION

This message is used to indicate that some error has been detected in the NG-RAN node.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|------------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| Old NG-RAN node UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the source NG-RAN node and for dual connectivity at the S-NG-RAN node or for an SN Status Transfer procedure at the NG-RAN node from which a DRB is offloaded. | YES | ignore |
| New NG-RAN node UE XnAP ID | O | | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated for handover at the target NG-RAN node and for dual connectivity at the M-NG-RAN node or for an SN Status Transfer procedure at the NG-RAN node to which a DRB is offloaded. | YES | ignore |
| Cause | O | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

9.1.3.13 XN REMOVAL REQUEST

This message is sent by a NG-RAN node to a neighbouring NG-RAN node to initiate the removal of the interface instance.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|------------------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Global NG-RAN Node ID | M | | 9.2.2.3 | | YES | reject |
| Xn Removal Threshold | O | | Xn Benefit Value 9.2.3.54 | | YES | reject |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

9.1.3.14 XN REMOVAL RESPONSE

This message is sent by a NG-RAN node to a neighbouring NG-RAN node to acknowledge the initiation of removal of the interface instance.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Global NG-RAN Node ID | M | | 9.2.2.3 | | YES | reject |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

9.1.3.15 XN REMOVAL FAILURE

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

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |
| Interface Instance Indication | O | | 9.2.2.39 | | YES | reject |

9.1.3.16 FAILURE INDICATION

This message is sent by NG-RAN node₂ to indicate an RRC re-establishment attempt or a reception of an RLF Report from a UE that suffered a connection failure at NG-RAN node₁.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|---|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| CHOICE <i>Initiating condition</i> | M | | | | YES | reject |
| > <i>RRC Reestab</i> | | | | | | |
| >>CHOICE <i>RRC Reestab Initiated Reporting</i> | M | | | | – | |
| >>> <i>RRC Reestab Reporting without RLF Report</i> | | | | | | |
| >>>>Failure cell PCI | M | | 9.2.2.10 | Physical Cell Identifier | – | |
| >>>>Re-establishment cell CGI | M | | Global NG-RAN Cell Identity 9.2.2.27 | | – | |
| >>>>C-RNTI | M | | BIT STRING (SIZE (16)) | C-RNTI contained in the <i>RRCRe-establishment Request</i> message (TS 38.331 [10]) or in the <i>RRCCoNNECTIONReestablishmentRequest</i> message (TS 36.331 [14]) | – | |
| >>>>ShortMAC-I | M | | BIT STRING (SIZE (16)) | ShortMAC-I contained in the <i>RRCRe-establishment</i> | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|--|--|-------------|----------------------|
| | | | | <i>Request</i> message (TS 38.331 [10]) or in the <i>RRCConnectionReestablishmentRequest</i> message (TS 36.331 [14]) | | |
| >>>>RRC Conn Reestab Indicator | O | | ENUMERATED (reconfiguration Failure, handoverFailure, otherFailure, ...) | | YES | ignore |
| >>>RRC Reestab Reporting with RLF Report | | | | | | |
| >>>>UE RLF Report Container | M | | 9.2.2.59 | <i>nr-RLF-Report-r16</i> IE contained in the <i>UEInformationResponse</i> message (TS 38.331 [10]) or <i>RLF-Report-r9</i> IE contained in the <i>UEInformationResponse</i> message (TS 36.331 [14]) | – | |
| >RRC Setup | | | | | | |
| >>CHOICE RRC Setup Initiated Reporting | M | | | | – | |
| >>>RRC Setup Reporting with RLF Report | | | | | | |
| >>>>UE RLF Report Container | M | | 9.2.2.59 | <i>nr-RLF-Report-r16</i> IE contained in the <i>UEInformationResponse</i> message (TS 38.331 [10]) or <i>RLF-Report-r9</i> IE contained in the <i>UEInformationResponse</i> message (TS 36.331 [14]) | – | |

9.1.3.17 HANDOVER REPORT

This message is sent by NG-RAN node₁ to NG-RAN node₂ to report a handover failure event, or other critical mobility problem.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|--|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| Handover Report Type | M | | ENUMERATED (HO too early, HO to wrong cell, Inter-system ping-pong. ...) | | YES | ignore |
| Handover Cause | M | | Cause 9.2.3.2 | Indicates handover cause employed for handover from | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------------|---|-------|--------------------------------------|--|-------------|----------------------|
| | | | | NG-RAN node ₂ | | |
| Source cell CGI | M | | Global NG-RAN Cell Identity 9.2.2.27 | NG-RAN CGI of source cell for handover procedure (in NG-RAN node ₂) | YES | ignore |
| Target cell CGI | M | | Global NG-RAN Cell Identity 9.2.2.27 | NG-RAN CGI of target cell for handover procedure (in NG-RAN node ₁). If the Handover Report Type is set to "Inter-system ping-pong", it contains the target cell of the inter system handover from the other system to NG-RAN node ₁ cell | YES | ignore |
| Re-establishment cell CGI | C- ifHandove rReportTy pe HoToWro ngCell | | Global Cell Identity 9.2.2.73 | CGI of cell where UE attempted re-establishment or where UE successfully re-connected after the failure | YES | ignore |
| Target cell in E-UTRAN | C- ifHandove rReportTy pe Intersyste mpingpon g | | OCTET STRING | Encoded according to <i>Global Cell ID</i> in the <i>Last Visited E-UTRAN Cell Information</i> IE, as defined in in TS 36.413 [31] | YES | ignore |
| Source cell C-RNTI | O | | BIT STRING (SIZE (16)) | C-RNTI allocated at the source NG-RAN node (in NG-RAN node ₂) | YES | ignore |
| Mobility Information | O | | BIT STRING (SIZE (32)) | Information provided in the HANDOVER REQUEST message from NG-RAN node ₂ . | YES | ignore |
| UE RLF Report Container | O | | 9.2.2.59 | The UE RLF Report Container IE received in the FAILURE INDICATION message. | YES | ignore |

| Condition | Explanation |
|--|---|
| ifHandoverReportType HoToWrongCell | This IE shall be present if the <i>Handover Report Type</i> IE is set to the value "HO to wrong cell" |
| ifHandoverReportType Intersystempingpong | This IE shall be present if the <i>Handover Report Type</i> IE is set to the value "Inter-system ping-pong" |

9.1.3.18 RESOURCE STATUS REQUEST

This message is sent by NG-RAN node₁ to NG-RAN node₂ to initiate the requested measurement according to the parameters given in the message.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------------------------------|-------------------------------------|--------------------------------------|---|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| NG-RAN node1 Measurement ID | M | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₁ | YES | reject |
| NG-RAN node2 Measurement ID | C-ifRegistrationRequestStoporAdd | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₂ | YES | ignore |
| Registration Request | M | | ENUMERATED (start, stop, add, ...) | Type of request for which the resource status is required. | YES | reject |
| Report Characteristics | C-ifRegistrationRequestStart | | BITSTRING (SIZE(32)) | Each position in the bitmap indicates measurement object the NG-RAN node ₂ is requested to report. First Bit = PRB Periodic, Second Bit = TNL Capacity Ind Periodic, Third Bit = Composite Available Capacity Periodic, Fourth Bit =Number of Active UEs, Fifth Bit =RRC connections. Other bits shall be ignored by the NG-RAN node ₂ . | YES | reject |
| Cell To Report List | | 0..1 | | Cell ID list to which the request applies. | YES | ignore |
| >Cell To Report Item | | 1 .. <maxnoof CellsinNG - RANnode > | | | - | |
| >>Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | - | |
| >>>SSB To Report List | | 0..1 | | SSB list to which the request applies. | - | |
| >>>>SSB To Report Item | | 1 .. <maxnoofS SBAreas> | | | - | |
| >>>>SSB-Index | M | | INTEGER (0..,63..) | | - | |
| >>>>Slice To Report List | | 0..1 | | S-NSSAI list to which the request applies. | - | |
| >>>>>Slice To Report Item | | 1 .. <maxnoofB PLMNs > | | | - | |
| >>>>>PLMN Identity | M | | 9.3.1.14 | Broadcast PLMN | - | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-----------------------|----------|--------------------------|--|---|-------------|----------------------|
| >>>>S-NSSAI List | | 1 | | | – | |
| >>>>>S-NSSAI Item | | 1 .. <maxnoofSliceltems> | | | – | |
| >>>>>>S-NSSAI | M | | S-NSSAI 9.3.1.38 | | – | |
| 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 |

| Condition | Explanation |
|--------------------------------|---|
| ifRegistrationRequestStoporAdd | This IE shall be present if the <i>Registration Request</i> IE is set to the value "stop" or "add". |
| ifRegistrationRequestStart | This IE shall be present if the <i>Registration Request</i> IE is set to the value "start". |

| Range bound | Explanation |
|--------------------------|--|
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |
| maxnoofSSBAreas | Maximum no. SSB Areas that can be served by a NG-RAN node cell. Value is 64. |
| maxnoofSliceltems | Maximum no. of signalled slice support items. Value is 1024. |

9.1.3.19 RESOURCE STATUS RESPONSE

This message is sent by NG-RAN node₂ to NG-RAN node₁ to indicate that the requested measurement, for all of the measurement objects included in the measurement is successfully initiated.

Direction: NG-RAN node₂ → NG-RAN node₁

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-----------------------------|----------|-------|-----------------------|---------------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| NG-RAN node1 Measurement ID | M | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₁ | YES | reject |
| NG-RAN node2 Measurement ID | M | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₂ | YES | reject |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.3.20 RESOURCE STATUS FAILURE

This message is sent by the NG-RAN node₂ to NG-RAN node₁ to indicate that for any of the requested measurement objects the measurement cannot be initiated.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |

| | | | | | | |
|-----------------------------|---|--|-----------------------|---------------------------------------|-----|--------|
| NG-RAN node1 Measurement ID | M | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₁ | YES | reject |
| NG-RAN node2 Measurement ID | M | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₂ | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.3 | | YES | ignore |

9.1.3.21 RESOURCE STATUS UPDATE

This message is sent by NG-RAN node₂ to NG-RAN node₁ to report the results of the requested measurements.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-----------------------------------|--------------------------------------|---------------------------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| NG-RAN node1 Measurement ID | M | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₁ | YES | reject |
| NG-RAN node2 Measurement ID | M | | INTEGER (1..4095,...) | Allocated by NG-RAN node ₂ | YES | reject |
| Cell Measurement Result | | 1 | | | YES | ignore |
| >Cell Measurement Result Item | | 1 .. < maxnoofCellsinNG-RANnode > | | | YES | ignore |
| >>Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | – | |
| >>Radio Resource Status | O | | 9.2.2.50 | | – | |
| >>TNL Capacity Indicator | O | | 9.2.2.49 | | – | |
| >>Composite Available Capacity Group | O | | 9.2.2.51 | | – | |
| >>Slice Available Capacity | O | | 9.2.2.55 | | – | |
| >>Number of Active UEs | O | | 9.2.2.62 | | -- | |
| >> RRC Connections | O | | 9.2.2.56 | | – | |

9.1.3.22 MOBILITY CHANGE REQUEST

| Range bound | Explanation |
|--------------------------|--|
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

This message is sent by NG-RAN node₁ to NG-RAN node₂ to initiate adaptation of mobility parameters.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|--------------------------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| NG-RAN node1 Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | reject |
| NG-RAN node2 Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|--|--|-------------|----------------------|
| NG-RAN node1 Mobility Parameters | O | | Mobility Parameters Information 9.2.2.60 | Configuration change in NG-RAN node1 cell | YES | ignore |
| NG-RAN node2 Proposed Mobility Parameters | M | | Mobility Parameters Information 9.2.2.60 | Proposed configuration change in NG-RAN node2 cell | YES | reject |
| Cause | M | | 9.2.3.2 | | YES | reject |

9.1.3.23 MOBILITY CHANGE ACKNOWLEDGE

This message is sent by NG-RAN node₂ to indicate to NG-RAN node₁ that Proposed Mobility Parameters proposed by NG-RAN node₁ were accepted.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------|----------|-------|--------------------------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| NG-RAN node1 Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | reject |
| NG-RAN node2 Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | reject |
| Criticality Diagnostics | O | | 9.2.3.2 | | YES | ignore |

9.1.3.24 MOBILITY CHANGE FAILURE

This message is sent by the NG-RAN node₂ to indicate to NG-RAN node₁ that Proposed Mobility Parameters proposed by NG-RAN node₁ were refused.

Direction: NG-RAN node₂ → NG-RAN node₁.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|--------------------------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | reject |
| NG-RAN node1 Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | ignore |
| NG-RAN node2 Cell ID | M | | Global NG-RAN Cell Identity 9.2.2.27 | | YES | ignore |
| Cause | M | | 9.2.3.2 | | YES | ignore |
| Mobility Parameters Modification Range | O | | 9.2.2.61 | | YES | ignore |
| Criticality Diagnostics | O | | 9.2.3.2 | | YES | ignore |

9.1.3.25 ACCESS AND MOBILITY INDICATION

This message is sent by NG-RAN node₁ to transfer access and mobility related information to NG-RAN node₂.

Direction: NG-RAN node₁ → NG-RAN node₂.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.2.3.1 | | YES | ignore |
| RACH Report List | | 0..1 | | | YES | ignore |
| >RACH Report List Item | | 1 .. | | | EACH | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------|----------|-----------------------|-----------------------|---|-------------|----------------------|
| | | <maxnoof RACHReports> | | | | |
| >>RACH Report Container | M | | OCTET STRING | RA-ReportList-r16 IE as defined in subclause 6.2.2 in TS 38.331 [10]. | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofRACHReports | Maximum no. of RACH Reports, the maximum value is 64. |

9.2 Information Element definitions

9.2.0 General

When specifying information elements which are to be represented by bit strings, if not otherwise specifically stated in the semantics description of the concerned IE or elsewhere, the following principle applies with regards to the ordering of bits:

- The first bit (leftmost bit) contains the most significant bit (MSB);
- The last bit (rightmost bit) contains the least significant bit (LSB);
- When importing bit strings from other specifications, the first bit of the bit string contains the first bit of the concerned information.

9.2.1 Container and List IE definitions

9.2.1.1 PDU Session Resources To Be Setup List

This IE contains PDU session resource related information used at UE context transfer between NG-RAN nodes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|------------------------------|--|--|-------------|----------------------|
| PDU Session Resources To Be Setup List | | 1 | | | – | |
| >PDU Session Resources To Be Setup Item | | 1 .. <maxnoof PDU sessions > | | | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>S-NSSAI | M | | 9.2.3.21 | | – | |
| >>PDU Session Resource Aggregate Maximum Bitrate | O | | PDU Session Aggregate Maximum Bit Rate 9.2.3.69 | This IE shall be present when at least one Non-GBR QoS Flow has been setup. | – | |
| >>UL NG-U UP TNL Information at UPF | M | | UP Transport Layer Information 9.2.3.30 | UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs | – | |
| >>Source DL NG-U TNL Information | O | | UP Transport Layer Information 9.2.3.30 | Indicates the possibility to keep the NG-U GTP-U tunnel termination point at the target NG-RAN node. | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|--------------------------|---|---|-------------|----------------------|
| >>Security Indication | O | | 9.2.3.52 | | – | |
| >>PDU Session Type | M | | 9.2.3.19 | | – | |
| >>Network Instance | O | | 9.2.3.85 | This IE is ignored if the <i>Common Network Instance</i> IE is present. | – | |
| >>QoS Flows To Be Setup List | | 1 | | | – | |
| >>>QoS Flows To Be Setup Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>QoS Flow Level QoS Parameters | M | | 9.2.3.5 | | – | |
| >>>>E-RAB ID | O | | INTEGER (0..15, ...) | | – | |
| >>>>TSC Traffic Characteristics | O | | 9.2.3.114 | | YES | ignore |
| >>>>Redundant QoS Flow Indicator | O | | 9.2.3.118 | | YES | ignore |
| >>Data Forwarding and Offloading Info from source NG-RAN node | O | | 9.2.1.17 | | – | |
| >>Additional UL NG-U UP TNL Information at UPF List | O | | Additional UP Transport Layer Information 9.2.1.32 | Additional UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs | YES | ignore |
| >> Common Network Instance | O | | 9.2.3.92 | | YES | ignore |
| >>Redundant UL NG-U UP TNL Information at UPF | O | | UP Transport Layer Information 9.2.3.30 | UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs for the redundant transmission | YES | ignore |
| >>Additional Redundant UL NG-U UP TNL Information at UPF List | O | | Additional UP Transport Layer Information 9.2.1.32 | Additional Redundant UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs | YES | ignore |
| >>Redundant Common Network Instance | O | | Common Network Instance 9.2.3.92 | | YES | ignore |
| >>Redundant PDU Session Information | O | | 9.2.3.112 | | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.1.2 PDU Session Resources Admitted List

This IE contains PDU session resource related information to report success of the establishment of PDU session resources.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------------|----------------------------------|---|-------------|----------------------|
| PDU Session Resources Admitted List | | 1 | | | – | |
| >PDU Session Resources Admitted Item | | 1..<maxno ofPDU Sessions> | | | – | |
| >>PDU Session ID | M | | 9.2.3.18 | | – | |
| >>>PDU Session Resource Admitted Info | M | | | | – | |
| >>>>DL NG-U TNL Information Unchanged | O | | ENUMERATED (True, ...) | Indicates the NG-U tunnels that have been kept unchanged at the target NG-RAN node | – | |
| >>>>QoS Flows Admitted List | | 1 | | | – | |
| >>>>>QoS Flows Admitted Item | | 1..<maxno ofQoS Flows> | | | – | |
| >>>>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>>>Current QoS Parameters Set Index | O | | 9.2.3.103 | Index to the currently fulfilled alternative QoS parameters set. | YES | ignore |
| >>>>QoS Flows not Admitted List | O | | QoS Flow List with Cause 9.2.1.4 | | – | |
| >>>>Data Forwarding Info from target NG-RAN node | O | | 9.2.1.16 | | – | |
| >>>>Secondary Data Forwarding Info from target NG-RAN node List | O | | 9.2.1.31 | This IE would be present only when the target M-NG-RAN node decide to split a PDU session between MN and SN | YES | ignore |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.1.3 PDU Session Resources Not Admitted List

This IE contains a list of PDU session resources which were not admitted to be added or modified.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|--------------------------|-----------------------|-----------------------|
| PDU Session Resources Not Admitted List | | 1 | | |
| >PDU Session Resources Not Admitted | | 1..<maxnoofPDU Sessions> | | |

| Item | | | | |
|------------------|---|--|----------|--|
| >>PDU Session ID | M | | 9.2.3.18 | |
| >>Cause | O | | 9.2.3.2 | |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUSessions | Maximum no. of PDU sessions. Value is 256 |

9.2.1.4 QoS Flow List with Cause

This IE contains a list of QoS flows with a cause value.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------------|----------|----------------------|-----------------------|-----------------------|
| QoS Flow with Cause Item | | 1..<maxnoofQoSFlows> | | |
| >QoS Flow Identifier | M | | 9.2.3.10 | |
| >Cause | O | | 9.2.3.2 | |

| Range bound | Explanation |
|-----------------|---|
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.1.4a QoS Flow List

This IE contains a list of QoS flows.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|----------------------|-----------------------|-----------------------|
| QoS Flow Item | | 1..<maxnoofQoSFlows> | | |
| >QoS Flow Identifier | M | | 9.2.3.10 | |

| Range bound | Explanation |
|-----------------|---|
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.1.5 PDU Session Resource Setup Info – SN terminated

This IE contains information for the addition of S-NG-RAN node resources related to a PDU session for DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-----------------------------------|----------|---------------|--|---|-------------|----------------------|
| UL NG-U UP TNL Information at UPF | M | | UP Transport Layer Information 9.2.3.30 | UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs | – | |
| PDU Session Type | M | | 9.2.3.19 | | – | |
| Network Instance | O | | 9.2.3.85 | This IE shall be ignored if the <i>Common Network Instance</i> IE is present. | – | |
| QoS Flows To Be Setup List | | 1 | | | – | |
| >QoS Flow To Be Setup Item | | 1 .. <maxnoof | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|----------------------|--|--|-------------|----------------------|
| | | <i>QoSFlows</i> > | | | | |
| >>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>QoS Flow Level QoS Parameters | M | | 9.2.3.5 | For GBR QoS flows, this IE contains GBR QoS flow information as received at NG-C | – | |
| >>Offered GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains M-Node offered GBR QoS Flow Information. | – | |
| >>TSC Traffic Characteristics | O | | 9.2.3.114 | | YES | ignore |
| >>Redundant QoS Flow Indicator | O | | 9.2.3.118 | | YES | ignore |
| Data Forwarding and Offloading Info from source NG-RAN node | O | | 9.2.1.17 | | – | |
| Security Indication | O | | 9.2.3.52 | | – | |
| Security Result | O | | 9.2.3.67 | Indicates security activation status in MN. | YES | reject |
| Common Network Instance | O | | 9.2.3.92 | | YES | ignore |
| Default DRB Allowed | O | | 9.2.3.93 | | YES | ignore |
| Split Session Indicator | O | | 9.2.3.94 | | YES | reject |
| Non-GBR Resources Offered | O | | 9.2.3.98 | | YES | ignore |
| Redundant UL NG-U UP TNL Information at UPF | O | | UP Transport Layer Information 9.2.3.30 | UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs for the redundant transmission. | YES | ignore |
| Redundant Common Network Instance | O | | Common Network Instance 9.2.3.92 | | YES | ignore |
| Redundant PDU Session Information | O | | 9.2.3.112 | | YES | ignore |

| Range bound | Explanation |
|-----------------|---------------------------------------|
| maxnoofQoSFlows | Maximum no. of QoS flows. Value is 64 |

9.2.1.6 PDU Session Resource Setup Response Info – SN terminated

This IE contains the result of the addition of S-NG-RAN node resources related to a PDU session for DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|-------|--|---|-------------|----------------------|
| DL NG-U UP TNL Information at NG-RAN | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of the NG transport bearer. For delivery of DL PDUs. | – | |
| DRBs To Be Setup List | | 0..1 | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-----------------------------------|--|---|-------------|----------------------|
| >DRBs to Be Setup Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>SN UL PDCP UP TNL Information | M | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs. | – | |
| >>DRB QoS | M | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>PDCP SN Length | O | | 9.2.3.63 | Indicates the PDCP SN length of the DRB. | – | |
| >>RLC Mode | M | | 9.2.3.28 | Indicates the RLC mode to be used in the assisting node. | – | |
| >>secondary SN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP duplication. | – | |
| >>Duplication Activation | O | | 9.2.3.71 | Information on the initial state of UL PDCP duplication. This IE is ignored if the <i>RLC Duplication Information</i> IE is present. | – | |
| >>UL Configuration | O | | 9.2.3.75 | Information about UL usage in the M-NG-RAN node. This IE is used when the concerned DRB has both MCG resource and SCG resource configured i.e. the concerned DRB is configured as split bearer. | – | |
| >>QoS Flows Mapped To DRB List | | 1 | | | – | |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>MCG requested GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains GBR QoS Flow Information necessary for the | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|---|--|-------------|----------------------|
| | | | | MCG part. | | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | – | |
| >>>>Current QoS Parameters Set Index | O | | Alternative QoS Parameters Set Index 9.2.3.103 | | YES | ignore |
| >>>>Source DL Forwarding IP Address | O | | Transport Layer Address 9.2.3.29 | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP duplication. | – | |
| >>RLC Duplication Information | O | | 9.2.3.111 | . | – | |
| Data Forwarding Info from target NG-RAN node | O | | 9.2.1.16 | | – | |
| QoS Flows Not Admitted List | O | | QoS Flow List with Cause 9.2.1.4 | | – | |
| Security Result | O | | 9.2.3.67 | | – | |
| DRB IDs taken into use | O | | DRB List 9.2.1.29 | Indicating the DRB IDs taken into use by the target NG-RAN node, as specified in TS 37.340 [8]. | YES | reject |
| Redundant DL NG-U UP TNL Information at NG-RAN | O | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of the NG transport bearer. For delivery of DL PDUs for the redundant transmission. | YES | ignore |
| Used RSN Information | O | | Redundant PDU Session Information 9.2.3.112 | | YES | ignore |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows. Value is 64 |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.7 PDU Session Resource Setup Info – MN terminated

This IE contains information for the addition of S-NG-RAN node resources related to a PDU session for DRBs configured with an MN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------------|--|---|-------------|----------------------|
| PDU Session Type | M | | 9.2.3.19 | | – | |
| DRBs To Be Setup List | | 1 | | | – | |
| >DRBs to Be Setup Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>MN UL PDCP UP TNL Information | M | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of a DRB's Xn-U transport bearer at its PDCP resource. For delivery of UL PDUs. | – | |
| >>RLC Mode | M | | 9.2.3.28 | Indicates the RLC mode to be used in the assisting node. | – | |
| >>UL Configuration | O | | 9.2.3.75 | Information about UL usage in the S-NG-RAN node. This IE is used when the concerned DRB has both MCG resource and SCG resource configured i.e. the concerned DRB is configured as split bearer. | – | |
| >>DRB QoS | M | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>PDCP SN Length | O | | 9.2.3.63 | Indicates the PDCP SN length of the DRB. | – | |
| >>secondary MN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP duplication. | – | |
| >>Duplication Activation | O | | 9.2.3.71 | Information on the initial state of UL PDCP duplication. This IE is ignored if the <i>RLC Duplication Information</i> IE is present. | – | |
| >>QoS Flows Mapped To DRB | | 1 | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|--|--|-------------|----------------------|
| List | | | | | | |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>QoS Flow Level QoS Parameters | M | | 9.2.3.5 | | – | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | – | |
| >>>>TSC Traffic Characteristics | O | | 9.2.3.114 | | YES | ignore |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP duplication. | – | |
| >>RLC Duplication Information | O | | 9.2.3.111 | | YES | ignore |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.8 PDU Session Resource Setup Response Info – MN terminated

This IE contains the result of the addition of S-NG-RAN node resources related to a PDU session for DRBs configured with an MN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------|----------|---------------------------|-------------------------------------|--|-------------|----------------------|
| DRBs Admitted List | | 1 | | | – | |
| >DRBs Admitted Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>SN DL SCG UP TNL Information | M | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node GTP-U tunnel endpoint(s) of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|--|---|-------------|----------------------|
| >>secondary SN DL SCG UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | PDU. S-NG-RAN node GTP-U tunnel endpoint(s) of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL PDUs in case of PDCP duplication. | – | |
| >>LCID | O | | 9.2.3.70 | LCID for primary path or LCID for split secondary path for fallback to split bearer if PDCP duplication is applied | – | |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node GTP-U tunnel endpoint(s) of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL PDUs in case of additional PDCP duplication. | – | |
| >>QoS Flows Mapped To DRB List | | 0..1 | | | YES | ignore |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>Current QoS Parameters Set Index | M | | Alternative QoS Parameters Set Index 9.2.3.103 | | – | |
| DRBs Not Admitted To Be Setup or Modified List | O | | DRB List with Cause 9.2.1.28 | | YES | ignore |

| Range bound | Explanation |
|-------------------------------------|--|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2 |

9.2.1.9 PDU Session Resource Modification Info – SN terminated

This IE contains information related to a PDU session resource for an M-NG-RAN node initiated request to modify DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|--------------------------|---|---|-------------|----------------------|
| UL NG-U UP TNL Information at UPF | O | | UP Transport Layer Information 9.2.3.30 | UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs | – | |
| Network Instance | O | | 9.2.3.85 | This IE shall be ignored if the <i>Common Network Instance</i> IE is present. | – | |
| QoS Flows To Be Setup List | | 0..1 | | | – | |
| >QoS Flows To Be Setup Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>QoS Flow Level QoS Parameters | M | | 9.2.3.5 | For GBR QoS flows, this IE contains GBR QoS flow information as received at NG-C | – | |
| >>Offered GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains M-Node offered GBR QoS Flow Information. | – | |
| >>TSC Traffic Characteristics | O | | 9.2.3.114 | | YES | ignore |
| >>Redundant QoS Flow Indicator | O | | 9.2.3.118 | | YES | ignore |
| Data Forwarding and Offloading Info from source NG-RAN node | O | | 9.2.1.17 | Applicable for the QoS flows contained in the <i>QoS Flows To Be Setup List</i> IE. | – | |
| QoS Flows To Be Modified List | | 0..1 | | | – | |
| >QoS Flows To Be Modified Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>QoS Flow Level QoS Parameters | O | | 9.2.3.5 | For GBR QoS flows, this IE contains GBR QoS flow information as received at NG-C | – | |
| >>Offered GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains M-Node offered GBR QoS Flow Information. | – | |
| >>QoS Flow Mapping Indication | O | | 9.2.3.79 | This IE is not applicable in this version of the specification. | – | |
| >>TSC Traffic Characteristics | O | | 9.2.3.114 | | YES | ignore |
| >>Redundant QoS Flow Indicator | O | | 9.2.3.118 | | YES | ignore |
| QoS Flows To Be Released List | | 0..1 | QoS Flow List with Cause 9.2.1.4 | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|--|--|-------------|----------------------|
| DRBs To Be Modified List | | 0..1 | | | – | |
| >DRBs to Be Modified Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>MN DL CG UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node GTP-U endpoint(s) of a DRB's Xn transport bearer at its lower layer CG resource. For delivery of DL PDUs. | – | |
| >>secondary MN DL CG UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node GTP-U endpoint(s) of a DRB's Xn transport bearer at its lower layer CG resource. For delivery of DL PDUs in case of PDCP duplication. | – | |
| >>LCID | O | | 9.2.3.70 | LCID for primary path or LCID for split secondary path for fallback to split bearer if PDCP duplication is applied | – | |
| >>RLC Status | O | | 9.2.3.80 | | – | |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | M-NG-RAN node GTP-U endpoint(s) of a DRB's Xn transport bearer at its lower layer CG resource. For delivery of DL PDUs in case of additional PDCP duplication. | – | |
| DRBs To Be Released List | O | | DRB List with Cause 9.2.1.28 | | – | |
| Common Network Instance | O | | 9.2.3.92 | | YES | ignore |
| Default DRB Allowed | O | | 9.2.3.93 | | YES | ignore |
| Non-GBR Resources Offered | O | | 9.2.3.98 | | YES | ignore |
| Redundant UL NG-U UP TNL Information at UPF | O | | UP Transport Layer Information 9.2.3.30 | UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs for the redundant transmission | YES | ignore |
| Redundant Common | O | | Common | | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------|----------|-------|------------------------------|-----------------------|-------------|----------------------|
| Network Instance | | | Network Instance 9.2.3.92 | | | |
| Security Indication | O | | 9.2.3.52 | | YES | ignore |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofQoSFlows | Maximum no. of QoS flows. Value is 64. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.10 PDU Session Resource Modification Response Info – SN terminated

This IE contains the PDU session resource related result of an M-NG-RAN node initiated request to modify DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|------------------------|--|---|-------------|----------------------|
| DL NG-U UP TNL Information at NG-RAN | O | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of the NG transport bearer. For delivery of DL PDUs. | – | |
| DRBs To Be Setup List | | 0..1 | | | – | |
| >DRBs to Be Setup Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>SN UL PDCP UP TNL Information | M | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs. | – | |
| >>DRB QoS | M | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>PDCP SN Length | O | | 9.2.3.63 | Indicates the PDCP SN length of the DRB. | – | |
| >>RLC Mode | M | | 9.2.3.28 | Indicates the RLC mode to be used in the assisting node. | – | |
| >>secondary SN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP duplication. | – | |
| >>Duplication Activation | O | | 9.2.3.71 | Information on the initial state of UL PDCP duplication. This IE is ignored if the <i>RLC Duplication Information</i> IE is | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|---|---|-------------|----------------------|
| | | | | present. | | |
| >>UL Configuration | O | | 9.2.3.75 | Information about UL usage in the S-NG-RAN node. This IE is used when the concerned DRB has both MCG resource and SCG resource configured i.e. the concerned DRB is configured as split bearer. | – | |
| >>QoS Flows Mapped To DRB List | | 1 | | | – | |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>MCG requested GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains GBR QoS Flow Information necessary for the MCG part. | – | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | – | |
| >>>>Current QoS Parameters Set Index | O | | Alternative QoS Parameters Set Index 9.2.3.103 | | YES | ignore |
| >>>>Source DL Forwarding IP Address | O | | Transport Layer Address 9.2.3.29 | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP duplication. | – | |
| >>RLC Duplication Information | O | | 9.2.3.111 | | YES | ignore |
| Data Forwarding Info from target NG-RAN node | O | | 9.2.1.16 | Applicable for the QoS flows in DRBs to be setup. | – | |
| DRBs To Be Modified List | | 0..1 | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|---|--|-------------|----------------------|
| >DRBs to Be Modified Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>SN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs. | – | |
| >>DRB QoS | O | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>QoS Flows Mapped to DRB List | | 0..1 | | Overwriting the existing QoS Flow List | – | |
| >>>QoS Flows Mapped to DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>MCG requested GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains GBR QoS Flow Information necessary for the MCG part. | – | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | – | |
| >>>>Current QoS Parameters Set Index | O | | Alternative QoS Parameters Set Index 9.2.3.103 | | YES | ignore |
| >>>>Source DL Forwarding IP Address | O | | Transport Layer Address 9.2.3.29 | Identifies the TNL address used by the source node for data forwarding. | YES | ignore |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP duplication. | – | |
| >>RLC Duplication Information | O | | 9.2.3.111 | | YES | ignore |
| >>secondary SN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------|---|--|-------------|----------------------|
| | | | | transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP duplication. | | |
| >>PDCP Duplication Configuration | O | | 9.2.3.86 | | YES | ignore |
| >>Duplication Activation | O | | 9.2.3.71 | | YES | ignore |
| DRBs To Be Released List | | 0..1 | | | – | |
| >DRBs to Be Released Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>Cause | O | | 9.2.3.2 | | – | |
| Data Forwarding and Offloading Info from source NG-RAN node | O | | 9.2.1.17 | Contains DL Data Forwarding indications for QoS Flows removed from the SDAP in the SN. | – | |
| QoS Flows Not Admitted to be Added List | O | | QoS Flow List with Cause 9.2.1.4 | | – | |
| QoS Flows Released List | O | | QoS Flow List with Cause 9.2.1.4 | | – | |
| DRB IDs taken into use | O | | DRB List 9.2.1.29 | Indicating the DRB IDs taken into use by the target NG-RAN node, as specified in TS 37.340 [8]. | YES | reject |
| Redundant DL NG-U UP TNL Information at NG-RAN | O | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of the NG transport bearer. For delivery of DL PDUs for the redundant transmission. | YES | ignore |
| Security Result | O | | 9.2.3.67 | | YES | ignore |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows. Value is 64. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.11 PDU Session Resource Modification Info – MN terminated

This IE contains information related to PDU session resource for an M-NG-RAN node initiated request to modify DRBs configured with an MN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------------------|----------|---------------------|-----------------------|-----------------------|-------------|----------------------|
| PDU Session Type | M | | 9.2.3.19 | | – | |
| DRBs To Be Setup List | | 0..1 | | | – | |
| >DRBs to Be Setup Item | | 1 .. <maxnoof DRBs> | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|----------------------------|--|---|-------------|----------------------|
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>MN UL PDCP UP TNL Information | M | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs. | – | |
| >>RLC Mode | M | | 9.2.3.28 | Indicates the RLC mode to be used in the assisting node. | – | |
| >>UL Configuration | O | | 9.2.3.75 | Information about UL usage in the S-NG-RAN node. This IE is used when the concerned DRB has both MCG resource and SCG resource configured i.e. the concerned DRB is configured as split bearer. | – | |
| >>DRB QoS | M | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>PDCP SN Length | O | | 9.2.3.63 | Indicates the PDCP SN length of the DRB. | – | |
| >>secondary MN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP duplication. | – | |
| >>Duplication Activation | O | | 9.2.3.71 | Information on the initial state of UL PDCP duplication. This IE is ignored if the <i>RLC Duplication Information</i> IE is present. | – | |
| >>QoS Flows Mapped to DRB List | | 1 | | | – | |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoSFlows> | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>QoS Flow Level QoS Parameters | M | | 9.2.3.5 | | – | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | – | |
| >>Additional PDCP Duplication TNL | | 0..1 | | | YES | Ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|---|--|-------------|----------------------|
| List | | | | | | |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP duplication. | – | |
| >>RLC Duplication Information | O | | 9.2.3.111 | | YES | ignore |
| DRBs To Be Modified List | | 0..1 | | | – | |
| >DRBs to Be Modified Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>MN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs. | – | |
| >>DRB QoS | O | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>secondary MN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP duplication. | – | |
| >>UL Configuration | O | | 9.2.3.75 | Information about UL usage in the S-NG-RAN node. | – | |
| >>PDCP Duplication Configuration | O | | 9.2.3.86 | | – | |
| >>Duplication Activation | O | | 9.2.3.71 | Information on the initial state of UL PDCP duplication. This IE is ignored if the <i>RLC Duplication Information</i> IE is present. | – | |
| >>QoS Flows Mapped To DRB List | | 0..1 | | Overwriting the existing QoS Flow List | – | |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoS Flows> | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|--|--|-------------|----------------------|
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>QoS Flow Level QoS Parameters | M | | 9.2.3.5 | | – | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | – | |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDuplicationTNL> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | M-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP duplication. | – | |
| >>RLC Duplication Information | O | | 9.2.3.111 | | YES | ignore |
| DRBs To Be Released List | O | | DRB List with Cause 9.2.1.28 | | – | |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.12 PDU Session Resource Modification Response Info – MN terminated

This IE contains the PDU session resource related result of an M-NG-RAN node initiated modification of DRBs configured with an MN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|------------------------|-------------------------------------|--|-------------|----------------------|
| DRBs Admitted to be Setup or Modified List | | 1 | | | – | |
| >DRBs Admitted to be Setup or Modified Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>SN DL SCG UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node GTP-U tunnel endpoint(s) of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL PDUs. | – | |
| >>secondary SN DL SCG UP TNL | O | | UP Transport Parameters | S-NG-RAN node GTP-U tunnel | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--|---|---|-------------|----------------------|
| Information | | | 9.2.3.76 | endpoint(s) of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL PDUs in case of PDCP duplication. | | |
| >>LCID | O | | 9.2.3.70 | LCID for primary path or LCID for split secondary path for fallback to split bearer if PDCP duplication is applied | – | |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN > | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node GTP-U tunnel endpoint(s) of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL PDUs in case of additional PDCP duplication. | – | |
| >>QoS Flows Mapped To DRB List | | 0..1 | | | YES | ignore |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>Current QoS Parameters Set Index | O | | Alternative QoS Parameters Set Index 9.2.3.103 | | – | |
| DRBs Released List | O | | DRB List 9.2.1.29 | | – | |
| DRBs Not Admitted To Be Setup or Modified List | O | | DRB List with Cause 9.2.1.28 | | – | |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.13 UE Context Information – Retrieve UE Context Response

This IE contains the UE context information within the RETRIEVE UE CONTEXT RESPONSE message.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|--|--|-------------|----------------------|
| NG-C UE associated Signalling reference | M | | AMF UE NGAP ID 9.2.3.26 | Allocated at the AMF on the old NG-C connection. | – | |
| Signalling TNL Association Address at source NG-C side | M | | CP Transport Layer Information 9.2.3.31 | This IE indicates the AMF's IP address of the SCTP association used at the source NG-C interface instance. Note: If no UE TNLA binding exists at the source NG-RAN node, the source NG-RAN node indicates the TNL association address it would have selected if it would have had to create a UE TNLA binding. | – | |
| UE Security Capabilities | M | | 9.2.3.49 | | – | |
| AS Security Information | M | | 9.2.3.50 | | – | |
| UE Aggregate Maximum Bit Rate | M | | 9.2.3.17 | | – | |
| PDU Session Resources To Be Setup List | M | | 9.2.1.1 | | – | |
| RRC Context | M | | OCTET STRING | Includes the <i>HandoverPreparationInformation</i> message as defined in subclause 11.2.2 of TS 38.331[10] if the old and new serving NG-RAN nodes are gNBs. Includes either the <i>HandoverPreparationInformation</i> message as defined in subclause 10.2.2 of TS 36.331 [14] or the <i>HandoverPreparationInformation-NB</i> message as defined in subclause 10.6.2 of TS 36.331 [14], if the old and new serving NG-RAN nodes are ng-eNBs. | – | |
| Mobility Restriction List | O | | 9.2.3.53 | | – | |
| Index to RAT/Frequency Selection Priority | O | | 9.2.3.23 | | – | |
| 5GC Mobility Restriction List Container | O | | 9.2.3.100 | | YES | ignore |
| NR UE Sidelink Aggregate Maximum Bit | O | | 9.2.3.107 | This IE applies only if the UE is | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|-----------------------|--|-------------|----------------------|
| Rate | | | | authorized for NR V2X services. | | |
| LTE UE Sidelink Aggregate Maximum Bit Rate | O | | 9.2.3.108 | This IE applies only if the UE is authorized for LTE V2X services. | YES | ignore |
| UE Radio Capability ID | O | | 9.2.3.138 | | YES | reject |

9.2.1.14 DRBs Subject To Status Transfer List

This IE contains a list of DRBs containing information about PDCP SN status.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------------|---|---|-------------|----------------------|
| DRBs Subject To Status Transfer Item | | 1 .. <maxnoof DRBs> | | | – | |
| >DRB ID | M | | 9.2.3.33 | | – | |
| >CHOICE PDCP Status Transfer UL | M | | | | – | |
| >> 12 bits | | | | | | |
| >>>Receive Status Of PDCP SDU | O | | BIT STRING (1.. 2048) | The IE is used in case of 12-bit long PDCP-SN. The first bit indicates the status of the SDU after the First Missing UL PDCP SDU. The Nth bit indicates the status of the UL PDCP SDU in position (N + First Missing SDU Number) modulo (1 + the maximum value of the PDCP-SN). 0: PDCP SDU has not been received. 1: PDCP SDU has been received correctly. | – | |
| >>>UL COUNT Value | M | | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 12-bit long PDCP-SN | – | |
| >> 18 bits | | | | | | |
| >>>Receive Status Of PDCP SDU | O | | BIT STRING (1.. 131072) | The IE is used in case of 18-bit long PDCP-SN. The first bit indicates the status of the SDU after the First Missing UL PDCP SDU. The Nth bit indicates the | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|---|---|-------------|----------------------|
| | | | | status of the UL PDCP SDU in position (N + First Missing SDU Number) modulo (1 + the maximum value of the PDCP-SN). 0: PDCP SDU has not been received. 1: PDCP SDU has been received correctly. | | |
| >>>UL COUNT Value | M | | COUNT Value for PDCP SN Length 18 9.2.3.37 | PDCP-SN and Hyper Frame Number of the first missing UL SDU in case of 18-bit long PDCP-SN | – | |
| >CHOICE <i>PDCP Status Transfer DL</i> >> 12 bits | M | | | | – | |
| >>>DL COUNT Value | M | | COUNT Value for PDCP SN Length 12 9.2.3.36 | PDCP-SN and Hyper Frame Number that the target NG-RAN node (handover) or the NG-RAN node to which the DRB context is transferred (dual connectivity) should assign for the next DL SDU not having an SN yet in case of 12-bit long PDCP-SN. | – | |
| >> 18 bits | | | | | | |
| >>>DL COUNT Value | M | | COUNT Value for PDCP SN Length 18 9.2.3.37 | PDCP-SN and Hyper Frame Number that the target NG-RAN node (handover) or the NG-RAN node to which the DRB context is transferred (dual connectivity) should assign for the next DL SDU not having an SN yet in case of 18-bit long PDCP-SN. | – | |
| >Old QoS Flow List - UL End Marker expected | O | | QoS Flow List 9.2.1.4a | This IE is included to be used for indicating that the source NG-RAN node has initiated QoS flow re-mapping and has not yet received SDAP end markers, as described in TS 38.300 [8]. | YES | reject |

| Range bound | Explanation |
|-------------|--|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |

9.2.1.15 DRB to QoS Flow Mapping List

This IE contains a list of DRBs containing information about the mapped QoS flows.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|------------------------------|-----------------------|---|-------------|----------------------|
| DRBs to QoS Flow Mapping Item | | 1 .. <maxnoof DRBs> | | | – | |
| >DRB ID | M | | 9.2.3.33 | | – | |
| >QoS Flows List | | 1 | | | – | |
| >>QoS Flow Item | | 1..<maxno ofQoSFlow s> | | | – | |
| >>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | – | |
| >RLC Mode | O | | 9.2.3.28 | Indicates the RLC mode for PDCP transfer between M-NG-RAN node and S-NG-RAN node. | – | |
| >DAPS Request Information | O | | 9.2.1.33 | | YES | ignore |

| Range bound | Explanation |
|-----------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.1.16 Data Forwarding Info from target NG-RAN node

This IE contains TNL information for the establishment of data forwarding tunnels towards the target NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|----------------------|---|--|
| QoS Flows Accepted For Data Forwarding List | | 1 | | |
| >QoS Flows Accepted For Data Forwarding Item | | 1..<maxnoofQoSFlows> | | |
| >>QoS Flow Identifier | M | | 9.2.3.10 | |
| PDU Session level DL data forwarding UP TNL Information | O | | UP Transport Layer Information 9.2.3.30 | To forward NG-U DL SDAP SDUs to the target node. |
| PDU Session level UL data forwarding UP TNL Information | O | | UP Transport Layer Information 9.2.3.30 | To forward NG-U UL SDAP SDU to the target node. |
| Data Forwarding Response DRB List | | 0..1 | | |
| >Data Forwarding Response DRB Item | | 1..<maxnoofDRBs> | | |
| >>DRB ID | M | | 9.2.3.33 | |
| >>DL Forwarding UP TNL Information | O | | UP Transport Layer Information 9.2.3.30 | |
| >>UL Forwarding UP | O | | UP Transport Layer | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------|----------|-------|-----------------------|-----------------------|
| TNL Information | | | Information 9.2.3.30 | |

| Range bound | Explanation |
|-----------------|---|
| maxnoofDRBs | Maximum no. of DRBs. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.1.17 Data Forwarding and Offloading Info from source NG-RAN node

This IE contains information from a source NG-RAN node regarding per QoS flow proposed data forwarding and offloading.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-----------------------------------|--|---|-------------|----------------------|
| QoS Flows To Be Forwarded List | | 1 | | | – | |
| >QoS Flows To Be Forwarded Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>DL Forwarding | M | | 9.2.3.34 | | – | |
| >>UL Forwarding | M | | 9.2.3.90 | This IE shall be ignored. | – | |
| >>UL Forwarding Proposal | O | | 9.2.3.95 | | YES | ignore |
| >>Source DL Forwarding IP Address | O | | Transport Layer Address 9.2.3.29 | Identifies the TNL address for data forwarding allocated by the MN node for DC cases and by source NG-RAN node for mobility without MR-DC involved cases | YES | ignore |
| >>Source Node DL Forwarding IP Address | O | | Transport Layer Address 9.2.3.29 | This IE is present only for the case of SA to MR-DC handover and it is used to identify the source TNL address allocated by the source NG-RAN node for data forwarding. | YES | ignore |
| Source DRB to QoS Flow Mapping List | O | | DRB to QoS Flow Mapping List 9.2.1.15 | Usage of the DRB IDs indicated in the <i>Source DRB to QoS Flow Mapping List</i> IE is specified in TS 37.340 [8]. | – | |

| Range bound | Explanation |
|-----------------|---|
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.1.18 PDU Session Resource Change Required Info – SN terminated

This IE contains information for the S-NG-RAN node initiated request for an S-NG-RAN node change related to a PDU session resource with DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|-----------------------|
| Data Forwarding and Offloading Info from source NG-RAN node | O | | 9.2.1.17 | |

9.2.1.19 PDU Session Resource Change Confirm Info – SN terminated

This IE contains information for the M-NG-RAN node's confirmation of an S-NG-RAN node initiated request for an S-NG-RAN node change related to a PDU session resource with DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|-----------------------|---|-------------|----------------------|
| Data Forwarding Info from target NG-RAN node | O | | 9.2.1.16 | | – | |
| DRB IDs taken into use | O | | DRB List 9.2.1.29 | Indicating the DRB IDs taken into use by the target NG-RAN node, as specified in TS 37.340 [8]. | YES | reject |

9.2.1.20 PDU Session Resource Modification Required Info – SN terminated

This IE contains PDU session resource information of an S-NG-RAN node initiated modification request of DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|----------------------------------|--|---|-------------|----------------------|
| DL NG-U UP TNL Information at NG-RAN | O | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of the NG-U transport bearer. For delivery of DL PDUs. | – | |
| QoS Flows To Be Released List | O | | QoS Flow List with Cause 9.2.1.4 | | – | |
| Data Forwarding and Offloading Info from source NG-RAN node | O | | 9.2.1.17 | This IE only applies to QoS flows included in the <i>QoS Flows To Be Released List</i> IE. | – | |
| DRBs To Be Setup List | | <i>0..1</i> | | | – | |
| >DRBs to Be Setup Item | | <i>1 .. <maxnoof DRBs></i> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>PDCP SN Length | O | | 9.2.3.63 | Indicates the PDCP SN length of the DRB. | – | |
| >>SN UL PDCP UP TNL Information | M | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|---------------------------------------|---|-------------|----------------------|
| | | | | PDU. | | |
| >>DRB QoS | M | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>secondary SN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP Duplication. | – | |
| >>Duplication Activation | O | | 9.2.3.71 | Information on the initial state of UL PDCP duplication. This IE is ignored if the <i>RLC Duplication Information</i> IE is present. | – | |
| >>UL Configuration | O | | 9.2.3.75 | Information about UL usage in the S-NG-RAN node. This IE is used when the concerned DRB has both MCG resource and SCG resource configured i.e. the concerned DRB is configured as split bearer. | – | |
| >>QoS Flows Mapped To DRB List | | 1 | | | – | |
| >>>QoS Flows Mapped To DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>MCG requested GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains GBR QoS Flow Information necessary for the MCG part. | – | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | YES | ignore |
| >>RLC Mode | M | | 9.2.3.28 | Indicates the RLC mode at the assisting node. | – | |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDuplicationTN L> | | | – | |
| >>>>Additional PDCP Duplication | M | | UP Transport Layer | S-NG-RAN node endpoint(s) of a | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-----------------------------------|--|---|-------------|----------------------|
| UP TNL Information | | | Information 9.2.3.30 | DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP Duplication. | | |
| >>RLC Duplication Information | O | | 9.2.3.111 | | YES | ignore |
| DRBs To Be Modified List | | 0..1 | | | – | |
| >DRBs to Be Modified Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>SN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs. | – | |
| >>DRB QoS | O | | QoS Flow Level QoS Parameters 9.2.3.5 | | – | |
| >>secondary SN UL PDCP UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP Duplication. | – | |
| >>UL Configuration | O | | 9.2.3.75 | Information about UL usage in the S-NG-RAN node. | – | |
| >>PDCP Duplication Configuration | O | | 9.2.3.86 | | – | |
| >>Duplication Activation | O | | 9.2.3.71 | This IE is ignored if the <i>RLC Duplication Information</i> IE is present. | – | |
| >>QoS Flows Mapped to DRB List | | 0..1 | | Overwriting the existing QoS Flow List | – | |
| >>>QoS Flows Mapped to DRB Item | | 1 .. <maxnoof QoSFlows > | | | – | |
| >>>>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>>>MCG requested GBR QoS Flow Information | O | | GBR QoS Flow Information 9.2.3.6 | This IE contains GBR QoS Flow Information necessary for the MCG part. | – | |
| >>>>QoS Flow Mapping Indication | O | | 9.2.3.79 | | YES | ignore |
| >>Additional PDCP Duplication TNL | | 0..1 | | | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---|---|--|-------------|----------------------|
| List | | | | | | |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDup licationTN L> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint(s) of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of additional PDCP Duplication. | – | |
| >>RLC Duplication Information | O | | 9.2.3.111 | | YES | ignore |
| DRBs To Be Released List | O | | DRB List with Cause 9.2.1.28 | | – | |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows. Value is 64. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.21 PDU Session Resource Modification Confirm Info – SN terminated

This IE contains the PDU session resource related result of an S-NG-RAN node initiated modification of DRBs configured with an SN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------------|---|---|-------------|----------------------|
| UL NG-U UP TNL Information at UPF | O | | UP Transport Layer Information 9.2.3.30 | UPF endpoint of the NG-U transport bearer. For delivery of UL PDUs | – | |
| DRBs Admitted to be Setup or Modified List | | 1 | | | – | |
| >DRBs Admitted to be Setup or Modified Item | | 1 .. <maxnoof DRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>MN DL CG UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of the DRB's Xn transport at its Lower Layer CG resource. For delivery of DL PDUs. | – | |
| >>secondary MN DL CG UP TNL Information | O | | UP Transport Parameters 9.2.3.76 | M-NG-RAN node endpoint(s) of the DRB's Xn transport at its Lower Layer CG resource. For delivery of DL PDUs at the case | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--|--|---|-------------|----------------------|
| | | | | of PDCP duplication. | | |
| >>LCID | O | | 9.2.3.70 | Shall be ignored by the S-NG-RAN node if received. | – | |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDuplicationTNL> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | M-NG-RAN node endpoint(s) of the DRB's Xn transport at its Lower Layer CG resource. For delivery of DL PDUs at the case of additional PDCP duplication. | – | |
| DRBs Not Admitted To Be Setup or Modified List | O | | DRB List with Cause 9.2.1.28 | | – | |
| Data Forwarding Info from target NG-RAN node | O | | 9.2.1.16 | Forwarding Addresses for both, QoS flow and DRB level offloading. | – | |
| DRB IDs taken into use | O | | DRB List 9.2.1.29 | Indicating the DRB IDs taken into use by the target NG-RAN node, as specified in TS 37.340 [8]. | YES | reject |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |
| maxnoofQoSFlows | Maximum no. of QoS flows. Value is 64. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.22 PDU Session Resource Modification Required Info – MN terminated

This IE contains PDU session resource information of an S-NG-RAN node initiated modification request of DRBs configured with an MN terminated bearer option.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------|----------|------------------|--|---|-------------|----------------------|
| DRBs To Be Modified List | O | | | | – | |
| >DRBs To Be Modified Item | | 1..<maxnoofDRBs> | | | – | |
| >>DRB ID | M | | 9.2.3.33 | | – | |
| >>SN DL SCG UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of a DRB's Xn transport bearer. For delivery of DL PDUs. | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--|---|---|-------------|----------------------|
| >>secondary SN DL SCG UP TNL Information | O | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of a DRB's Xn transport bearer. For delivery of DL PDUs in case of PDCP Duplication | – | |
| >>LCID | O | | 9.2.3.70 | LCID for primary path or LCID for split secondary path for fallback to split bearer if PDCP duplication is applied | – | |
| >>RLC Status | O | | 9.2.3.80 | | – | |
| >>Additional PDCP Duplication TNL List | | 0..1 | | | YES | ignore |
| >>>Additional PDCP Duplication TNL Item | | 1 .. <maxnoof Additional PDCPDuplicationTNL> | | | – | |
| >>>>Additional PDCP Duplication UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | S-NG-RAN node endpoint of a DRB's Xn transport bearer. For delivery of DL PDUs in case of additional PDCP Duplication | – | |
| DRBs To Be Released List | O | | DRB List with Cause 9.2.1.28 | | – | |

| Range bound | Explanation |
|-------------------------------------|---|
| maxnoofDRBs | Maximum no. of DRBs. Value is 32. |
| maxnoofAdditionalPDCPDuplicationTNL | Maximum no. of additional PDCP Duplication TNL. Value is 2. |

9.2.1.23 PDU Session Resource Modification Confirm Info – MN terminated

This IE contains the PDU session resource related result of an S-NG-RAN node initiated modification of DRBs configured with an MN terminated bearer option.

NOTE: In the current version of this specification, this IE has no content, apart from an extension container.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| | | | | |

9.2.1.24 PDU Session List with data forwarding request info

This IE contains a list of PDU session related data forwarding request information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|----------------------------|-----------------------|-----------------------|-------------|----------------------|
| PDU Session List with data forwarding request info | | 1 .. <maxnoof PDUsessions> | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|---------------------------------------|--|-------------|----------------------|
| >PDU Session ID | M | | 9.2.3.18 | | – | |
| >Data Forwarding and Offloading Info from source NG-RAN node | O | | 9.2.1.17 | | – | |
| >DRBs To Be Released List | O | | DRB to QoS Flow Mapping List 9.2.1.15 | Indicate the QoS flow mapping and RLC mode of the released DRBs. | – | |
| >Cause | O | | 9.2.3.2 | | YES | ignore |

| Range bound | Explanation |
|--------------------|--|
| maxnoofPDUsessions | Maximum no. of PDU sessions. Value is 256. |

9.2.1.25 PDU Session List with data forwarding info from the target node

This IE contains a list of PDU session related data forwarding information from the target NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---------------------------|-----------------------|---|-------------|----------------------|
| PDU Session List with data forwarding from the target node | | 1 .. <maxnoofPDUsessions> | | | – | |
| >PDU Session ID | M | | 9.2.3.18 | | – | |
| >Data Forwarding Info from target NG-RAN node | M | | 9.2.1.16 | | – | |
| >DRB IDs taken into use | O | | DRB List 9.2.1.29 | Indicating the DRB IDs taken into use by the target NG-RAN node, as specified in TS 37.340 [8]. | YES | reject |

| Range bound | Explanation |
|--------------------|--|
| maxnoofPDUsessions | Maximum no. of PDU sessions. Value is 256. |

9.2.1.26 PDU Session List with Cause

This IE contains a list of PDU Sessions, a cause may accompany each list element.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|---------------------------|-----------------------|-----------------------|
| PDU Session List with Cause | | 1 .. <maxnoofPDUsessions> | | |
| >PDU Session ID | M | | 9.2.3.18 | |
| >Cause | O | | 9.2.3.2 | |

| Range bound | Explanation |
|--------------------|---|
| maxnoofPDUsessions | Maximum no. of PDU sessions. Value is 256 |

9.2.1.27 PDU Session List

This IE contains a list of PDU sessions.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------------------------------|-----------------------|-----------------------|
| PDU Session List | | 1 .. <maxnoofPDU sessions> | | |
| >PDU Session ID | M | | 9.2.3.18 | |

| Range bound | Explanation |
|--------------------|--|
| maxnoofPDUsessions | Maximum no. of PDU sessions. Value is 256. |

9.2.1.28 DRB List with Cause

This IE contains a list of DRBs, a cause may accompany each list element.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------------|----------|-----------------------|-----------------------|---|
| DRB List with Cause | | 1 .. <maxnoofDRBs> | | |
| >DRB ID | M | | 9.2.3.33 | |
| >Cause | M | | 9.2.3.2 | |
| >RLC Mode | O | | 9.2.3.28 | Indicates the RLC mode for PDCP transfer between M-NG-RAN node and S-NG-RAN node. |

| Range bound | Explanation |
|-------------|---|
| maxnoofDRBs | Maximum no. of PDU sessions. Value is 32. |

9.2.1.29 DRB List

This IE contains a list of DRBs.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------|----------|-----------------------|-----------------------|-----------------------|
| DRB List | | 1 .. <maxnoofDRBs> | | |
| >DRB ID | M | | 9.2.3.33 | |

| Range bound | Explanation |
|-------------|-----------------------------------|
| maxnoofDRBs | Maximum no. of DRBs. Value is 32. |

9.2.1.30 PDU Session Resource Setup Complete Info – SN terminated

This IE contains information to complete the establishment of Xn-U bearers for SN terminated bearers.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|------------------------|--|---|-------------|----------------------|
| DRBs To Be Setup List | | 1 | | | – | – |
| >DRBs to Be Setup Item | | 1 .. <maxnoof DRBs> | | | – | – |
| >>DRB ID | M | | 9.2.3.33 | | – | – |
| >>MN DL Xn UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | M-NG-RAN node endpoint of a DRB's Xn-U transport. For | – | – |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|--|--|-------------|----------------------|
| | | | | delivery of DL PDUs. | | |
| >>Secondary MN DL Xn UP TNL Information | O | | UP Transport Layer Information 9.2.3.30 | M-NG-RAN node endpoint of a DRB's Xn-U transport. For delivery of DL PDUs in case of PDCP Duplication. | YES | ignore |

| Range bound | Explanation |
|-------------|--|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |

9.2.1.31 Secondary Data Forwarding Info from target NG-RAN node List

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|--|--|-----------------------|
| Secondary Data Forwarding Info from target NG-RAN node Item | | <i>1..<maxnoofMultiConnectivityMinusOne></i> | | |
| >Secondary Data Forwarding Info from target NG-RAN node | M | | Data Forwarding Info from target NG-RAN node 9.2.1.16 | |

| Range bound | Explanation |
|---|--|
| <i>maxnoofMultiConnectivityMinusOne</i> | Maximum no. of <i>MultiConnectivity minus one</i> . Value is 3 |

9.2.1.32 Additional UL NG-U UP TNL Information at UPF List

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--|--|-----------------------|-------------|----------------------|
| Additional UL NG-U UP TNL Information at UPF Item | | <i>1..<maxnoofMultiConnectivityMinusOne></i> | | | – | |
| >Additional UL NG-U UP TNL Information at UPF | M | | UP Transport Layer Information 9.2.3.30 | | – | |
| >Common Network Instance | O | | 9.2.3.92 | | YES | ignore |

| Range bound | Explanation |
|---|--|
| <i>maxnoofMultiConnectivityMinusOne</i> | Maximum no. of <i>MultiConnectivity minus one</i> . Value is 3 |

9.2.1.33 DAPS Request Information

The *DAPS Indicator* IE indicates that the source NG-RAN node requests a DAPS HO for the concerned DRB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------|----------|-------|------------------------------------|-------------------------------------|
| DAPS Indicator | M | | ENUMERATED (DAPS HO required, ...) | Indicates that DAPS HO is requested |

9.2.1.34 DAPS Response Information

The *DAPS Response Information* IE indicates, per DRB, the response to a requested DAPS Handover.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------------------|----------|------------------|--|--|
| DAPS Response Information List | | 1..<maxnoofDRBs> | | |
| >DRB ID | M | | 9.2.3.33 | |
| >DAPS Response Indicator | M | | ENUMERATED (DAPS HO accepted, DAPS HO not accepted, ...) | Indicates whether the DAPS Handover has been accepted. |

| Range bound | Explanation |
|-------------|--|
| maxnoofDRBs | Maximum no. of DRBs allowed towards one UE. Value is 32. |

9.2.1.35 Data Forwarding Info from target E-UTRAN node

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|--|---|-----------------------|
| Data Forwarding Info from Target E-UTRAN node List | | 1 | | |
| >Data Forwarding Info from Target E-UTRAN node Item | | 1..<maxnoofDataForwardingTunnelsToE-UTRAN> | | |
| >>DL Forwarding UP TNL Information | M | | UP Transport Layer Information 9.2.3.30 | |
| >>>QoS Flows To Be Forwarded List | | 1 | | |
| >>>> QoS Flows To Be Forwarded Item | | 1..<maxnoofQoSFlows> | | |
| >>>>>QoS Flow Identifier | M | | 9.2.3.10 | |

| Range bound | Explanation |
|---------------------------------------|---|
| maxnoofDataForwardingTunnelsToE-UTRAN | Maximum no. of Data Forwarding Tunnels to E-UTRAN for a UE. Value is 256. |
| maxnoofQoSflows | Maximum no. of QoS flows in a PDU Session. Value is 64. |

9.2.2 NG-RAN Node and Cell Configuration related IE definitions

9.2.2.1 Global gNB ID

This IE is used to globally identify a gNB (see TS 38.300 [9]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-------|---------------------------|--|
| PLMN Identity | M | | 9.2.2.4 | |
| CHOICE <i>gNB ID</i> | M | | | |
| > <i>gNB ID</i> | | | | |
| >> <i>gNB ID</i> | M | | BIT STRING (SIZE(22..32)) | Equal to the leftmost bits of the <i>NR Cell Identity</i> IE contained in the <i>NR CGI</i> IE of each cell served by the gNB. |

9.2.2.2 Global ng-eNB ID

This IE is used to globally identify an ng-eNB (see TS 38.300 [9]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------|----------|-------|-----------------------|--|
| PLMN Identity | M | | 9.2.2.4 | |
| CHOICE <i>ng-eNB ID</i> | M | | | |
| > <i>Macro ng-eNB ID</i> | | | | |
| >>Macro ng-eNB ID | M | | BIT STRING (SIZE(20)) | Equal to the 20 leftmost bits of the <i>E-UTRA Cell Identity</i> IE contained in the <i>E-UTRA CGI</i> IE of each cell served by the ng-eNB. |
| > <i>Short Macro ng-eNB ID</i> | | | | |
| >>Short Macro ng-eNB ID | M | | BIT STRING (SIZE(18)) | Equal to the 18 leftmost bits of the <i>E-UTRA Cell Identity</i> IE contained in the <i>E-UTRA CGI</i> IE of each cell served by the ng-eNB. |
| > <i>Long Macro ng-eNB ID</i> | | | | |
| >>Long Macro ng-eNB ID | M | | BIT STRING (SIZE(21)) | Equal to the 21 leftmost bits of the <i>E-UTRA Cell Identity</i> IE contained in the <i>E-UTRA CGI</i> IE of each cell served by the ng-eNB. |

9.2.2.3 Global NG-RAN Node ID

This IE is used to globally identify an NG-RAN node (see TS 38.300 [9]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------|-----------------------|
| CHOICE <i>NG-RAN node</i> | M | | | |
| > <i>gNB</i> | | | | |
| >>Global gNB ID | M | | 9.2.2.1 | |
| > <i>ng-eNB</i> | | | | |
| >>Global ng-eNB ID | M | | 9.2.2.2 | |

9.2.2.4 PLMN Identity

This IE indicates the PLMN Identity.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|------------------------|---|
| PLMN Identity | M | | OCTET STRING (SIZE(3)) | <p>Digits 0 to 9 encoded 0000 to 1001, 1111 used as filler digit.</p> <p>Two digits per octet:</p> <ul style="list-style-type: none"> - bits 4 to 1 of octet n encoding digit 2n-1 - bits 8 to 5 of octet n encoding digit 2n <p>PLMN Identity consists of 3 digits from MCC followed by either:</p> <ul style="list-style-type: none"> - a filler digit plus 2 digits from MNC (in case of 2 digit MNC) or - 3 digits from MNC (in case of 3 digit MNC). |

9.2.2.5 TAC

This information element is used to uniquely identify a Tracking Area within a PLMN.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|----------------------------|-----------------------|
| TAC | M | | OCTET STRING (SIZE (3)) | |

9.2.2.6 RAN Area Code

This IE defines the RAN Area Code.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|-----------------------|-----------------------|
| RANAC | M | | INTEGER (0..255) | |

9.2.2.7 NR CGI

This IE is used to globally identify an NR cell (see TS 38.300 [9]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------|----------|-------|--------------------------|--|
| PLMN Identity | M | | 9.2.2.4 | |
| NR Cell Identity | M | | BIT STRING (SIZE(36)) | The leftmost bits of the <i>NR Cell Identity</i> IE correspond to the gNB ID (defined in subclause 9.2.2.1). |

9.2.2.8 E-UTRA CGI

This IE is used to globally identify an E-UTRA cell (see TS 36.300 [12]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-------|--------------------------|---|
| PLMN Identity | M | | 9.2.2.4 | |
| E-UTRA Cell Identity | M | | BIT STRING (SIZE(28)) | The leftmost bits of the <i>E-UTRA Cell Identity</i> IE correspond to the ng-eNB ID (defined in subclause 9.2.2.2). |

9.2.2.9 NG-RAN Cell Identity

This IE contains either an NR or an E-UTRA Cell Identity.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------|----------|-------|--------------------------|---|
| CHOICE <i>Cell Identifier</i> | M | | | |
| >NR | | | | |
| >>NR Cell Identity | M | | BIT STRING (SIZE(36)) | The leftmost bits of the <i>NR Cell Identity</i> IE correspond to the gNB ID (defined in subclause 9.2.2.1). |
| >E-UTRA | | | | |
| >>E-UTRA Cell Identity | M | | BIT STRING (SIZE(28)) | The leftmost bits of the <i>E-UTRA Cell Identity</i> IE correspond to the ng-eNB ID (defined in subclause 9.2.2.8). |

9.2.2.10 NG-RAN Cell PCI

This IE defines physical cell ID of a cell served by an NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------|----------|-------|------------------------|-------------------------|
| CHOICE <i>RAT</i> | M | | | |
| > <i>nr</i> | | | | |
| >>NR PCI | M | | INTEGER (0..1007, ...) | NR Physical Cell ID |
| > <i>e-utra</i> | | | | |
| >>E-UTRA PCI | M | | INTEGER (0..503, ...) | E-UTRA Physical Cell ID |

9.2.2.11 Served Cell Information NR

This IE contains cell configuration information of an NR cell that a neighbouring NG-RAN node may need for the Xn 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 | – | |
| NR CGI | M | | 9.2.2.7 | | – | |
| TAC | M | | 9.2.2.5 | Tracking Area Code | – | |
| RANAC | O | | RAN Area Code 9.2.2.6 | | – | |
| Broadcast PLMNs | | <i>1..<maxno of BPLMNs ></i> | | Broadcast PLMNs in SIB1 associated to the NR Cell Identity in the <i>NR CGI</i> IE. | – | |
| >PLMN Identity | M | | 9.2.2.4 | | – | |
| CHOICE <i>NR-Mode-Info</i> | M | | | | – | |
| > <i>FDD</i> | | | | | | |
| >> FDD Info | | 1 | | | – | |
| >>>UL NR Frequency Info | M | | NR Frequency Info 9.2.2.19 | This IE is ignored for NR operating bands for which uplink range of N_{REF} is not defined in section 5.4.2.3 of TS 38.104 [24]. | – | |
| >>>DL NR Frequency Info | M | | NR Frequency Info 9.2.2.19 | | – | |
| >>>UL Transmission Bandwidth | M | | NR Transmission Bandwidth 9.2.2.20 | This IE is ignored for NR operating bands for which uplink range of N_{REF} is not defined in section 5.4.2.3 of TS 38.104 [24]. | – | |
| >>>DL Transmission Bandwidth | M | | NR Transmission Bandwidth 9.2.2.20 | | – | |
| >>>UL Carrier List | O | | NR Carrier List 9.2.2.63 | If included, the <i>UL Transmission Bandwidth</i> IE shall be ignored. | YES | ignore |
| >>>DL Carrier List | O | | NR Carrier List 9.2.2.63 | If included, the <i>DL Transmission Bandwidth</i> IE shall be ignored. | YES | ignore |
| > <i>TDD</i> | | | | | | |
| >> TDD Info | | 1 | | | – | |
| >>>Frequency Info | M | | NR Frequency | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-----------------------------------|--|---|-------------|----------------------|
| | | | Info 9.2.2.19 | | | |
| >>>Transmission Bandwidth | M | | NR Transmission Bandwidth 9.2.2.20 | | – | |
| >>>Intended TDD DL-UL Configuration NR | O | | 9.2.2.40 | | YES | ignore |
| >>>TDD UL-DL Configuration Common NR | O | | OCTET STRING | The <i>tdd-UL-DL-ConfigurationCommon</i> as defined in TS 38.331 [10] | YES | ignore |
| >>>Carrier List | O | | NR Carrier List 9.2.2.63 | If included, the <i>Transmission Bandwidth</i> IE shall be ignored. | YES | ignore |
| Measurement Timing Configuration | M | | OCTET STRING | Contains the <i>MeasurementTimingConfiguration</i> inter-node message for the served cell, as defined in TS 38.331 [10]. | – | |
| Connectivity Support | M | | 9.2.2.28 | | – | |
| Broadcast PLMN Identity Info List NR | | <i>0..<maxno ofBPLMNs ></i> | | This IE corresponds to the <i>PLMN-IdentityInfoList</i> IE and the <i>NPN-IdentityInfoList</i> IE (if available) in <i>SIB1</i> as specified in TS 38.331 [8]. All PLMN Identities and associated information contained in the <i>PLMN-IdentityInfoList</i> IE and NPN identities and associated information contained in the <i>NPN-IdentityInfoList</i> IE (if available) are included and provided in the same order as broadcast in <i>SIB1</i> . NOTE: In case of NPN-only cell, the PLMN Identities and associated information contained in the <i>PLMN-IdentityInfoList</i> IE are not included. | YES | ignore |
| >Broadcast PLMNs | | <i>1..<maxno ofBPLMNs ></i> | | Broadcast PLMNs in <i>SIB1</i> associated to the <i>NR Cell Identity</i> IE. | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------|----------|-------|--|---|-------------|----------------------|
| >>PLMN Identity | M | | 9.2.2.4 | | – | |
| >TAC | M | | 9.2.2.5 | | – | |
| >NR Cell Identity | M | | BIT STRING (SIZE(36)) | | – | |
| >RANAC | O | | RAN Area Code 9.2.2.6 | | – | |
| >Configured TAC Indication | O | | 9.2.2.39a | NOTE: This IE is associated with the TAC in the <i>Broadcast PLMN Identity Info List NR IE</i> | YES | ignore |
| >NPN Broadcast Information | O | | 9.2.2.71 | If this IE is included the content of the <i>Broadcast PLMNs IE</i> in the <i>Broadcast PLMN Identity Info List NR IE</i> is ignored. | YES | reject |
| Configured TAC Indication | O | | 9.2.2.39a | NOTE: This IE is associated with the TAC on top-level of the <i>Served Cell Information NR IE</i> | YES | ignore |
| NPN Broadcast Information | O | | 9.2.2.71 | If this IE is included the content of the <i>Broadcast PLMNs IE</i> in the top <i>Served Cell Information NR IE</i> is ignored. | YES | reject |
| SSB Positions In Burst | O | | 9.2.2.64 | | YES | ignore |
| NR Cell PRACH Configuration | O | | OCTET STRING | Containing 9.3.1.139 NR Cell PRACH Configuration as of TS 38.473 [41]. | YES | ignore |
| CSI-RS Transmission Indication | O | | ENUMERATED (activated, deactivated, ...) | This IE indicates the CSI-RS transmission status of the given cell. | YES | ignore |
| SFN Offset | O | | 9.2.2.75 | | YES | ignore |

| Range bound | Explanation |
|---------------|--|
| maxnoofBPLMNs | Maximum no. of broadcast PLMNs by a cell. Value is 12. |

9.2.2.12 Served Cell Information E-UTRA

This IE contains cell configuration information of an E-UTRA cell that a neighbour NG-RAN node may need for the Xn AP interface.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------|----------|-------|-----------------------|-------------------------|-------------|----------------------|
| E-UTRA PCI | M | | INTEGER (0..503, ...) | E-UTRA Physical Cell ID | – | |
| ECGI | M | | E-UTRA CGI 9.2.2.8 | | – | |
| TAC | M | | 9.2.2.5 | Tracking Area | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|----------------------|---|--|-------------|----------------------|
| | | | | Code | | |
| RANAC | O | | RAN Area Code 9.2.2.6 | | – | |
| Broadcast PLMNs | | 1..<maxno ofBPLMNs > | | Broadcast PLMNs in SIB1 associated to the E-UTRA Cell Identity in the ECGI IE. NOTE: In this version of the specification, it is possible to broadcast only up to 6 PLMN IDs. | – | |
| >PLMN Identity | M | | 9.2.2.4 | | – | |
| CHOICE E-UTRA-Mode-Info | M | | | | – | |
| >FDD | | | | | – | |
| >>FDD Info | | 1 | | | – | |
| >>>UL EARFCN | M | | E-UTRA ARFCN 9.2.2.21 | Corresponds to N _{UL} in TS 36.104 [25] for E-UTRA operating bands for which it is defined; ignored for E-UTRA operating bands for which N _{UL} is not defined | – | |
| >>>DL EARFCN | M | | E-UTRA ARFCN 9.2.2.21 | Corresponds to N _{DL} in TS 36.104 [25] | – | |
| >>>UL E-UTRA Transmission Bandwidth | M | | E-UTRA Transmission Bandwidth 9.2.2.22 | Same as DL Transmission Bandwidth in this release; ignored in case UL EARFCN value is ignored | – | |
| >>>DL E-UTRA Transmission Bandwidth | M | | E-UTRA Transmission Bandwidth 9.2.2.22 | | – | |
| >>>Offset of NB-IoT Channel Number to DL EARFCN | O | | Offset of NB-IoT Channel Number to EARFCN 9.2.2.47 | Corresponds to M _{DL} in TS 36.104 [25] | YES | reject |
| >>>Offset of NB-IoT Channel Number to UL EARFCN | O | | Offset of NB-IoT Channel Number to EARFCN 9.2.2.47 | Corresponds to M _{UL} in TS 36.104 [25] | YES | reject |
| >TDD | | | | | – | |
| >>TDD Info | | 1 | | | – | |
| >>>EARFCN | M | | E-UTRA ARFCN 9.2.2.21 | Corresponds to N _{DL} /N _{UL} in TS 36.104 [25] | – | |
| >>>E-UTRA Transmission Bandwidth | M | | 9.2.2.22 | | – | |
| >>>Subframe Assignment | M | | ENUMERATED (sa0, sa1, sa2, sa3, sa4, sa5, sa6, ...) | Uplink-downlink subframe configuration information defined in TS 36.211 [26] | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|--------------------------|---|---|-------------|----------------------|
| >>>Special Subframe Info | | 1 | | Special subframe configuration information defined in TS 36.211 [26] | – | |
| >>>>Special Subframe Patterns | M | | ENUMERATED (ssp0, ssp1, ssp2, ssp3, ssp4, ssp5, ssp6, ssp7, ssp8, ssp9, ssp10, ...) | | – | |
| >>>>Cyclic Prefix DL | M | | ENUMERATED (Normal, Extended,...) | | – | |
| >>>>Cyclic Prefix UL | M | | ENUMERATED (Normal, Extended, ...) | | – | |
| >>>Offset of NB-IoT Channel Number to DL EARFCN | O | | Offset of NB-IoT Channel Number to EARFCN 9.2.2.47 | Corresponds to M_{DL} in TS 36.104 [25] | YES | reject |
| >>>NB-IoT UL DL Alignment Offset | O | | 9.2.2.48 | Corresponds to the TDD-UL-DL-AlignmentOffset-NB in TS 36.331 [14]. | YES | reject |
| Number of Antenna Ports E-UTRA | O | | 9.2.2.23 | | – | |
| PRACH Configuration | O | | E-UTRA PRACH Configuration 9.2.2.25 | | – | |
| MBSFN Subframe Info | | $0..<maxno\ of\ MBSFN >$ | | MBSFN subframe defined in TS 36.331 [14] | – | |
| >Radioframe Allocation Period | M | | ENUMERATED (n1, n2, n4, n8, n16, n32, ...) | | – | |
| >Radioframe Allocation Offset | M | | INTEGER (0..7, ...) | | – | |
| >MBSFN Subframe Allocation E-UTRA | M | | 9.2.2.26 | | – | |
| E-UTRA Multiband Info List | O | | 9.2.2.24 | | – | |
| FreqBandIndicatorPriority | O | | ENUMERATED (not-broadcast, broadcast, ...) | This IE indicates that the eNodeB supports <i>FreqBandIndicatorPriority</i> , and whether <i>FreqBandIndicatorPriority</i> is broadcast in SIB 1 (see TS 36.331 [14]) | – | |
| BandwidthReducedSI | O | | ENUMERATED (scheduled, ...) | This IE indicates that the SystemInformationBlockType1-BR is scheduled in the cell (see TS 36.331 [14]) | – | |
| Protected E-UTRA Resource Indication | O | | 9.2.2.29 | This IE indicates which E-UTRA | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|--|----------------------------------|---|-------------|----------------------|
| | | | | control/reference signal resources are protected and are not subject to E-UTRA - NR Cell Resource Coordination. | | |
| Broadcast PLMN Identity Info List E-UTRA | | <i>0..<maxno ofEUTRA BPLMNs></i> | | This IE corresponds to the <i>cellAccessRelated InfoList-5GC</i> IE in <i>SIB1</i> as specified in TS 36.331 [14]. All PLMN Identities and associated information contained in the <i>cellAccessRelated InfoList-5GC</i> IE are included and provided in the same order as broadcast in <i>SIB1</i> . | YES | ignore |
| >Broadcast PLMNs | | <i>1..<maxno ofEUTRA BPLMNs></i> | | Broadcast PLMNs in <i>SIB1</i> associated to the <i>E-UTRA Cell Identity</i> IE. | – | |
| >>PLMN Identity | M | | 9.2.2.4 | | – | |
| >TAC | M | | 9.2.2.5 | | – | |
| >E-UTRA Cell Identity | M | | BIT STRING (SIZE(28)) | | – | |
| >RANAC | O | | RAN Area Code 9.2.2.6 | | – | |
| NPRACH Configuration | O | | NPRACH Configuration 9.2.2.74 | | YES | ignore |

| Range bound | Explanation |
|--------------------|--|
| maxnoofBPLMNs | Maximum no. of broadcast PLMNs by a cell. The value is 12. |
| maxnoofMBSFN | Maximum no. of MBSFN frame allocation with different offset. Value is 8. |
| maxnoofEUTRABPLMNs | Maximum no. of PLMN Ids.broadcast in an E-UTRA cell. Value is 6. |

9.2.2.13 Neighbour Information NR

This IE contains cell configuration information of NR cells that a neighbour NG-RAN node may need to properly operate its own served cells.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------|----------|--|--------------------------|-----------------------|
| Neighbour Information NR | | <i>1 .. <maxnoofNeig hbours></i> | | |
| >NRPCI | M | | INTEGER (0..1007) | NR Physical Cell ID |
| >NR CGI | M | | 9.2.2.7 | |
| >TAC | M | | 9.2.2.5 | Tracking Area Code |
| >RANAC | O | | RAN Area Code 9.2.2.6 | |
| >CHOICE <i>NR-Mode-Info</i> | M | | | |
| >> <i>FDD</i> | | | | |
| >>> FDD Info | | <i>1</i> | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------------|----------|-------|--|---|
| >>>>UL NR FreqInfo | M | | NR Frequency Info 9.2.2.19 | This IE is ignored for NR operating bands for which uplink range of N _{REF} is not defined in section 5.4.2.3 of TS 38.104 [24]. |
| >>>>DL NR FreqInfo | M | | NR Frequency Info 9.2.2.19 | |
| >>TDD | | | | |
| >>>TDD Info | | 1 | | |
| >>>>NR FreqInfo | M | | NR ARFCN Frequency Info 9.2.2.19 | |
| >Connectivity Support | M | | 9.2.2.28 | |
| >Measurement Timing Configuration | M | | OCTET STRING | Contains the <i>MeasurementTimingConfiguration</i> inter-node message for the neighbour cell, as defined in TS 38.331 [10]. |

| Range bound | Explanation |
|-------------------|---|
| maxnoofNeighbours | Maximum no. of neighbour cells associated to a given served cell. Value is 1024. |

9.2.2.14 Neighbour Information E-UTRA

This IE contains cell configuration information of E-UTRA cells that a neighbour NG-RAN node may need to properly operate its own served cells.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|--------------------------|--------------------------|---|
| E-UTRA Neighbour Information E-UTRA | | 1 .. <maxnoofNeighbours> | | |
| >E-UTRA PCI | M | | INTEGER (0..503, ...) | E-UTRA Physical Cell Identifier of the neighbour cell |
| >ECGI | M | | E-UTRA CGI 9.2.2.8 | |
| >EARFCN | M | | E-UTRA ARFCN 9.2.2.21 | DL EARFCN for FDD or EARFCN for TDD |
| >TAC | M | | 9.2.2.5 | Tracking Area Code |
| >RANAC | O | | RAN Area Code 9.2.2.6 | |

| Range bound | Explanation |
|-------------------|---|
| maxnoofNeighbours | Maximum no. of neighbour cells associated to a given served cell. Value is 1024. |

9.2.2.15 Served Cells To Update NR

This IE contains updated configuration information for served NR cells exchanged between NG-RAN nodes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|----------------------------------|-----------------------|--|-------------|----------------------|
| Served Cells NR To Add | | 0 .. <maxnoofCellsinNG-RAN node> | | List of added cells served by the NG-RAN node. | GLOBAL | reject |
| >Served Cell Information NR | M | | 9.2.2.11 | | – | |
| >Neighbour | O | | 9.2.2.13 | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------------------|----------|---|-------------------------------|--|-------------|----------------------|
| Information NR | | | | | | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| Served Cells To Modify NR | | $0 \dots < \text{maxnoofCellsinNG-RAN node}>$ | | List of modified cells served by the NG-RAN node. | YES | reject |
| >Old NR CGI | M | | NR CGI 9.2.2.7 | | – | |
| >Served Cell Information NR | M | | 9.2.2.11 | | – | |
| >Neighbour Information NR | O | | 9.2.2.13 | | – | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| >Deactivation Indication | O | | ENUMERATED (deactivated, ...) | Indicates that the concerned cell is switched off for energy saving reasons. | – | |
| Served Cells To Delete NR | | $0 \dots < \text{maxnoofCellsinNG-RAN node}>$ | | List of deleted cells served by the NG-RAN node. | YES | reject |
| >Old NR-CGI | M | | NR CGI 9.2.2.7 | | – | |

| Range bound | Explanation |
|---------------------------|--|
| maxnoofCellsinNG-RAN node | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.2.2.16 Served Cells to Update E-UTRA

This IE contains updated configuration information for served E-UTRA cells exchanged between NG-RAN nodes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|---|-----------------------|--|-------------|----------------------|
| Served Cells To Add E-UTRA | | $0 \dots < \text{maxnoofCellsinNG-RAN node}>$ | | List of added cells served by the NG-RAN node. | YES | reject |
| >Served Cell Information E-UTRA | M | | 9.2.2.12 | | – | |
| >Neighbour Information NR | O | | 9.2.2.13 | | – | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| >SFN Offset | O | | 9.2.2.75 | Associated with the <i>ECGI</i> IE in the <i>Served Cell Information E-UTRA</i> IE | YES | ignore |
| Served Cells To Modify E-UTRA | | $0 \dots < \text{maxnoofCellsinNG-RAN node}>$ | | List of modified cells served by the NG-RAN node. | YES | reject |
| >Old ECGI | M | | E-UTRA CGI 9.2.2.8 | | – | |
| >Served Cell | M | | 9.2.2.12 | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------|----------|------------------------------------|-------------------------------|--|-------------|----------------------|
| Information E-UTRA | | | | | | |
| >Neighbour Information NR | O | | 9.2.2.13 | | – | |
| >Neighbour Information E-UTRA | O | | 9.2.2.14 | | – | |
| >Deactivation Indication | O | | ENUMERATED (deactivated, ...) | Indicates that the concerned cell is switched off for energy saving reasons. | – | |
| >SFN Offset | O | | 9.2.2.75 | Associated with the ECGI IE in the Served Cell Information E-UTRA IE | YES | ignore |
| Served Cells To Delete E-UTRA | | 0 .. < maxnoofCellsinNG-RAN node > | | List of deleted cells served by the NG-RAN node. | YES | reject |
| >Old ECGI | M | | E-UTRA CGI 9.2.2.8 | | – | |

| Range bound | Explanation |
|---------------------------|--|
| maxnoofCellsinNG-RAN node | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.2.2.17 Cell Assistance Information NR

The *Cell Assistance Information* IE is used by the NG-RAN node to request information about NR cells.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--|----------|------------------------------------|------------------------------------|--|
| CHOICE Cell Assistance Type | M | | | |
| >Limited NR List | | | | |
| >>List of Requested NR Cells | | 1 .. < maxnoofCellsinNG-RAN node > | | Included when the NG-RAN node requests a limited list of served NR cells. |
| >>>NR CGI | M | | 9.2.2.7 | NR cell for which served NR cell information is requested. |
| >Full NR List | | | | |
| >>Complete Information Request Indicator | M | | ENUMERATED (allServedCellsNR, ...) | Included when the NG-RAN node requests the complete list of served cells for a gNB |

| Range bound | Explanation |
|---------------------------|--|
| maxnoofCellsinNG-RAN node | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.2.2.18 SUL Information

This IE contains information about the SUL carrier.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
|--------------------|----------|-------|--------------------------|---|-------------|----------------------|
| SUL Frequency Info | M | | INTEGER (0..maxNRARF CN) | RF Reference Frequency as defined in TS | – | |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
|----------------------------|----------|-------|------------------------------------|---|-------------|----------------------|
| | | | | 38.104 [24] section 5.4.2.1. The frequency provided in this IE identifies the absolute frequency position of the reference resource block (Common RB 0) of the SUL carrier. Its lowest subcarrier is also known as Point A. | | |
| SUL Transmission Bandwidth | M | | NR Transmission Bandwidth 9.2.2.20 | | – | |
| Carrier List | O | | NR Carrier List 9.2.2.63 | If included, the SUL Transmission Bandwidth IE shall be ignored. | YES | ignore |
| Frequency Shift 7p5khz | O | | ENUMERATED (false, true, ...) | Indicate whether the value of Δ_{shift} is 0kHz or 7.5kHz when calculating $F_{\text{REF,shift}}$ as defined in Section 5.4.2.1 of TS 38.104 [24]. | YES | ignore |

| Range bound | Explanation |
|-------------|--|
| maxNRARFCN | Maximum value of NRARFCNs. Value is 3279165. |

9.2.2.19 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 or for SUL carrier.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
|-------------------------|----------|---------------------------|--------------------------|--|-------------|----------------------|
| NR ARFCN | M | | INTEGER (0.. maxNRARFCN) | RF Reference Frequency as defined in TS 38.104 [24], section 5.4.2.1. The frequency provided in this IE identifies the absolute frequency position of the reference resource block (Common RB 0) of the carrier. Its lowest subcarrier is also known as Point A. | – | |
| SUL Information | O | | 9.2.2.18 | | – | |
| NR Frequency Band List | | 1 | | | – | |
| >NR Frequency Band Item | | 1..<maxno of NRCellBands> | | | – | |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
|----------------------------|----------|--------------------------|-------------------------------|--|-------------|----------------------|
| >>NR Frequency Band | M | | INTEGER (1..1024, ...) | Primary NR Operating Band as defined in TS 38.104 [24], section 5.4.2.3. The value 1 corresponds to n1, value 2 corresponds to NR operating band n2, etc. | – | |
| >>Supported SUL band List | | 0..<maxno ofNRCellBands> | | | – | |
| >>>Supported SUL band Item | M | | INTEGER (1..1024, ...) | Supplementary NR Operating Band as defined in TS 38.104 [24] 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. | – | |
| Frequency Shift 7p5khz | O | | ENUMERATED (false, true, ...) | Indicate whether the value of Δ_{shift} is 0kHz or 7.5kHz when calculating $F_{\text{REF,shift}}$ as defined in Section 5.4.2.1 of TS 38.104 [24]. | YES | ignore |

| Range bound | Explanation |
|--------------------|--|
| maxNRARFCN | Maximum value of NRARFCNs. Value is 3279165. |
| maxnoofNRCellBands | Maximum no. of frequency bands supported for a NR cell. Value is 32. |

9.2.2.20 NR Transmission Bandwidth

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

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|---|--|
| NR SCS | M | | ENUMERATED (scs15, scs30, scs60, scs120, ...) | The values scs15, scs30, scs60 and scs120 corresponds to the sub carrier spacing in TS 38.104 [24]. |
| NR NRB | M | | ENUMERATED (nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121, nrb132, nrb133, nrb135, | This IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "N _{RB} " (TS 38.104 [24]). The values nrb11, nrb18, etc. correspond to the number of resource blocks "N _{RB} " 11, 18, etc. |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|--|-----------------------|
| | | | nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...) | |

9.2.2.21 E-UTRA ARFCN

The E-UTRA Absolute Radio Frequency Channel Number defines the carrier frequency used in an E-UTRAN 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 |
|---------------|----------|-------|------------------------|---|
| E-UTRA ARFCN | M | | INTEGER (0..maxEARFCN) | The relation between EARFCN and carrier frequency (in MHz) are defined in TS 36.104 [25]. |

| Range bound | Explanation |
|-------------|--|
| maxEARFCN | Maximum value of EARFCNs. Value is 262143. |

9.2.2.22 E-UTRA Transmission Bandwidth

The *E-UTRA Transmission Bandwidth* IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "N_{RB}" (TS 36.104 [25]). The values bw1, bw6, bw15, bw25, bw50, bw75, bw100 correspond to the number of resource blocks "N_{RB}" 6, 15, 25, 50, 75, 100.

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

9.2.2.23 Number of Antenna Ports E-UTRA

The *Number of Antenna Ports E-UTRA* IE is used to indicate the number of cell specific antenna ports supported by an E-UTRA cell.

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

9.2.2.24 E-UTRA Multiband Info List

The *E-UTRA Multiband Info List* IE contains the additional frequency band indicators that an E-UTRA cell belongs to listed in decreasing order of preference and corresponds to the *MultiBandInfoList* specified in TS 36.331 [14].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|------------------------|------------------------|---|
| BandInfo | | 1..<maxnoofEutraBands> | | |
| >Frequency Band Indicator | M | | INTEGER (1.. 256, ...) | E-UTRA operating band as defined in TS 36.101 [27, table 5.5-1] |

| Range bound | Explanation |
|-------------------|--|
| maxnoofEUTRABands | Maximum number of frequency bands that an E-UTRA cell belongs to. The value is 16. |

9.2.2.25 E-UTRA PRACH Configuration

This IE indicates the E-UTRA PRACH resources used in an E-UTRA neighbour cell.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------------------|----------|-------|-------------------------------|---|
| RootSequenceIndex | M | | INTEGER (0..837) | See section 5.7.2. in TS 36.211 [26] |
| ZeroCorrelationZoneConfiguration | M | | INTEGER (0..15) | See section 5.7.2. in TS 36.211 [26] |
| HighSpeedFlag | M | | ENUMERATED (true, false, ...) | "true" corresponds to Restricted set and "false" to Unrestricted set. See section 5.7.2 in TS 36.211 [26] |
| PRACH-FrequencyOffset | M | | INTEGER (0..94) | See section 5.7.1 of TS 36.211 [26] |
| PRACH-ConfigurationIndex | C-ifTDD | | INTEGER (0..63) | See section 5.7.1. in TS 36.211 [26] |

| Condition | Explanation |
|-----------|--|
| ifTDD | This IE shall be present if the <i>EUTRA-Mode-Info</i> IE in the <i>Served Cell Information E-UTRA</i> IE is set to the value "TDD". |

9.2.2.26 MBSFN Subframe Allocation E-UTRA

The *MBSFN Subframe Allocation E-UTRA* IE is used to indicate the subframes that are allocated for MBSFN within the radio frame allocation period as specified for the *MBSFN-SubframeConfig* IE TS 36.331 [14].

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

9.2.2.27 Global NG-RAN Cell Identity

This IE contains either an NR or an E-UTRA Cell Identity.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-------|-----------------------|-----------------------|
| PLMN Identity | M | | 9.2.2.4 | |
| NG-RAN Cell Identity | M | | 9.2.2.9 | |

9.2.2.28 Connectivity Support

The *Connectivity Support* IE is used to indicate the connectivity supported by a NR cell.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| EN-DC Support | M | | ENUMERATED | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|---------------------------------|-----------------------|
| | | | (Supported, Not supported, ...) | |

9.2.2.29 Protected E-UTRA Resource Indication

This IE indicates the resources allocated for E-UTRA DL and UL reference and control signals (hereby referred to as protected resources). This information is used in the process of E-UTRA – NR Cell Resource Coordination.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|---------------------------------------|---|---|
| Activation SFN | M | | INTEGER (0..1023) | Indicates from which SFN of the receiving node the resource allocation is valid. |
| Protected Resource List | | 1 | | The protected resource pattern is continuously repeated, and it is valid until stated otherwise or until replaced by a new pattern. The pattern does not apply in reserved subframes. |
| >Protected Resource List Item | | 1..<maxnoofProtectedResourcePatterns> | | Each item describes one transmission pattern. A pattern may comprise several control signals. |
| >>Resource Type | M | | ENUMERATED (downlinknonCRS, CRS, uplink, ...) | Indicates whether the protected resource is E-UTRA DL non-CRS, E-UTRA CRS or E-UTRA UL. |
| >>Intra-PRB Protected Resource Footprint | M | | BIT STRING (84, ...) | The bitmap of REs occupied by the protected signal within one PRB. Each position in the bitmap represents an RE in one PRB; value "0" indicates "resource not protected", value "1" indicates "resource protected". The first bit of the string corresponds to the RE with the smallest time and frequency index in the PRB, where the indexing first goes into the frequency domain. The length of the bit string equals the product of N_{sc}^{PRB} and the length of PRB in time dimension, measured in REs. N_{sc}^{PRB} is defined in TS 36.211 [10]. The intra-PRB pattern consisting of all "1"s is equivalent to PRB-level granularity. |
| >>Protected Footprint Frequency Pattern | M | | BIT STRING(6..110, ...) | The bit string indicates in which PRBs inside carrier bandwidth the Intra-PRB Protected Resource Footprint applies. How often in time dimension this frequency pattern applies, depends on time periodicity of Intra-PRB Protected Resource Footprint. The first bit of the bit string corresponds to the PRB occupying the lowest subcarrier frequencies of the carrier bandwidth, where the indexing first goes into the frequency domain. Each position in the string represents a PRB; value |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|---|
| | | | | "0" indicates " Intra-PRB Protected Resource Footprint does not appear in PRB", value "1" indicates "Intra-PRB Protected Resource Footprint appears in PRB". The length of the bit string equals the number of PRBs in the carrier bandwidth. |
| >>Protected Footprint Time Pattern | M | | | The description of time periodicity of the Intra-PRB Protected Resource Footprint. |
| >>>Protected Footprint Time-periodicity | M | | INTEGER(1..320, ...) | Periodicity with which the periodic Intra-PRB Protected Resource Footprint repeats in time-dimension (1= every PRB (i.e. slot), 2=every other PRB (i.e. slot) etc. |
| >>>Protected Footprint Start Time | M | | INTEGER(1..20, ...) | The time-position of the PRB inside the frame in which the periodic Intra-PRB Protected Resource Footprint appears for the first time. The value "1" corresponds to the receiving node's slot 0 in subframe 0 in the receiving node's radio frame where SFN = Activation SFN. |
| MBSFN Control Region Length | O | | INTEGER(0..3) | Length of control region in MBSFN subframes. Expressed in REs, in the time dimension. |
| PDCCH Region Length | M | | INTEGER(1..3) | Length of PDCCH region in regular subframes. Expressed in REs, in the time dimension. |

| Range bound | Explanation |
|----------------------------------|---|
| maxnoofProtectedResourcePatterns | Maximum no. protected resource patterns. Value is 16. |

9.2.2.30 Data Traffic Resource Indication

This IE indicates the intended data traffic resource allocation for E-UTRA - NR Cell Resource Coordination.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|-------|---------------------------------|--|
| Activation SFN | M | | INTEGER (0..1023) | Indicates from which SFN of the receiving node the agreement is valid. |
| <i>CHOICE Shared Resource Type</i> | M | | | |
| >UL Only Sharing | | | | |
| >>UL Resource Bitmap | M | | Data Traffic Resources 9.2.2.31 | |
| >UL and DL Sharing | | | | |
| >>CHOICE UL Resources | M | | | |
| >>>Unchanged | | | NULL | |
| >>>Changed | | | | |
| >>>>UL Resource Bitmap | M | | Data Traffic Resources 9.2.2.31 | |
| >>CHOICE DL Resources | M | | | |
| >>>Unchanged | | | NULL | |
| >>>Changed | | | | |
| >>>>DL Resource | M | | Data Traffic | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------|---|
| Bitmap | | | Resources 9.2.2.31 | |
| Reserved Subframe Pattern | O | | 9.2.2.32 | Indicates subframes in which the resource allocation does not hold. |

9.2.2.31 Data Traffic Resources

The *Data Traffic Resources* IE indicates the intended data traffic resource allocation for E-UTRA - NR Cell Resource Coordination.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|-------|-----------------------|--|
| Data Traffic Resources | M | | BIT STRING (6..17600) | The indication of resources allocated to E-UTRA PDSCH/PUSCH. Each position in the bit string represents a PRB pair in a subframe; value "0" indicates "resource not intended to be used for transmission", value "1" indicates "resource intended to be used for transmission". The first bit of the bit string corresponds to the PRB pair occupying the lowest subcarrier frequencies of the carrier, where the indexing first goes into the frequency domain. The bit string may span across multiple contiguous subframes. The first position of the Data Traffic Resources IE corresponds to the receiving node's subframe 0 in a receiving node's radio frame where SFN = Activation SFN. The length of the bit string is an integer multiple of N_{RB}^{DL} or N_{RB}^{UL} , defined in TS 36.211 [10]. |

9.2.2.32 Reserved Subframe Pattern

The *Reserved Subframe Pattern* IE indicates the pattern of subframes in which the *Protected E-UTRA Resource Indication* and *Data Traffic Resource Indication* do not hold.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------------------|---|
| Subframe Type | M | | ENUMERATED(MBSFN, non-MBSFN, ...) | Indicates what type of non-regular subframes the <i>Reserved Subframe Pattern</i> refers to (e.g. MBSFN). |
| Reserved Subframe Pattern | M | | BIT STRING (10..160) | Each position in the bitmap represents a subframe. Value '0' indicates "regular subframe". Value '1' indicates "reserved subframe". For MBSFN subframes, the exception refers only to the non-control region of the subframe. The bit string may span across multiple contiguous subframes. |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------|----------|-------|-----------------------|---|
| | | | | The first position of the Subframe Configuration IE corresponds to the receiving node's subframe 0 in a receiving node's radio frame where SFN = Activation SFN. The IE is ignored if received by the ng-eNB. |
| MBSFN Control Region Length | O | | INTEGER(0..3) | Length of control region in MBSFN subframes. Expressed in REs, in the time dimension. |

9.2.2.33 MR-DC Resource Coordination Information

The *MR-DC Resource Coordination Information* IE is used to coordinate resource utilisation between the M-NG-RAN node and the S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|--|
| <i>CHOICE</i> NG-RAN Node Resource Coordination Information | M | | | |
| >E-UTRA | | | | |
| >>E-UTRA Resource Coordination Information | | | 9.2.2.34 | E-UTRA resource coordination information |
| >NR | | | | |
| >>NR Resource Coordination Information | | | 9.2.2.35 | NR resource coordination information |

9.2.2.34 E-UTRA Resource Coordination Information

The *E-UTRA Resource Configuration Information* IE indicates LTE resource allocation at ng-eNB used at the gNB to coordinate resource or sidelink resource utilisation between M-NG-RAN-node and S-NG-RAN node.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-----------------------------|----------|-------|------------------------------|---|
| EUTRA Cell ID | M | | E-UTRA CGI 9.2.2.8 | This IE indicates the SpCell. |
| UL Coordination Information | M | | BIT STRING (6..4400, ...) | Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "PCell resource not intended to be used for transmission by the sending node", value "1" indicates "PCell resource intended to be used for transmission by the sending node". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to UL subframes or SL subframes for sidelink transmission. The bit string may span across multiple contiguous subframes (maximum 40). |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--|----------|-------|---------------------------|--|
| | | | | The first position of the <i>UL Coordination Information</i> corresponds to subframe 0 in a radio frame where $SFN = 0$. The length of the bit string is an integer multiple of N_{RB}^{UL} . N_{RB}^{UL} is defined in TS 36.211 [10]. The <i>UL Coordination Information</i> is continuously repeated. |
| DL Coordination Information | O | | BIT STRING (6..4400, ...) | Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "PCell resource not intended to be used for transmission by the sending node", value "1" indicates "PCell resource intended to be used for transmission by the sending node". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to DL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the <i>DL Coordination Information</i> corresponds to the receiving node's subframe 0 in a receiving node's radio frame where $SFN = 0$. The length of the bit string is an integer multiple of N_{RB}^{DL} . N_{RB}^{DL} is defined in TS 36.211 [10]. The <i>DL Coordination Information</i> is continuously repeated. |
| NR CGI | O | | 9.2.2.7 | This IE indicates the assumed SpCell. |
| E-UTRA Coordination Assistance Information | O | | 9.2.2.36 | |

9.2.2.35 NR Resource Coordination Information

The *NR Resource Coordination Information* IE indicates resources within the bandwidth of the ng-eNB SpCell which are not available for use by the ng-eNB and is used at the ng-eNB to coordinate resource or sidelink resource utilisation between the gNB and the ng-eNB.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-----------------------------|----------|-------|---------------------------|---|
| NR CGI | M | | 9.2.2.7 | This IE indicates the SpCell. |
| UL Coordination Information | M | | BIT STRING (6..4400, ...) | Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "SpCell resource not intended to be used for transmission by the sending node", value "1" indicates "SpCell resource intended to be used for transmission by the sending |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--|----------|-------|---------------------------|---|
| | | | | <p>node". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to UL subframes or SL subframes for sidelink transmission.</p> <p>The bit string may span across multiple contiguous subframes (maximum 40). The first position of the <i>UL Coordination Information</i> corresponds to the receiving node's subframe 0 in a receiving node's radio frame where $SFN = 0$.</p> <p>The length of the bit string is an integer multiple of N_{RB}^{UL}.</p> <p>N_{RB}^{UL} is defined in TS 36.211 [26].</p> <p>The UL Coordination Information is continuously repeated.</p> |
| DL Coordination Information | O | | BIT STRING (6..4400, ...) | <p>Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "SpCell resource not intended to be used for transmission by the sending node", value "1" indicates "SpCell resource intended to be used for transmission by the sending node". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to DL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the <i>DL Coordination Information</i> corresponds to the receiving node's subframe 0 in a receiving node's radio frame where $SFN = 0$.</p> <p>The length of the bit string is an integer multiple of N_{RB}^{DL}. N_{RB}^{DL} is defined in TS 36.211 [26].</p> <p>The DL Coordination Information is continuously repeated.</p> |
| EUTRA Cell ID | O | | ECGI 9.2.2.8 | Reference cell for <i>UL Coordination Information</i> IE and <i>DL Coordination Information</i> IE. |
| NR Coordination Assistance Information | O | | 9.2.2.37 | |

9.2.2.36 E-UTRA Coordination Assistance Information

The *E-UTRA Coordination Assistance Information* IE is provided by the ng-eNB and used by the gNB to determine further coordination of resource utilisation between the gNB and the ng-eNB.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--|----------|-------|--|-----------------------|
| E-UTRA Coordination Assistance Information | M | | ENUMERATED(Coordination Not Required, ...) | |

9.2.2.37 NR Coordination Assistance Information

The *NR Coordination Assistance Information* IE is provided by the gNB and used by the ng-eNB to determine further coordination of resource utilisation between the gNB and the ng-eNB.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--|----------|-------|--|-----------------------|
| NR Coordination Assistance Information | M | | ENUMERATED(Coordination Not Required, ...) | |

9.2.2.38 NE-DC TDM Pattern

The *NE-DC TDM Pattern* IE is provided by the gNB and used by the ng-eNB to determine UL/DL reference configuration indicating the time during which a UE configured with NE-DC is allowed to transmit.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------------|----------|-------|---|--|
| Subframe Assignment | M | | ENUMERATED(sa0, sa1, sa2, sa3, sa4, sa5, sa6) | Indicates DL/UL subframe configuration where sa0 points to Configuration 0, sa1 to Configuration 1 etc. as specified in TS 36.331 [14]. |
| Harq Offset | M | | INTEGER (0..9) | Indicates a HARQ subframe offset that is applied to the subframes designated as UL in the associated subframe assignment, see TS 36.331 [14] |

9.2.2.39 Interface Instance Indication

The Interface Instance Indication identifies the interface instance the XnAP message is destined for.

NOTE: The Interface Instance Indication is allocated so that it can be associated with an Xn-C interface instance. The Interface Instance Indication may identify more than one interface instance.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-------------------------------|----------|-------|-----------------------|-----------------------|
| Interface Instance Indication | M | | INTEGER (0..255, ...) | |

9.2.2.39a Configured TAC Indication

This IE indicates that in a NR cell served by the gNB, the TAC with which this IE is associated, is only configured but not broadcast.

NOTE: This IE is defined in accordance to the possibility foreseen in TS 38.331 [10] to not broadcast the TAC if the NR cell only supports PSCell/SCell functionality.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|---------------------------|-----------------------|
| Configured TAC Indication | M | | ENUMERATED (true, ...) | |

9.2.2.40 Intended TDD DL-UL Configuration NR

This IE contains the subcarrier spacing, cyclic prefix and TDD DL-UL slot configuration of an NR cell that a neighbour NG-RAN node needs to take into account for cross-link interference mitigation, and/or for NR-DC power coordination, when operating its own cells.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---|----------|-------------------|---|---|
| NR SCS | M | | ENUMERATED (scs15, scs30, scs60, scs120, ...) | The values scs15, scs30, scs60 and scs120 corresponds to the sub carrier spacing in TS 38.104 [24]. |
| NR Cyclic Prefix | M | | ENUMERATED (Normal, Extended, ...) | The type of cyclic prefix, which determines the number of symbols in a slot. |
| NR DL-UL Transmission Periodicity | M | | ENUMERATED (ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms3, ms4, ms5, ms10, ms20, ms40, ms60, ms80, ms100, ms120, ms140, ms160, ...) | The periodicity is expressed in the format msXpYZ, and equals X.YZ milliseconds. |
| Slot Configuration List | | 1 | | |
| >Slot Configuration List Item | | 1..<maxnoofs/ots> | | |
| >>Slot Index | | | INTEGER (0.. 5119) | |
| >>CHOICE <i>Symbol Allocation in Slot</i> | M | | | |
| >>>All DL | | | | |
| >>>All UL | | | | |
| >>>Both DL and UL | | | | |
| >>>>Number of DL Symbols | M | | INTEGER (0..13) | Number of consecutive DL symbols at the beginning of the slot identified by Slot Index. If extended cyclic prefix is used, the maximum value is 11. |
| >>>>Number of UL Symbols | M | | INTEGER (0..13) | Number of consecutive UL symbols in the end of the slot identified by Slot Index. If extended cyclic prefix is used, the maximum value is 11. |

| Range bound | Explanation |
|--------------|---|
| maxnoofs/ots | Maximum length of number of slots in a 10-ms period. Value is 5120. |

9.2.2.41 Cell and Capacity Assistance Information NR

The *Cell and Capacity Assistance Information NR* IE is used by the NG-RAN node to request information about NR cells and it includes information about cell list size capacity.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--------------------------------|----------|-------|-----------------------|-----------------------|
| Maximum Cell List Size | O | | 9.2.2.44 | |
| Cell Assistance Information NR | O | | 9.2.2.17 | |

9.2.2.42 Cell and Capacity Assistance Information E-UTRA

The *Cell and Capacity Assistance Information E-UTRA* IE is used by the NG-RAN node to request information about E-UTRA cells and it includes information about cell list size capacity.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|------------------------------------|----------|-------|-----------------------|-----------------------|
| Maximum Cell List Size | O | | 9.2.2.44 | |
| Cell Assistance Information E-UTRA | O | | 9.2.2.43 | |

9.2.2.43 Cell Assistance Information E-UTRA

The *Cell Assistance Information* IE is used by the NG-RAN node to request information about E-UTRA cells.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--|----------|------------------------------------|--|---|
| <i>CHOICE</i> Cell Assistance Type | M | | | |
| >Limited <i>EUTRA</i> List | | | | |
| >>List of Requested E-UTRA Cells | | 1 .. <maxnoofCells in NG-RAN node> | | Included when the NG-RAN node requests a limited list of served E-UTRA cells. |
| >>>E-UTRA CGI | M | | 9.2.2.7 | E-UTRA cell for which served E-UTRA cell information is requested. |
| >Full <i>E-UTRA</i> List | | | | |
| >>Complete Information Request Indicator | M | | ENUMERATED (allServedCellsE-UTRA, ...) | Included when the NG-RAN node requests the complete list of served cells for a ng-eNB |

| Range bound | Explanation |
|-----------------------------|--|
| maxnoofCells in NG-RAN node | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

9.2.2.44 Maximum Cell List Size

This IE indicates the maximum size the sending node can handle for a given cell list.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|-------|-------------------------|-----------------------|
| Maximum Cell List Size | M | | INTEGER (0..16384, ...) | |

9.2.2.45 Message Oversize Notification

This IE indicates that a failure has occurred due to an excessive message size and it indicates the maximum number of cells that can be received in the *List of Served Cells NR* IE or in the *List of Served Cells E-UTRA* IE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|-------|-----------------------|-----------------------|
| Maximum Cell List Size | M | | 9.2.2.44 | |

9.2.2.46 Partial List Indicator

The *Partial List Indicator* IE is used by the NG-RAN node to indicate whether the served cell information contained in the same message is a partial list.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|------------------------|----------|-------|---------------------------|-----------------------|
| Partial List Indicator | M | | ENUMERATED (partial, ...) | |

9.2.2.47 Offset of NB-IoT Channel Number to EARFCN

This IE is used to indicate the offset of the NB-IoT Channel Number to the EARFCN (TS 36.104 [25]).

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---|----------|-------|---|-----------------------|
| Offset of NB-IoT Channel Number to EARFCN | M | | ENUMERATED (-10, -9, -8.5, -8, -7, -6, -5, -4.5, -4, -3, -2, -1, -0.5, 0, 1, 2, 3, 3.5, 4, 5, 6, 7, 7.5, 8, 9, ...) | |

9.2.2.48 NB-IoT UL DL Alignment Offset

This IE is used to indicate the offset between the UL carrier frequency center with respect to DL carrier frequency center.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-------------------------------|----------|-------|--------------------------------|-----------------------|
| NB-IoT UL DL Alignment Offset | M | | ENUMERATED (-7.5, 0, 7.5, ...) | Unit: kHz |

9.2.2.49 TNL Capacity Indicator

The *TNL Capacity Indicator* IE indicates the offered and available capacity of the Transport Network experienced by the NG RAN cell

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|----------------------------|--|
| DL TNL 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. Value 100 corresponds to the offered capacity. |
| UL TNL 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. Value 100 corresponds to the offered capacity. |

9.2.2.50 Radio Resource Status

The *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 | Criticality | Assigned Criticality |
|--|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| CHOICE <i>Radio Resource Status Type</i> | M | | | | – | |
| >ng-eNB | | | | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------------------|-----------------------|-----------------------------------|-------------|----------------------|
| >>DL GBR PRB usage | M | | INTEGER (0..100) | Per cell DL GBR PRB usage | – | |
| >>UL GBR PRB usage | M | | INTEGER (0..100) | Per cell UL GBR PRB usage | – | |
| >>DL non-GBR PRB usage | M | | INTEGER (0..100) | Per cell DL non-GBR PRB usage | – | |
| >>UL non-GBR PRB usage | M | | INTEGER (0..100) | Per cell UL non-GBR PRB usage | – | |
| >>DL Total PRB usage | M | | INTEGER (0..100) | Per cell DL Total PRB usage | – | |
| >>UL Total PRB usage | M | | INTEGER (0..100) | Per cell UL Total PRB usage | – | |
| >>DL scheduling PDCCH CCE usage | O | | INTEGER (0..100) | | YES | ignore |
| >>UL scheduling PDCCH CCE usage | O | | INTEGER (0..100) | | YES | ignore |
| >gNB | | | | | – | |
| >>SSB Area Radio Resource Status List | | 1 | | | – | |
| >>>SSB Area Radio Resource Status Item | | 1..<maxno ofSSBAreas> | | | – | |
| >>>>SSB Index | M | | INTEGER (0..63) | | – | |
| >>>>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) | | YES | ignore |
| >>>>UL scheduling PDCCH CCE usage | O | | INTEGER (0..100) | | YES | ignore |

| Range bound | Explanation |
|-----------------|--|
| maxnoofSSBAreas | Maximum no. SSB Areas that can be served by a NG-RAN node cell. Value is 64. |

9.2.2.51 Composite Available Capacity Group

The *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 | | Composite Available Capacity 9.2.2.52 | For the Downlink |
| Composite Available Capacity Uplink | M | | Composite Available Capacity 9.2.2.52 | For the Uplink |

9.2.2.52 Composite Available Capacity

The *Composite Available Capacity* IE indicates the overall available resource level in the cell in either Downlink or Uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------|---|
| Cell Capacity Class Value | O | | 9.2.2.53 | |
| Capacity Value | M | | 9.2.2.54 | '0' indicates no resource is available, Measured on a linear scale. |

9.2.2.53 Cell Capacity Class Value

The *Cell Capacity Class Value* IE indicates the value that classifies the cell capacity with regards to the other cells. The *Cell Capacity Class Value* IE only indicates resources that are configured for traffic purposes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-------|-------------------------|--|
| Capacity Class Value | M | | INTEGER (1..100,...) | Value 1 indicates the minimum cell capacity, and 100 indicates the maximum cell capacity. There should be a linear relation between cell capacity and Cell Capacity Class Value. |

9.2.2.54 Capacity Value

The *Capacity Value* IE indicates the amount of resources per cell and per SSB area that are available relative to the total NG-RAN resources. The capacity value should be measured and reported so that the minimum NG-RAN resource usage of existing services is reserved according to implementation. The *Capacity Value* IE can be weighted according to the ratio of cell capacity class values, if available.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|--------------------------|-----------------------|--|
| Capacity Value | M | | INTEGER (0..100) | Value 0 indicates no available capacity, and 100 indicates 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..<maxnoofS SBAreas> | | |
| >>SSB Index | M | | INTEGER (0..63) | |
| >>SSB Area Capacity Value | M | | INTEGER (0..100) | Value 0 indicates no available capacity, and 100 indicates maximum available capacity . SSB Area Capacity Value should be measured on a linear scale. |

| Range bound | Explanation |
|-----------------|--|
| maxnoofSSBAreas | Maximum no. SSB Areas that can be served by a NG-RAN node cell. Value is 64. |

9.2.2.55 Slice Available Capacity

The *Slice Available Capacity* IE indicates the amount of resources per network slice that are available per cell relative to the total NG-RAN resources per cell. The *Slice Capacity Value Downlink* IE and the *Slice Capacity Value Uplink* IE can be weighted according to the ratio of the corresponding cell capacity class values contained in the *Composite Available Capacity Group* IE, if available.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|--------------------------|-----------------------|--|
| Slice Available Capacity | | 1..<maxnoofBPLMNs > | | |
| >PLMN Identity | M | | 9.2.2.4 | Broadcast PLMN |
| > S-NSSAI Available Capacity List | | 1 | | |
| >> S-NSSAI Available Capacity Item | M | 1 .. <maxnoofSliceltems> | | |
| >>>S-NSSAI | | | 9.2.3.21 | |
| >>>Slice Available Capacity Value Downlink | O | | INTEGER (0..100) | Value 0 indicates no available capacity, and 100 indicates maximum available capacity . Slice Capacity Value should be measured on a linear scale. |
| >>>Slice Available Capacity Value Uplink | O | | INTEGER (0..100) | Value 0 indicates no available capacity, and 100 indicates maximum available capacity. Slice Capacity Value should be measured on a linear scale. |

| Range bound | Explanation |
|-------------------|--|
| maxnoofSliceltems | Maximum no. of signalled slice support items. Value is 1024. |
| maxnoofBPLMNs | Maximum no. of PLMN Ids.broadcast in a cell. Value is 12. |

9.2.2.56 RRC Connections

The *RRC Connections* IE indicates the overall status of RRC connections per cell.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|-----------------------|
| Number of RRC Connections | M | | 9.2.2.57 | |
| Available RRC Connection Capacity Value | M | | 9.2.2.58 | |

9.2.2.57 Number of RRC Connections

The *Number of RRC Connections* IE indicates the maximum supported number of UEs in RRC_CONNECTED mode.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|------------------------|-----------------------|
| Number of RRC Connections | M | | INTEGER (1..65536,...) | |

9.2.2.58 Available RRC Connection Capacity Value

The *Available RRC Connection Capacity Value* IE indicates the residual percentage of the number of RRC connections, relative to the maximum number of RRC connections supported by the cell.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|--|
| Available RRC Connection Capacity Value | M | | INTEGER (0..100) | Value 0 indicates no available capacity, and 100 indicates maximum available capacity with respect to the whole cell. Capacity Value should be measured on a linear scale. |

9.2.2.59 UE RLF Report

This IE contains the RLF Report to be transferred.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|-----------------------|---|-------------|----------------------|
| <i>CHOICE type</i> | M | | | | – | |
| > <i>NR</i> | | | | | – | |
| >>NR UE RLF Report Container | M | | OCTET STRING | <i>nr-RLF-Report-r16</i> IE contained in the <i>UEInformationResponse</i> message defined in TS 38.331 [10]. | – | |
| > <i>LTE</i> | | | | | – | |
| >>LTE UE RLF Report Container | M | | OCTET STRING | <i>RLF-Report-r9</i> IE contained in the <i>UEInformationResponse</i> message defined in TS 36.331 [14] | – | |
| > <i>LTE Extension</i> | | | | | YES | ignore |
| >>LTE UE RLF Report Container | M | | OCTET STRING | Includes the <i>RLF-Report-r9</i> contained in the <i>UEInformationResponse</i> message defined in TS 36.331 [14] | – | |
| >>LTE UE RLF Report Container for extended bands | M | | OCTET STRING | Includes the <i>RLF-Report-v9e0</i> contained in the <i>UEInformationResponse</i> message defined in TS 36.331 [14] | – | |

9.2.2.60 Mobility Parameters Information

The *Mobility Parameters Information* IE contains the change of the Handover Trigger as compared to its current value. The Handover Trigger corresponds to the threshold at which a cell initialises the handover preparation procedure towards a specific neighbour cell. Positive value of the change means the handover is proposed to take place later.

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

9.2.2.61 Mobility Parameters Modification Range

The *Mobility Parameters Modification Range* IE contains the range of *Handover Trigger Change* values permitted by the NG-RAN node₂ at the moment the MOBILITY CHANGE FAILURE message is sent.

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

9.2.2.62 Number of Active UEs

The *Number of Active UEs* IE indicates the mean number of active UEs as defined in TS 38.314 [42].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|----------------------------|---|
| Mean number of Active UEs | M | | INTEGER (0..16777215, ...) | As defined in TS 38.314 [42] and where value "1" is equivalent to 0.1 Active UEs, value "2" is equivalent to 0.2 Active UEs, value <i>n</i> is equivalent to <i>n</i> /10 Active UEs. |

9.2.2.63 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 | | <i>1..<maxnoofNRSCSs></i> | | |
| >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 <i>NR SCS</i> IE defined for this carrier). The maximum value corresponds to 275×8–1. See TS 38.211 [39], clause 4.4.2. |
| >Carrier Bandwidth | M | | INTEGER (1..maxnoofPhysicalResourceBlocks, ...) | Width of this carrier in number of PRBs (using the <i>NR SCS</i> IE defined for this carrier). See TS 38.211 [39], 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. |
| maxnoofPhysicalResourceBlocks | Maximum no. of Physical Resource Blocks. Value is 275. |

9.2.2.64 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 [40], clause 4.1.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|------------------------------------|----------|-------|-----------------------|--|
| CHOICE <i>ssb-PositionsInBurst</i> | 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. |
| > <i>ShortBitmap</i> | | | | |
| >> <i>ShortBitmap</i> | M | | BIT STRING (SIZE(4)) | |
| > <i>MediumBitmap</i> | | | | |
| >> <i>MediumBitmap</i> | M | | BIT STRING (SIZE(8)) | |
| > <i>LongBitmap</i> | | | | |
| >> <i>LongBitmap</i> | M | | BIT STRING (SIZE(64)) | |

9.2.2.65 NID

This IE is used to identify (together with a PLMN identifier) a Standalone Non-Public Network. The NID is specified in TS 23.003 [22].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| NID | M | | BIT STRING (SIZE(44)) | |

9.2.2.66 CAG-Identifier

This IE is used to identify (together with a PLMN identifier) a Public Network Integrated Non-Public Network. The CAG-Identifier is specified in TS 23.003 [22].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------|----------|-------|-----------------------|-----------------------|
| CAG-Identifier | M | | BIT STRING (SIZE(32)) | |

9.2.2.67 Broadcast NID List

This IE contains a list of NIDs.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------------------------------|-----------------------|-----------------------|
| Broadcast NID List | | <i>1..<maxnoofNIDs></i> | | |
| >NID | M | | 9.2.2.65 | |

| Range bound | Explanation |
|-------------|---|
| maxnoofNIDs | Maximum no. of NIDs broadcast in a cell. Value is 12. |

9.2.2.68 Broadcast SNPN ID List

This IE contains a list of SNPN IDs.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------|----------|---------------------|-----------------------|-----------------------|
| Broadcast SNPN ID List | | 1..<maxnoofSNPNIDs> | | |
| >PLMN Identity | M | | 9.2.2.4 | |
| >Broadcast NID List | M | | 9.2.2.67 | |

| Range bound | Explanation |
|----------------|---|
| maxnoofSNPNIDs | Maximum no. of SNPN IDs broadcast in a cell. Value is 12. |

9.2.2.69 Broadcast CAG-Identifier List

This IE contains a list of CAG-Identifiers.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------------|----------|------------------|-----------------------|-----------------------|
| Broadcast CAG-Identifier List | | 1..<maxnoofCAGs> | | |
| >CAG-Identifier | M | | 9.2.2.66 | |

| Range bound | Explanation |
|-------------|--|
| maxnoofCAGs | Maximum no. of CAG-Identifiers broadcast in a cell. Value is 12. |

9.2.2.70 Broadcast PNI-NPN ID Information

This IE contains a list of PNI-NPN IDs.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|--------------------|-----------------------|-----------------------|
| Broadcast PNI-NPN ID Information | | 1..<maxnoofBPLMNs> | | Broadcast PLMNs |
| >PLMN Identity | M | | 9.2.2.4 | |
| >Broadcast CAG-Identifier List | M | | 9.2.2.69 | |

| Range bound | Explanation |
|---------------|--|
| maxnoofBPLMNs | Maximum no. of broadcast PLMNs by a cell. Value is 12. |

9.2.2.71 NPN Broadcast Information

This IE contains NPN related broadcast information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|-----------------------|-----------------------|
| <i>CHOICE NPN Broadcast Information per PLMN</i> | M | | | |
| >SNPN Information | | | | |
| >>Broadcast SNPN ID List | M | | 9.2.2.68 | |
| >PNI-NPN Information | | | | |
| >>Broadcast PNI-NPN ID Information | M | | 9.2.2.70 | |

9.2.2.72 NPN Support

This IE contains NPN related information associated with Network Slicing information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------|---|
| CHOICE <i>NPN Support</i> | M | | | |
| > <i>SNPN</i> | | | | |
| >>NID | M | | 9.2.2.65 | This IE is associated with the PLMN Identity and the TAI Slice Support List contained in the <i>TAI Support List IE</i> . Together with the PLMN Identity it identifies the SNPN supported in the corresponding Tracking Area by the NG-RAN node. |

9.2.2.73 Global Cell Identity

This IE is used to globally identify an NG-RAN cell or an E-UTRAN cell (see TS 36.300 [12]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------|-----------------------|--|
| PLMN Identity | M | | 9.2.2.4 | |
| CHOICE <i>Cell Type</i> | M | | | |
| > <i>NG-RAN E-UTRA</i> | | | | |
| >>E-UTRA Cell Identity | M | | BIT STRING (SIZE(28)) | The leftmost bits of the <i>E-UTRA Cell Identity</i> IE correspond to the ng-eNB ID (defined in subclause 9.2.2.2). |
| > <i>NG-RAN NR</i> | | | | |
| >>NR Cell Identity | M | | BIT STRING (SIZE(36)) | The leftmost bits of the <i>NR Cell Identity</i> IE correspond to the gNB ID (defined in subclause 9.2.2.1). |
| > <i>E-UTRAN</i> | | | | |
| >>E-UTRAN Cell Identity | M | | BIT STRING (SIZE(28)) | The leftmost bits of the <i>E-UTRAN Cell Identity</i> IE value correspond to the eNB ID (defined in section 9.2.22 in TS 36.423 [44]). |

9.2.2.74 NPRACH Configuration

This IE indicates the NPRACH Configuration.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|---------------------------------------|--|
| CHOICE <i>FDDorTDD</i> | M | | | |
| > <i>FDD</i> | | | | |
| >>NPRACH-CP-Length | M | | ENUMERATED (us66dot7, us266dot7, ...) | |
| >>Anchor Carrier NPRACH Configuration | M | | OCTET STRING | Includes the <i>NPRACH-ParametersList-NB-r13</i> IE as defined in 6.7.3.2 of TS 36.331 [14]. |
| >>Anchor Carrier EDT NPRACH Configuration | O | | OCTET STRING | Includes the <i>NPRACH-ParametersList-NB-r14</i> IE as defined in 6.7.3.2 of TS 36.331 [14]. |
| >>Anchor Carrier Format 2 NPRACH Configuration | O | | OCTET STRING | Includes the <i>NPRACH-ParametersListFmt2-NB-r15</i> IE as defined in 6.7.3.2 of TS 36.331 [14]. |
| >>Anchor Carrier Format 2 EDT NPRACH | O | | OCTET STRING | Includes the <i>NPRACH-ParametersListFmt2-NB-r15</i> IE |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|---|--|---|
| Configuration | | | | as defined in 6.7.3.2 of TS 36.331 [14]. |
| >>Non Anchor Carrier NPRACH Configuration | O | | OCTET STRING | Includes the <i>UL-ConfigCommonList-NB-r14</i> IE as defined in 6.7.3.1 of TS 36.331 [14]. |
| >>Non Anchor Carrier Format 2 NPRACH Configuration | O | | OCTET STRING | Includes the <i>UL-ConfigCommonList-NB-v1530</i> IE as defined in 6.7.3.1 of TS 36.331 [14]. |
| > <i>TDD</i> | | | | |
| >>NPRACH-PreambleFormat | M | | ENUMERATED (fmt0, fmt1, fmt2, fmt0-a, fmt1-a, ...) | |
| >>Anchor Carrier NPRACH Configuration TDD | M | | OCTET STRING | Includes the <i>NPRACH-ParametersListTDD-NB-r15</i> IE as defined in 6.7.3.2 of TS 36.331 [14]. |
| >> Non Anchor Carrier Frequency Configuration list | | <i>0..<maxnoofNonAnchorCarrierFreqConfig></i> | | |
| >>>Non Anchor Carrier Frequency | M | | OCTET STRING | Includes the <i>DL-CarrierConfigCommon-NB-r14</i> IE as defined in 6.7.3.2 of TS 36.331 [14]. |
| >>Non Anchor Carrier NPRACH Configuration TDD | O | | OCTET STRING | Includes the <i>UL-ConfigCommonListTDD-NB-r15</i> IE as defined in 6.7.3.1 of TS 36.331 [14]. |

| Range bound | Explanation |
|-----------------------------------|--|
| maxnoofNonAnchorCarrierFreqConfig | Maximum no. of non-Anchor Carrier Frequency Configurations. Value is 15. |

9.2.2.75 SFN Offset

This IE contains the time offset between an absolute time reference and the SFN0 start. The IE is calculated assuming that the SFN transmission started at the absolute time reference. The absolute time reference chosen is 1980-01-06 T00:00:19 International Atomic Time (TAI).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------|----------|-------|-----------------------|--|
| SFN Time Offset | M | | BIT STRING (SIZE(24)) | Time offset in microseconds between the absolute time reference "1980-01-06 T00:00:19 International Atomic Time (TAI)" and the SFN0 start. The maximum usable value is $(1024 \cdot 10^4 - 1)$. Values higher than the maximum are discarded. |

9.2.3 General IE definitions

9.2.3.1 Message Type

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

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

9.2.3.2 Cause

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

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--------------------------------|----------|-------|---|-----------------------|
| CHOICE <i>Cause Group</i> | M | | | |
| > <i>Radio Network Layer</i> | | | | |
| >>Radio Network Layer Cause | M | | ENUMERATED (Cell not Available, Handover Desirable for Radio Reasons, Handover Target not Allowed, Invalid AMF Set ID, No Radio Resources Available in Target Cell, Partial Handover, Reduce Load in Serving Cell, Resource Optimisation Handover, Time Critical Handover, TXnRELOCoverall Expiry, TXnRELOCprep Expiry, Unknown GUAMI ID, Unknown Local NG- RAN node UE XnAP ID, Inconsistent Remote NG-RAN node UE XnAP ID, Encryption And/Or Integrity Protection Algorithms Not Supported, Protection Algorithms Not Supported, Multiple PDU Session ID Instances, Unknown PDU Session ID, Unknown QoS Flow ID, Multiple QoS Flow ID Instances, Switch Off Ongoing, | |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|---|-----------------------|
| | | | Not supported 5QI value, TXnDCoverall Expiry, TXnDCprep Expiry, Action Desirable for Radio Reasons, Reduce Load, Resource Optimisation, Time Critical action, Target not Allowed, No Radio Resources Available, Invalid QoS combination, Encryption Algorithms Not Supported, Procedure cancelled, RRM purpose, Improve User Bit Rate, User Inactivity, Radio Connection With UE Lost, Failure in the Radio Interface Procedure, Bearer Option not Supported, UP integrity protection not possible, UP confidentiality protection not possible, Resources not available for the slice(s), UE Maximum integrity protected data rate reason, CP Integrity Protection Failure, UP Integrity Protection Failure, Slice(s) not supported by NG-RAN, MN Mobility, SN Mobility, Count reaches max value, Unknown Old NG-RAN node UE XnAP ID, PDCP Overload, DRB ID not available, Unspecified, UE Context ID not known, Non-relocation of context, CHO-CPC | |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-------------------------|----------|-------|--|-----------------------|
| | | | resources to be changed, RSN not available for the UP, NPN access denied, Report Characteristics Empty, Existing Measurement ID, Measurement Temporarily not Available, Measurement not Supported For The Object, UE Power Saving, Not existing NG-RAN node ₂ Measurement ID, Insufficient UE Capabilities, Normal Release, Value out of allowed range) | |
| >Transport Layer | | | | |
| >>Transport Layer Cause | M | | ENUMERATED (Transport Resource Unavailable, Unspecified, ...) | |
| >Protocol | | | | |
| >>Protocol Cause | M | | ENUMERATED (Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State, Semantic Error, Abstract Syntax Error (Falsely Constructed Message), Unspecified, ...) | |
| >Misc | | | | |
| >>Miscellaneous Cause | M | | ENUMERATED (Control Processing Overload, Hardware Failure, O&M Intervention, Not enough User Plane Processing Resources, Unspecified, ...) | |

The meaning of the different cause values is specified in the following table. In general, "not supported" cause values indicate that the related capability is missing. On the other hand, "not available" cause values indicate that the related capability is present, but insufficient resources were available to perform the requested action.

| Radio Network Layer cause | Meaning |
|---|--|
| Cell not Available | The concerned cell is not available. |
| Handover Desirable for Radio Reasons | The reason for requesting handover is radio related. |
| Handover Target not Allowed | Handover to the indicated target cell is not allowed for the UE in question. |
| Invalid AMF Set ID | The target NG-RAN node doesn't belong to the same AMF Set of the source NG-RAN node, i.e. NG handovers should be attempted instead. |
| No Radio Resources Available in Target Cell | The target cell doesn't have sufficient radio resources available. |
| Partial Handover | Provides a reason for the handover cancellation. The target NG-RAN node did not admit all PDU Sessions included in the HANDOVER REQUEST and the source NG-RAN node estimated service continuity for the UE would be better by not proceeding with handover towards this particular target NG-RAN node. |
| Reduce Load in Serving Cell | Load in serving cell needs to be reduced. When applied to handover preparation, it indicates the handover is triggered due to load balancing. |
| Resource Optimisation Handover | The reason for requesting handover is to improve the load distribution with the neighbour cells. |
| Value out of allowed range | The action failed because the proposed Handover Trigger parameter change in the NG-RAN node ₂ Proposed Mobility Parameters IE is too low or too high. |
| Time Critical Handover | Handover is requested for time critical reason i.e. this cause value is reserved to represent all critical cases where the connection is likely to be dropped if handover is not performed. |
| TXnRELOC _{overall} Expiry | The reason for the action is expiry of timer TXnRELOC _{overall} . |
| TXnRELOC _{prep} Expiry | Handover Preparation procedure is cancelled when timer TXnRELOC _{prep} expires. |
| Unknown GUAMI ID | The target NG-RAN node belongs to the same AMF Set of the source NG-RAN node and recognizes the AMF Set ID. However, the GUAMI value is unknown to the target NG-RAN node. |
| Unknown Local NG-RAN node UE XnAP ID | The action failed because the receiving NG-RAN node does not recognise the local NG-RAN node UE XnAP ID. |
| Inconsistent Remote NG-RAN node UE XnAP ID | The action failed because the receiving NG-RAN node considers that the received remote NG-RAN node UE XnAP ID is inconsistent.. |
| Encryption And/Or Integrity Protection Algorithms Not Supported | The target NG-RAN node is unable to support any of the encryption and/or integrity protection algorithms supported by the UE. |
| Multiple PDU Session ID Instances | The action failed because multiple instances of the same PDU Session had been provided to the NG-RAN node. |
| Unknown PDU Session ID | The action failed because the PDU Session ID is unknown in the NG-RAN node. |
| Unknown QoS Flow ID | The action failed because the QoS Flow ID is unknown in the NG-RAN node. |
| Multiple QoS Flow ID Instances | The action failed because multiple instances of the same QoS flow had been provided to the NG-RAN node. |
| Switch Off Ongoing | The reason for the action is an ongoing switch off i.e. the concerned cell will be switched off after offloading and not be available. It aides the receiving NG-RAN node in taking subsequent actions, e.g. selecting the target cell for subsequent handovers. |
| Not supported 5QI value | The action failed because the requested 5QI is not supported. |
| TXnDC _{overall} Expiry | The reason for the action is expiry of timer TXnDC _{overall} . |
| TXnDC _{prep} Expiry | The reason for the action is expiry of timer TXnDC _{prep} . |
| Action Desirable for Radio Reasons | The reason for requesting the action is radio related. In the current version of this specification applicable for Dual Connectivity only. |
| Reduce Load | Load in the cell(group) served by the requesting node needs to be reduced. In the current version of this specification applicable for Dual Connectivity only. |
| Resource Optimisation | The reason for requesting this action is to improve the load |

| Radio Network Layer cause | Meaning |
|---|--|
| | distribution with the neighbour cells. In the current version of this specification applicable for Dual Connectivity only. |
| Time Critical action | The action is requested for time critical reason i.e. this cause value is reserved to represent all critical cases where radio resources are likely to be dropped if the requested action is not performed. In the current version of this specification applicable for Dual Connectivity only. |
| Target not Allowed | Requested action towards the indicated target cell is not allowed for the UE in question. In the current version of this specification applicable for Dual Connectivity only. |
| No Radio Resources Available | The cell(s) in the requested node don't have sufficient radio resources available. In the current version of this specification applicable for Dual Connectivity only. |
| Invalid QoS combination | The action was failed because of invalid QoS combination. In the current version of this specification applicable for Dual Connectivity only. |
| Encryption Algorithms Not Supported | The requested NG-RAN node is unable to support any of the encryption algorithms supported by the UE. In the current version of this specification applicable for Dual Connectivity only. |
| Procedure cancelled | The sending node cancelled the procedure due to other urgent actions to be performed. In the current version of this specification applicable for Dual Connectivity only. |
| RRM purpose | The procedure is initiated due to node internal RRM purposes. In the current version of this specification applicable for Dual Connectivity only. |
| Improve User Bit Rate | The reason for requesting this action is to improve the user bit rate. In the current version of this specification applicable for Dual Connectivity only. |
| User Inactivity | The action is requested due to user inactivity on all PDU Sessions. The action may be performed on several levels: <ul style="list-style-type: none"> - on UE Context level, if NG is requested to be released in order to optimise the radio resources; or S-NG-RAN node didn't see activity on the PDU session recently. - on PDU Session Resource or DRB or QoS flow level, e.g. if Activity Notification indicate lack of activity In the current version of this specification applicable for Dual Connectivity only. |
| Radio Connection With UE Lost | The action is requested due to losing the radio connection to the UE. In the current version of this specification applicable for Dual Connectivity only. |
| Failure in the Radio Interface Procedure | Radio interface procedure has failed. In the current version of this specification applicable for Dual Connectivity only. |
| Bearer Option not Supported | The requested bearer option is not supported by the sending node. In the current version of this specification applicable for Dual Connectivity only. |
| UP integrity protection not possible | The PDU session cannot be accepted according to the required user plane integrity protection policy. |
| UP confidentiality protection not possible | The PDU session cannot be accepted according to the required user plane confidentiality protection policy. |
| Resources not available for the slice(s) | The requested resources are not available for the slice(s). |
| UE Maximum integrity protected data rate reason | The request is not accepted in order to comply with the maximum data rate for integrity protection supported by the UE. |
| CP Integrity Protection Failure | The request is not accepted due to failed control plane integrity protection. |
| UP Integrity Protection Failure | The procedure is initiated because the SN (hosting node) |

| Radio Network Layer cause | Meaning |
|--|--|
| | detected an Integrity Protection failure in the UL PDU coming from the MN. |
| Slice(s) not supported by NG-RAN | The failure is due to slice(s) not supported by the NG-RAN node. |
| MN Mobility | The procedure is initiated due to relocation of the M-NG-RAN node UE context. |
| SN Mobility | The procedure is initiated due to relocation of the S-NG-RAN node UE context. |
| Count reaches max value, | Indicates the PDCP COUNT for UL or DL reached the max value and the bearer may be released. |
| Unknown Old NG-RAN node UE XnAP ID | The action failed because the Old NG-RAN node UE XnAP ID or the S-NG-RAN node UE XnAP ID is unknown. |
| PDCP Overload | The procedure is initiated due to PDCP resource limitation. |
| DRB ID not available | The action failed because the M-NG-RAN node is not able to provide additional DRB IDs to the S-NG-RAN node. |
| Unspecified | Sent for radio network layer cause when none of the specified cause values applies. |
| UE Context ID not known | The context retrieval procedure cannot be performed because the UE context cannot be identified. |
| Non-relocation of context | The context retrieval procedure is not performed because the old RAN node has decided not to relocate the UE context. |
| CHO-CPC resources to be changed | The prepared resources for CHO or CPC for a UE are to be changed. |
| RSN not available for the UP | The redundant user plane resources are not available. |
| NPN Access denied | Access denied, or release is required, due to NPN reasons. |
| Report Characteristics Empty | The action failed because there is no measurement object in the report characteristics. |
| Existing Measurement ID | The action failed because the measurement ID is already used. |
| Measurement Temporarily not Available | The NG-RAN node can temporarily not provide the requested measurement object. |
| Measurement not Supported For The Object | At least one of the concerned object(s) does not support the requested measurement. |
| Report Characteristics Empty | The action failed because there is no measurement object in the report characteristics. |
| UE Power Saving | The procedure is initiated to accommodate the preference indicated by UE to release the S-NG-RAN node for UE power saving purpose. |
| Not existing NG-RAN node ₂ Measurement ID | The action failed because the NG-RAN node ₂ Measurement ID is not used. |
| Insufficient UE Capabilities | The procedure can't proceed due to insufficient UE capabilities. |
| Normal Release | The release is due to normal reasons. |

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

| NAS cause | Meaning |
|------------------|--|
| Unspecified | Sent when none of the above cause values applies but still the cause is NAS related. |

| Protocol cause | Meaning |
|--|--|
| Transfer Syntax Error | The received message included a transfer syntax error. |
| Abstract Syntax Error (Reject) | The received message included an abstract syntax error and the concerning criticality indicated "reject". |
| Abstract Syntax Error (Ignore And Notify) | The received message included an abstract syntax error and the concerning criticality indicated "ignore and notify". |
| Message Not Compatible With Receiver State | The received message was not compatible with the receiver state. |
| Semantic Error | The received message included a semantic error. |
| Abstract Syntax Error (Falsely | The received message contained IEs or IE groups in wrong |

| Protocol cause | Meaning |
|----------------------|---|
| Constructed Message) | order or with too many occurrences. |
| Unspecified | Sent when none of the above cause values applies but still the cause is Protocol related. |

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

9.2.3.3 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the NG-RAN node when parts of a received message have not been comprehended or were missing, or if the message contained logical errors. When applicable, it contains information about which IEs were not comprehended or were missing.

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

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

9.2.3.4 Bit Rate

This IE indicates the number of bits delivered by NG-RAN in UL or to NG-RAN in DL or by the UE in sidelink within a period of time, divided by the duration of the period. It is used, for example, to indicate the maximum or guaranteed bit rate for a GBR QoS flow, or an aggregate maximum bit rate.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|---------------------------------------|-----------------------|
| Bit Rate | M | | INTEGER (0..4,000,000,000,000,...) | The unit is: bit/s |

9.2.3.5 QoS Flow Level QoS Parameters

This IE defines the QoS Parameters to be applied to a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------------------------|----------|-------|--------------------------------|---|-------------|----------------------|
| CHOICE QoS Characteristics | M | | | | – | |
| >Non Dynamic 5QI | | | | | | |
| >>Non dynamic 5QI Descriptor | M | | 9.2.3.8 | | – | |
| >Dynamic 5QI | | | | | | |
| >>Dynamic 5QI Descriptor | M | | 9.2.3.9 | | – | |
| Allocation and Retention Priority | M | | 9.2.3.7 | | – | |
| GBR QoS Flow Information | O | | 9.2.3.6 | This IE shall be present for GBR QoS flows and is ignored otherwise. | – | |
| Reflective QoS Attribute | O | | ENUMERATED (subject to, ...) | Reflective QoS is specified in TS 23.501 [7]. This IE applies to Non-GBR bearers only and is ignored otherwise. | – | |
| Additional QoS flow Information | O | | ENUMERATED (more likely, ...) | If this IE is set to "more likely", this indicates that traffic for this QoS flow is likely to appear more often than traffic for other flows established for the PDU session. This IE may be present in case of Non-GBR flows only and is ignored otherwise. | – | |
| QoS Monitoring Request | O | | ENUMERATED (UL, DL, Both, ...) | Indicates to measure UL, or DL, or both UL/DL delays for the associated QoS flow. | YES | ignore |
| QoS Monitoring Reporting Frequency | O | | INTEGER (1..1800, ...) | Indicates the Reporting Frequency for RAN part delay for QoS monitoring. Unit: second | YES | ignore |
| QoS Monitoring Disabled | O | | ENUMERATED (true, ...) | Indicates to stop the QoS monitoring. | YES | ignore |

9.2.3.6 GBR QoS Flow Information

This IE indicates QoS Parameters for a GBR QoS Flow for downlink and uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------------|----------|-------|---|---|-------------|----------------------|
| Maximum Flow Bit Rate Downlink | M | | Bit Rate 9.2.3.4 | Maximum Bit Rate in DL. Flow Bit Rates are specified in TS 23.501 [7]. | – | |
| Maximum Flow Bit Rate Uplink | M | | Bit Rate 9.2.3.4 | Maximum Bit Rate in UL. Flow Bit Rates are specified in TS 23.501 [7]. | – | |
| Guaranteed Flow Bit Rate Downlink | M | | Bit Rate 9.2.3.4 | Guaranteed Bit Rate (provided that there is data to deliver) in DL. Flow Bit Rates are specified in TS 23.501 [7]. | – | |
| Guaranteed Flow Bit Rate Uplink | M | | Bit Rate 9.2.3.4 | Guaranteed Bit Rate (provided that there is data to deliver). Flow Bit Rates are specified in TS 23.501 [7]. | – | |
| Notification Control | O | | ENUMERATED (notification requested, ...) | Notification control is specified in TS 23.501 [7] | – | |
| Maximum Packet Loss Rate Downlink | O | | Packet Loss Rate 9.2.3.11 | Indicates the maximum rate for lost packets that can be tolerated in the downlink direction. Maximum Packet Loss Rate is specified in TS 23.501 [7]. | – | |
| Maximum Packet Loss Rate Uplink | O | | Packet Loss Rate 9.2.3.11 | Indicates the maximum rate for lost packets that can be tolerated in the uplink direction. Maximum Packet Loss Rate is specified in TS 23.501 [7]. | – | |
| Alternative QoS Parameters Set List | O | | 9.2.3.102 | Indicates alternative sets of QoS Parameters for the QoS flow. | YES | ignore |

9.2.3.7 Allocation and Retention Priority

This IE specifies the relative importance compared to other QoS flows for allocation and retention of the NR RAN resource.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-------|-----------------------|-----------------------|
| Allocation/Retention | | 1 | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------------|----------|-------|--|---|
| Priority | | | | |
| >Priority Level | M | | INTEGER (0..15, ...) | Desc.: This defines the relative importance of a resource request. (see TS 23.501 [7]). Usage: Values between 1 and 15 are ordered in decreasing order of priority, i.e., 1 is the highest and 15 is the lowest. |
| >Pre-emption Capability | M | | ENUMERATED (shall not trigger pre-emption, may trigger pre-emption, ...) | Desc.: This IE indicates the pre-emption capability of the request on other QoS flows (see TS 23.501 [7]). Usage: The QoS flow shall not pre-empt other QoS flow or, the QoS flow may pre-empt other QoS flows. NOTE: The Pre-emption Capability indicator applies to the allocation of resources for a QoS flow and as such it provides the trigger to the pre-emption procedures/processes of the gNB. |
| >Pre-emption Vulnerability | M | | ENUMERATED (not pre-emptable, pre-emptable, ...) | Desc.: This IE indicates the vulnerability of the QoS flow to preemption of other QoS flows (see TS 23.501 [7]). Usage: The QoS flow shall not be pre-empted by other QoS flows or the QoS flow may be pre-empted by other QoS flows. NOTE: Pre-emption Vulnerability indicator applies for the entire duration of the QoS flow, unless modified and as such indicates whether the QoS flow is a target of the pre-emption procedures/processes of the gNB. |

9.2.3.8 Non dynamic 5QI Descriptor

This IE defines QoS characteristics for a standardized or pre-configured 5QI for downlink and uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------|----------|-------|-----------------------|---|-------------|----------------------|
| 5QI | M | | INTEGER (0..255, ...) | This IE contains the standardized or pre-configured 5QI as specified in TS 23.501 [7] | – | |
| Priority Level | O | | 9.2.3.62 | Priority level is specified in TS 23.501 [7]. When included, it overrides standardized or pre-configured value. | – | |
| Averaging Window | O | | 9.2.3.14 | Averaging window is specified in TS 23.501 [7]. When | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------------------|----------|-------|---|---|-------------|----------------------|
| | | | | included, it overrides standardized or pre-configured value. | | |
| Maximum Data Burst Volume | O | | 9.2.3.15 | Maximum Data Burst Volume is specified in TS 23.501 [7]. When included, it overrides standardized or pre-configured value. | – | |
| CN Packet Delay Budget Downlink | O | | Extended Packet Delay Budget 9.2.3.113 | Core Network Packet Delay Budget is specified in TS 23.501 [7]. This IE may be present in case of GBR QoS flows and is ignored otherwise. | YES | ignore |
| CN Packet Delay Budget Uplink | O | | Extended Packet Delay Budget 9.2.3.113 | Core Network Packet Delay Budget is specified in TS 23.501 [7]. This IE may be present in case of GBR QoS flows and is ignored otherwise. | YES | ignore |

9.2.3.9 Dynamic 5QI Descriptor

This IE defines the QoS characteristics for a non-standardized or not pre-configured 5QI for downlink and uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------|-----------------|-------|--|---|-------------|----------------------|
| Priority Level | M | | 9.2.3.62 | Priority level is specified in TS 23.501 [7]. | – | |
| Packet Delay Budget | M | | 9.2.3.12 | Packet Delay Budget is specified in TS 23.501 [7]. This IE is ignored if the <i>Extended Packet Delay Budget</i> IE is present. | – | |
| Packet Error Rate | M | | 9.2.3.13 | Packet Error Rate is specified in TS 23.501 [7]. | – | |
| 5QI | O | | INTEGER (0..255, ...) | This IE contains the dynamically assigned 5QI as specified in TS 23.501 [7]. | – | |
| Delay Critical | C- ifGBRflow | | ENUMERATED (Delay critical, Non-delay) | This IE indicates whether the GBR QoS flow is delay | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------------------|-------------|-------|---|--|-------------|----------------------|
| | | | critical, ...) | critical as specified in TS 23.501 [7]. | | |
| Averaging Window | C-ifGBRflow | | 9.2.3.14 | Averaging window is specified in TS 23.501 [7]. | – | |
| Maximum Data Burst Volume | O | | 9.2.3.15 | Maximum Data Burst Volume is specified in TS 23.501 [7]. This IE shall be included if the <i>Delay Critical</i> IE is set to "delay critical" and is be ignored otherwise. | – | |
| Extended Packet Delay Budget | O | | 9.2.3.113 | Packet Delay Budget is specified in TS 23.501 [7]. | YES | ignore |
| CN Packet Delay Budget Downlink | O | | Extended Packet Delay Budget 9.2.3.113 | Core Network Packet Delay Budget is specified in TS 23.501 [7]. This IE may be present in case of GBR QoS flows and is ignored otherwise. | YES | ignore |
| CN Packet Delay Budget Uplink | O | | Extended Packet Delay Budget 9.2.3.113 | Core Network Packet Delay Budget is specified in TS 23.501 [7]. This IE may be present in case of GBR QoS flows and is ignored otherwise. | YES | ignore |

| Condition | Explanation |
|-----------|---|
| ifGBRflow | This IE shall be present if the <i>GBR QoS Flow Information</i> IE is present in the <i>QoS Flow Level QoS Parameters</i> IE. |

9.2.3.10 QoS Flow Identifier

This IE identifies a QoS Flow within a PDU Session. Definition and use of the QoS Flow Identifier is specified in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------|----------|-------|--------------------------|-----------------------|
| QoS Flow Identifier | M | | INTEGER (0 ..63, ...) | |

9.2.3.11 Packet Loss Rate

This IE indicates the Packet Loss Rate for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
|---------------|----------|-------|-----------------------|-----------------------|

| | | | | |
|------------------|---|--|------------------------|--|
| Packet Loss Rate | M | | INTEGER (0..1000, ...) | Ratio of lost packets per number of packets sent, expressed in tenth of percent. |
|------------------|---|--|------------------------|--|

9.2.3.12 Packet Delay Budget

This IE indicates the Packet Delay Budget for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------|----------|-------|------------------------|---|
| Packet Delay Budget | M | | INTEGER (0..1023, ...) | Upper bound value for the delay that a packet may experience expressed in units of 0.5ms. |

9.2.3.13 Packet Error Rate

This IE indicates the Packet Error Rate for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|--|
| Scalar | M | | INTEGER (0..9,...) | The packet error rate is expressed as Scalar * 10 ^{-k} , whereas k is the Exponent. |
| Exponent | M | | INTEGER (0..9, ...) | |

9.2.3.14 Averaging Window

This IE indicates the Averaging Window for a QoS flow and applies to GBR QoS flows only.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------|----------|-------|------------------------|-----------------------|
| Averaging Window | M | | INTEGER (0..4095, ...) | Unit: ms. |

9.2.3.15 Maximum Data Burst Volume

This IE indicates the Maximum Data Burst Volume for a QoS flow and applies to delay critical GBR QoS flows only.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|--|-----------------------|
| Maximum Data Burst Volume | M | | INTEGER (0..4095, ..., 4096.. 2000000) | Unit: byte, |

9.2.3.16 NG-RAN node UE XnAP ID

The NG-RAN node UE XnAP ID uniquely identifies a UE over the Xn interface within the NG-RAN node.

The use of this IE is defined in TS 38.401 [2].

NOTE: If Xn-C signalling transport is shared among multiple interface instances, the value of the NG-RAN node UE XnAP ID is allocated so that it can be associated with the corresponding Xn-C interface instance.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|-------|------------------------------------|-----------------------|
| NG-RAN node UE XnAP ID | M | | INTEGER (0 .. 2 ³² - 1) | |

9.2.3.17 UE Aggregate Maximum Bit Rate

The UE Aggregate Maximum Bitrate is applicable for all Non-GBR QoS flows per UE which is defined for the Downlink and the Uplink direction and a subscription parameter provided by the AMF to the NG-RAN.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|--|
| UE Aggregate Maximum Bit Rate | | 1 | | Applicable for Non-GBR QoS flows. |
| >UE Aggregate Maximum Bit Rate Downlink | M | | Bit Rate 9.2.3.4 | This IE indicates the UE Aggregate Maximum Bit Rate as specified in TS 23.501 [7] in the downlink direction. |
| >UE Aggregate Maximum Bit Rate Uplink | M | | Bit Rate 9.2.3.4 | This IE indicates the UE Aggregate Maximum Bit Rate as specified in TS 23.501 [7] in the uplink direction. |

9.2.3.18 PDU Session ID

This IE identifies a PDU Session for a UE. Definition and use of the PDU Session ID is specified in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------|----------|-------|-----------------------|-----------------------|
| PDU Session ID | M | | INTEGER (0 ..255) | |

9.2.3.19 PDU Session Type

This IE defines the PDU Session Type as specified in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------|----------|-------|--|-----------------------|
| PDU Session Type | M | | ENUMERATED (IPv4, IPv6, IPv4v6, Ethernet, Unstructured, ...) | |

9.2.3.20 TAI Support List

This IE indicates the list of TAIs supported by NG-RAN node and associated characteristics e.g. supported slices.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-----------------------------------|----------|-----------------------------|---------------------------------------|--|-------------|----------------------|
| TAI Support Item | | 1..<maxno ofsupportedTACs> | | | – | |
| >TAC | M | | 9.2.2.5 | Broadcast TAC | – | |
| >Broadcast PLMNs | | 1..<maxno ofsupportedPLMNs> | | | – | |
| >>PLMN Identity | M | | 9.2.2.4 | Broadcast PLMN | – | |
| >>TAI Slice Support List | M | | Slice Support List 9.2.3.22 | Supported S-NSSAIs per TAC, per PLMN or per SNPN. | – | |
| >>NPN Support | O | | 9.2.2.72 | | YES | reject |
| >>Extended TAI Slice Support List | O | | Extended Slice Support List 9.2.3.139 | Additional Supported S-NSSAIs per TAC, per PLMN or per SNPN. | YES | reject |

| Range bound | Explanation |
|-----------------------|--|
| maxnoofsupportedTACs | Maximum no. of TACs supported by an NG-RAN node. Value is 256. |
| maxnoofsupportedPLMNs | Maximum no. of PLMNs supported by an NG-RAN node. Value is 12. |

9.2.3.21 S-NSSAI

This IE indicates the S-NSSAI as defined in TS 23.003 [22].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|------------------------|-----------------------|
| SST | M | | OCTET STRING (SIZE(1)) | |
| SD | O | | OCTET STRING (SIZE(3)) | |

9.2.3.22 Slice Support List

This IE indicates the list of supported slices.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|------------------------------------|-----------------------|-----------------------|
| Slice Support Item | | <i>1..<maxnoofSlicItems></i> | | |
| >S-NSSAI | M | | 9.2.3.21 | |

| Range bound | Explanation |
|------------------|--|
| maxnoofSlicItems | Maximum no. of signalled slice support items. Value is 1024. |

9.2.3.23 Index to RAT/Frequency Selection Priority

The *Index to RAT/Frequency Selection Priority* IE is used to define local configuration for RRM strategies such as camp priorities and control of inter-RAT/inter-frequency mobility in RRC_CONNECTED, as specified in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|-----------------------|
| Index to RAT/Frequency Selection Priority | M | | INTEGER (1..256) | |

9.2.3.24 GUAMI

This IE contains the Globally Unique AMF Identifier (GUAMI) as defined in TS 23.003 [22].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------|----------|----------|------------------------|-----------------------|
| PLMN Identity | M | | 9.2.2.4 | |
| AMF Identifier | | <i>1</i> | | |
| >AMF Region ID | M | | BIT STRING (SIZE (8)) | |
| >AMF Set ID | M | | BIT STRING (SIZE (10)) | |
| >AMF Pointer | M | | BIT STRING (SIZE (6)) | |

9.2.3.25 Target Cell Global ID

This IE contains either an NR CGI or an E-UTRA CGI.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------|-----------------------|
| CHOICE <i>Target Cell</i> | M | | | |
| >NR | | | | |
| >>NR CGI | M | | 9.2.2.7 | |
| >E-UTRA | | | | |
| >>E-UTRA CGI | M | | 9.2.2.8 | |

9.2.3.26 AMF UE NGAP ID

This IE is defined in TS 38.413 [5] and used to uniquely identify the UE association over the source side NG interface instance.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------|----------|-------|------------------------------------|-----------------------|
| AMF UE NGAP ID | M | | INTEGER (0 .. 2 ⁴⁰ - 1) | |

9.2.3.27 SCG Configuration Query

The *SCG Configuration Query* IE is used to request the S-NG-RAN node to provide current SCG configuration.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-------------------------|----------|-------|------------------------|-----------------------|
| SCG Configuration Query | M | | ENUMERATED (True, ...) | |

9.2.3.28 RLC Mode

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

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|---|-----------------------|
| RLC Mode | M | | ENUMERATED (RLC-AM, RLC-UM-Bidirectional, RLC-UM-Unidirectional-UL, RLC-UM-Unidirectional-DL, ...) | |

9.2.3.29 Transport Layer Address

This IE is defined to contain an IP address.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------|--------------------------|-----------------------|
| Transport Layer Address | M | | BIT STRING (1..160, ...) | |

9.2.3.30 UP Transport Layer Information

This element is used to provide the transport layer information associated with NG or Xn user plane transport. In this release it corresponds to an IP address and a GTP Tunnel Endpoint Identifier. When the NR-DC UE is connected with an

IAB, the QoS Mapping Information is used to set the IP header of packets in case that the S-NG-RAN node serves the IAB and the packets belonging to MN-terminated split bearer/SCG bearer are transmitted from M-NG-RAN node to S-NG-RAN node, and in case that the M-NG-RAN node serves the IAB and the packets belonging to SN-terminated split bearer/MCG bearer are transmitted from S-NG-RAN node to M-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|-----------------------|--|-------------|----------------------|
| CHOICE <i>UP Transport Layer Information</i> | M | | | | – | |
| > <i>GTP tunnel</i> | | | | | | |
| >>Transport Layer Address | M | | 9.2.3.29 | The Transport Layer Address is specified in TS 38.424 [19] and TS 38.414 [20]. | – | |
| >>GTP-TEID | M | | OCTET STRING (4) | The Tunnel Endpoint Identifier (TEID) is specified in TS 29.281 [18] | – | |
| >>QoS Mapping Information | O | | 9.2.3.144 | | YES | reject |

9.2.3.31 CP Transport Layer Information

This element is used to provide the transport layer information associated with NG or Xn control plane transport.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|-------------------------------------|-----------------------|-------------|----------------------|
| CHOICE <i>CP Transport Layer Information</i> | M | | | | – | |
| > <i>Endpoint-IP-address</i> | | | | | | |
| >>Endpoint IP Address | M | | Transport Layer Address 9.2.3.29 | | – | |
| > <i>Endpoint-IP-address-and-port</i> | | | | | YES | reject |
| >>Endpoint IP Address | M | | Transport Layer Address 9.2.3.29 | | – | |
| >>Port Number | M | | BIT STRING (16) | | – | |

9.2.3.32 Masked IMEISV

This information element contains the IMEISV value with a mask, to identify a terminal model without identifying an individual Mobile Equipment.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|--|
| Masked IMEISV | M | | BIT STRING (SIZE(64)) | Coded as the International Mobile station Equipment Identity and Software Version Number (IMEISV) defined in TS 23.003 [22] with the last 4 digits of the SNR masked by setting the corresponding bits to 1. |

9.2.3.33 DRB ID

This IE contains the DRB ID.

| IE/Group Name | Presence | Range | IE type and | Semantics description |
|---------------|----------|-------|-------------|-----------------------|
|---------------|----------|-------|-------------|-----------------------|

| | | | | |
|--------|---|--|----------------------|--|
| | | | reference | |
| DRB ID | M | | INTEGER (1..32, ...) | |

9.2.3.34 DL Forwarding

This element indicates a proposal for forwarding of downlink packets.

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

9.2.3.35 Data Forwarding Accepted

This element indicates that data forwarding was accepted.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------|----------|-------|--|-----------------------|
| Data Forwarding Accepted | M | | ENUMERATED (data forwarding accepted, ...) | |

9.2.3.36 COUNT Value for PDCP SN Length 12

This information element indicates the 12-bit long PDCP sequence number and the corresponding 20 bits long Hyper Frame Number.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------|-----------------------|
| PDCP-SN Length 12 | M | | INTEGER (0..4095) | |
| HFN for PDCP-SN Length 12 | M | | INTEGER (0..1048575) | |

9.2.3.37 COUNT Value for PDCP SN Length 18

This information element indicates the 18-bit long PDCP sequence number and the corresponding 14 bits long Hyper Frame Number.

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

9.2.3.38 RAN Paging Area

The *RAN Paging Area* IE defines the paging area within a PLMN for RAN paging a UE in RRC_INACTIVE state.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------------|----------|-------------------------------|-----------------------|-----------------------|
| PLMN Identity | M | | 9.2.2.4 | |
| <i>CHOICE RAN Paging Area Choice</i> | M | | | |
| > <i>Cell List</i> | | | | |
| >> <i>Cell List Item</i> | | 1 .. < <i>maxnoofCells</i> | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|--------------------------------------|-----------------------|---|
| | | <i>nRNA</i> > | | |
| >>>NG-RAN Cell Identity | M | | 9.2.2.9 | In this version of the specification, the RAN paging area should contain NG-RAN cells of the same RAT type. |
| >RAN Area ID List | | | | |
| >>RAN Area ID List Item | | 1 .. < <i>maxnoofRanAreasinRNA</i> > | | |
| >>>RAN Area ID | M | | 9.2.3.39 | |

| Range bound | Explanation |
|----------------------|--|
| maxnoofCellsinRNA | Maximum no. of cells in a RAN notification area. Value is 32. |
| maxnoofRanAreasinRNA | Maximum no. of RAN area IDs in a RAN notification area. Value is 16. |

9.2.3.39 RAN Area ID

This IE defines the RAN Area ID.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|--------------------------|-----------------------|
| TAC | M | | 9.2.2.5 | Tracking Area Code |
| RANAC | O | | RAN Area Code 9.2.2.6 | |

9.2.3.40 UE Context ID

This IE is used to address a UE Context within an NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------|----------|-------|-----------------------------|---|
| CHOICE <i>UE Context ID</i> | M | | | |
| >RRC Resume | | | | |
| >>I-RNTI | M | | 9.2.3.46 | NOTE: How the new NG-RAN node is able to resolve the old NG-RAN ID from the I-RNTI is a matter of proper configuration in the old and new NG-RAN node. |
| >>Allocated C-RNTI | M | | BIT STRING (SIZE (16)) | Temporary C-RNTI or C-RNTI allocated to the UE by the cell where the RRC connection has been requested to be resumed, contained in the MAC RAR or MAC MSGB as defined in TS 38.321 [35] or in TS 36.321 [36]. |
| >>Access PCI | M | | NG-RAN Cell PCI 9.2.2.10 | The cell PCI where the RRC connection has been requested to be resumed. |
| >RRC Reestablishment | | | | |
| >>C-RNTI | M | | BIT STRING (SIZE (16)) | C-RNTI contained in the <i>RRCReestablishmentRequest</i> message (TS 38.331 [10]) or <i>RRCConnectionReestablishmentRequest</i> message (TS 36.331 [14]). |
| >>Failure Cell PCI | M | | NG-RAN Cell PCI 9.2.2.10 | |

9.2.3.41 Assistance Data for RAN Paging

This IE provides assistance information for RAN paging.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-----------------------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| RAN Paging Attempt Information | O | | 9.2.3.42 | | – | |
| NPN Paging Assistance Information | O | | 9.2.3.121 | | YES | ignore |

9.2.3.42 RAN Paging Attempt Information

This IE includes information related to the RAN paging attempt over Xn.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|-------|---------------------------------|---|
| Paging Attempt Count | M | | INTEGER (1..16,...) | Number of the RAN paging attempt. |
| Intended Number of Paging Attempts | M | | INTEGER (1..16,...) | Intended number of RAN paging attempts. |
| Next Paging Area Scope | O | | ENUMERATED (same, changed, ...) | Indicates whether the RAN paging area scope will change at next RAN paging attempt. |

9.2.3.43 UE RAN Paging Identity

The IE defines the UE Identity for RAN paging a UE in RRC_INACTIVE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------|----------|-------|------------------------|-----------------------|
| CHOICE UE RAN Paging Identity | M | | | |
| >I-RNTI full | | | | |
| >>I-RNTI full | M | | BIT STRING (SIZE (40)) | |

9.2.3.44 Paging Priority

This information element contains an indication of the priority to be considered for the paging request.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------|----------|-------|--|--|
| Paging Priority | M | | ENUMERATED (PrioLevel1, PrioLevel2, PrioLevel3, PrioLevel4, PrioLevel5, PrioLevel6, PrioLevel7, PrioLevel8, ...) | Lower value codepoint indicates higher priority. |

9.2.3.45 Delivery Status

This IE provides the delivery status of RRC PDUs provided by RRC Transfer message.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-----------------|----------|-------|---------------------------------|--|
| Delivery Status | M | | INTEGER (0..2 ¹² -1) | Highest successfully delivered NR PDCP SN, as defined in TS 38.323 [11]. |

9.2.3.46 I-RNTI

The I-RNTI is defined for allocation in an NR or E-UTRA serving cell as a reference to a UE Context within an NG-RAN node. The I-RNTI is partitioned into two parts, the first part identifies the NG-RAN node that allocated the I-RNTI and the second part identifies the UE context stored in this NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|-------|------------------------|--|
| CHOICE <i>I-RNTI</i> | | | | |
| > <i>I-RNTI full</i> | | | | |
| >> <i>I-RNTI full</i> | M | | BIT STRING (SIZE (40)) | This IE is used to identify the suspended UE context of a UE in RRC_INACTIVE using 40 bits (refer to <i>I-RNTI-Value</i> IE in TS 38.331 [10] and <i>I-RNTI</i> IE in TS 36.331 [14]). |
| > <i>I-RNTI short</i> | | | | |
| >> <i>I-RNTI short</i> | M | | BIT STRING (SIZE (24)) | This IE is used to identify the suspended UE context of a UE in RRC_INACTIVE using 24 bits (refer to <i>ShortI-RNTI-Value</i> IE in TS 38.331 [10] and <i>ShortI-RNTI</i> IE in TS 36.331 [14]). |

9.2.3.47 Location Reporting Information

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------------------|----------|-------|--|-----------------------|-------------|----------------------|
| Event Type | M | | ENUMERATED (report upon change of serving cell, report UE moving presence into or out of the Area of Interest, ..., report upon change of serving cell and Area of Interest) | | – | |
| Report Area | M | | ENUMERATED (Cell, ...) | | – | |
| Area of Interest Information | O | | 9.2.3.48 | | – | |
| Additional Location Information | O | | ENUMERATED (Include PSCell, ...) | | YES | ignore |

9.2.3.48 Area of Interest Information

This IE contains indicates the Area of Interest information, which may contain multiple Areas of Interest, as specified in TS 23.502 [13].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------|----------|-------|-----------------------|-----------------------|
| Area of Interest Item | | 1.. | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|------------------------------|-----------------------|--|
| | | <maxnoofAols > | | |
| >List of TAIs in Area of Interest | | 0..1 | | |
| >>TAI in Area of Interest Item | | 1..<maxnoofTAls in Aol > | | |
| >>>PLMN Identity | M | | 9.2.2.4 | |
| >>>TAC | M | | 9.2.2.5 | |
| >List of Cells in Area of Interest | | 0..1 | | This IE may need to be refined with SA2. |
| >>Cell Item | | 1..<maxnoofcells in Aol > | | |
| >>>PLMN Identity | M | | 9.2.2.4 | |
| >>>NG-RAN Cell Identity | M | | 9.2.2.9 | |
| >List of Global NG-RAN Nodes in Area of Interest | | 0..1 | | |
| >>Global NG-RAN Node in Area of Interest Item | | 1..<maxnoofRANNodes in Aol > | | |
| >>>Global NG-RAN Node ID | M | | 9.2.2.3 | |
| >Request Reporting Reference ID | M | | 9.2.3.58 | |

| Range bound | Explanation |
|------------------------|---|
| maxnoofAOIs | Maximum no. of Areas of Interest. Value is 64. |
| maxnoofTAls in Aol | Maximum no. of tracking areas in an Area of Interest. Value is 16. |
| maxnoofcells in Aol | Maximum no. of cells in an Area of Interest. Value is 256. |
| maxnoofRANNodes in Aol | Maximum no. of global NG-RAN nodes in an Area of Interest. Value is 64. |

9.2.3.49 UE Security Capabilities

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

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|------------------------------------|----------|-------|--|--|
| NR Encryption Algorithms | M | | BIT STRING {nea1-128(1), nea2-128(2), nea3-128(3)} (SIZE(16, ...)) | Each position in the bitmap represents an encryption algorithm: "all bits equal to 0" – UE supports no other NR algorithm than NEA0, "second bit" – 128-NEA1, "third bit" – 128-NEA2, "fourth bit" – 128-NEA3, other bits reserved for future use. Value '1' indicates support and value '0' indicates no support of the algorithm. Algorithms are defined in TS 33.501 [28]. |
| NR Integrity Protection Algorithms | M | | BIT STRING {nia1-128(1), nia2-128(2), nia3-128(3)} (SIZE(16, ...)) | Each position in the bitmap represents an integrity protection algorithm: "all bits equal to 0" – UE supports no other NR algorithm than NIA0, "second bit" – 128-NIA1, "third bit" – 128-NIA2, |

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--|----------|-------|---|---|
| | | | | "fourth bit" – 128-NIA3, other bits reserved for future use. Value '1' indicates support and value '0' indicates no support of the algorithm. Algorithms are defined in TS 33.501 [28]. |
| E-UTRA Encryption Algorithms | M | | BIT STRING {eea1-128(1), eea2-128(2), eea3-128(3)} (SIZE(16, ...)) | Each position in the bitmap represents an encryption algorithm: "all bits equal to 0" – UE supports no other algorithm than EEA0, "second bit" – 128-EEA1, "third bit" – 128-EEA2, "fourth bit" – 128-EEA3, other bits reserved for future use. Value '1' indicates support and value '0' indicates no support of the algorithm. Algorithms are defined in TS 33.401 [29]. |
| E-UTRA Integrity Protection Algorithms | M | | BIT STRING {eia1-128(1), eia2-128(2), eia3-128(3)} (SIZE(16, ...)) | Each position in the bitmap represents an integrity protection algorithm: "all bits equal to 0" – UE supports no other algorithm than EIA0, "second bit" – 128-EIA1, "third bit" – 128-EIA2, "fourth bit" – 128-EIA3, other bits reserved for future use. Value '1' indicates support and value '0' indicates no support of the algorithm. Algorithms are defined in TS 33.401 [29]. |

9.2.3.50 AS Security Information

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

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-------------------------|----------|-------|-----------------------|---|
| Key NG-RAN Star | M | | BIT STRING (256) | $K_{\text{NG-RAN}}^*$ defined in TS 33.501 [28]. |
| Next Hop Chaining Count | M | | INTEGER (0..7) | Next Hop Chaining Count (NCC) defined in TS 33.501 [28] |

9.2.3.51 S-NG-RAN node Security Key

The *S-NG-RAN node Security Key* IE is used to apply security in the S-NG-RAN node as defined in TS 33.501 [28].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|----------------------------|----------|-------|---------------------------|--|
| S-NG-RAN node Security Key | M | | BIT STRING (SIZE(256)) | The $S\text{-}K_{\text{SN}}$ which is provided by the M-NG-RAN node, see TS 33.501 [28]. |

9.2.3.52 Security Indication

This IE contains the user plane integrity protection indication and confidentiality protection indication which indicates the requirements on UP integrity protection and ciphering for the corresponding PDU session, respectively. Additionally, this IE contains the maximum integrity protected data rate values (UL and DL) per UE for integrity protected DRBs.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------------------------------|--|-------|---|--|
| Integrity Protection Indication | M | | ENUMERATED (required, preferred, not needed,...) | Indicates whether UP integrity protection shall apply, should apply, or shall not apply for the concerned PDU session. |
| Confidentiality Protection Indication | M | | ENUMERATED (required, preferred, not needed, ...) | Indicates whether UP ciphering shall apply, should apply, or shall not apply for the concerned PDU session. |
| Maximum Integrity Protected Data Rate | C- ifIntegrityP rotectionre quiredorpr eferred | | 9.2.3.73 | If present, this IE contains the values received from the CN for the overall UE capability. This IE may be ignored by the SN in the case of dual connectivity. |

| Condition | Explanation |
|--|--|
| ifIntegrityProtectionrequiredorpreferred | This IE shall be present if the <i>Integrity Protection</i> IE within the <i>Security Indication</i> IE is present and set to "required" or "preferred". |

9.2.3.53 Mobility Restriction List

This IE defines roaming or access restrictions for subsequent mobility actions for which the NG-RAN provides information about the target of the mobility action towards the UE, e.g., handover, or for SCG selection during dual connectivity operation or for assigning proper RNAs. If the NG-RAN receives the *Mobility Restriction List* IE, it shall overwrite previously received restriction information. NG-RAN behaviour upon receiving this IE is specified in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------|----------|----------------------------|--------------------------|--|-------------|----------------------|
| Serving PLMN | M | | PLMN Identity 9.2.2.4 | | – | |
| Equivalent PLMNs | | $0..<maxno\ of\ EPLMNs\ >$ | | Allowed PLMNs in addition to Serving PLMN. This list corresponds to the list of "equivalent PLMNs" as defined in TS 24.501 [30]. This list is part of the roaming restriction information. Roaming restrictions apply to PLMNs other than the Serving PLMN and Equivalent PLMNs. | – | |
| >PLMN Identity | M | | 9.2.2.4 | | – | |
| RAT Restrictions | | $0..<maxno\ of\ PLMNs\ >$ | | This IE contains RAT restriction related information as specified in TS 23.501 [7]. | – | |
| >PLMN Identity | M | | 9.2.2.4 | | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|----------------------------|--|---|-------------|----------------------|
| >RAT Restriction Information | M | | BIT STRING { e-UTRA (0), nR (1), nR-unlicensed (2)} (SIZE(8, ...)) | Each position in the bitmap represents a RAT. If a bit is set to "1", the respective RAT is restricted for the UE. If a bit is set to "0", the respective RAT is not restricted for the UE. Bits 3-7 are reserved for future use. | – | |
| >Extended RAT Restriction Information | O | | 9.2.3.99 | If this IE is included, the <i>RAT Restriction Information</i> IE is ignored. | YES | ignore |
| Forbidden Area Information | | 0..<maxno ofPLMNs> | | This IE contains Forbidden Area information as specified in TS 23.501 [7]. | – | |
| >PLMN Identity | M | | 9.2.2.4 | | – | |
| > Forbidden TACs | | 1..<maxno ofForbiddenTACs> | | | – | |
| >>TAC | M | | 9.2.2.5 | The TAC of the forbidden TAI. | – | |
| Service Area Information | | 0..<maxno ofPLMNs> | | This IE contains Service Area Restriction information as specified in TS 23.501 [7]. | – | |
| >PLMN Identity | M | | 9.2.2.4 | | – | |
| > Allowed TACs | | 0..<maxno ofAllowedAreas> | | | – | |
| >>TAC | M | | 9.2.2.5 | The TAC of the allowed TAI. | – | |
| > Not Allowed TACs | | 0..<maxno ofAllowedAreas> | | | – | |
| >>TAC | M | | 9.2.2.5 | The TAC of the not-allowed TAI. | – | |
| Last E-UTRAN PLMN Identity | O | | 9.2.2.4 | Indicates the E-UTRAN PLMN ID from where the UE formerly handed over to 5GS and which is preferred in case of subsequent mobility to EPS. | YES | ignore |
| Core Network Type Restriction for serving PLMN | O | | ENUMERATED (EPCForbidden, ...) | Indicates whether the UE is restricted to connect to EPC for the Serving PLMN as specified in TS 23.501 [7]. | YES | ignore |
| Core Network Type Restriction for Equivalent PLMNs | | 0..<maxno ofEPLMNs> | | | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------|----------|-------|--|---|-------------|----------------------|
| >PLMN Identity | M | | 9.2.2.4 | Includes any of the Equivalent PLMNs listed in the <i>Mobility Restriction List</i> IE for which CN Type restriction applies as specified in TS 23.501 [7]. | – | |
| >Core Network Type Restriction | M | | ENUMERATED (EPCForbidden, 5GCForbidden, ...) | Indicates whether the UE is restricted to connect to EPC or to 5GC for this PLMN. | – | |
| NPN Mobility Information | O | | 9.2.3.119 | | YES | reject |

| Range bound | Explanation |
|----------------------|--|
| maxnoofEPLMNs | Maximum no. of equivalent PLMNs. Value is 15. |
| maxnoofPLMNs | Maximum no. of allowed PLMNs. Value is 16. |
| maxnoofForbiddenTACs | Maximum no. of forbidden Tracking Area Codes. Value is 4096. |
| maxnoofAllowedAreas | Maximum no. of allowed or not allowed Tracking Areas. Value is 16. |

9.2.3.54 Xn Benefit Value

The *Xn Benefit Value* IE indicates the quantified benefit of the signalling connection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------|----------|-------|-----------------------|--|
| Xn Benefit Value | M | | INTEGER (1..8, ...) | Value 1 indicates lowest benefit, and 8 indicates highest benefit. |

9.2.3.55 Trace Activation

This IE defines parameters related to a trace activation.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------|----------|-------|---------------------------------------|--|-------------|----------------------|
| NG-RAN Trace ID | M | | 9.2.3.97 | | – | |
| Interfaces To Trace | M | | BIT STRING (SIZE(8)) | Each position in the bitmap represents an NG-RAN node interface: first bit = NG-C, second bit = Xn-C, third bit = Uu, fourth bit = F1-C, fifth bit = E1: other bits reserved for future use. Value '1' indicates 'should be traced'. Value '0' indicates 'should not be traced'. | – | |
| Trace Depth | M | | ENUMERATED (minimum, medium, maximum, | Defined in TS 32.422 [23]. | – | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------------------------|----------|-------|--|--|-------------|----------------------|
| | | | MinimumWithoutVendorSpecificExtension, MediumWithoutVendorSpecificExtension, MaximumWithoutVendorSpecificExtension, ...) | | | |
| Trace Collection Entity IP Address | M | | Transport Layer Address 9.2.3.29 | For File based Reporting. Defined in TS 32.422 [23] Should be ignored if the <i>Trace Collection Entity</i> URI IE is present. | – | |
| Trace Collection Entity URI | O | | URI 9.2.3.124 | For Streaming based Reporting. Defined in TS 32.422 [23] Replaces Trace Collection Entity IP Address if present | YES | ignore |
| MDT Configuration | O | | 9.2.3.125 | This IE defines the MDT configuration parameters. | YES | ignore |

9.2.3.56 Time To Wait

This IE defines the minimum allowed waiting times.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|---|-----------------------|
| Time To Wait | M | | ENUMERATED (1s, 2s, 5s, 10s, 20s, 60s, ...) | |

9.2.3.57 QoS Flow Notification Control Indication Info

This IE provides information about QoS flows of a PDU Session Resource for which notification control has been requested.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------------------|---|---|-------------|----------------------|
| QoS Flow Notification Indication Info | | 1 | | | – | |
| >QoS Flows Notify Item | | 1..<maxno ofQoSFlows> | | | – | |
| >>QoS Flow Identifier | M | | 9.2.3.10 | | – | |
| >>Notification Information | M | | ENUMERATED (fulfilled, not fulfilled, ...) | | – | |
| >>Current QoS Parameters Set Index | O | | Alternative QoS Parameters Set Notify Index 9.2.3.104 | Index to the currently fulfilled alternative QoS parameters set. Value 0 indicates that NG-RAN cannot even fulfil | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------|----------|-------|-----------------------|---------------------------------------|-------------|----------------------|
| | | | | the lowest alternative parameter set. | | |

| Range bound | Explanation |
|-----------------|---|
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.3.58 Request Reporting Reference ID

This IE contains the Request Reporting Reference ID and is used for UE presence in Area of Interest reporting as specified in TS 23.502 [13].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--------------------------------|----------|-------|-----------------------|-----------------------|
| Request Reporting Reference ID | M | | INTEGER (1..64, ...) | |

9.2.3.59 User plane traffic activity report

This IE is used to indicate user plane traffic activity.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|-------|--|--|
| User plane traffic activity report | M | | ENUMERATED (inactive, re-activated, ...) | "re-activated" is only set after "inactive" has been reported for the concerned reporting object |

9.2.3.60 Lower Layer presence status change

This IE is used to indicate that lower layer resources' presence status shall be changed. If the presence status is set to "release lower layers" or "suspend lower layers", SDAP entities, PDCP entities, Xn-U bearer resources, NG-U bearer resources and UE context information shall be kept.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|-------|--|--|
| Lower Layer presence status change | M | | ENUMERATED (release lower layers, re-establish lower layers, ..., suspend lower layers, resume lower layers) | "re-establish lower layers" is only set after "release lower layers" has been indicated. "resume lower layers" shall restore SCG. "resume lower layers" shall be only set after "suspend lower layers" has been indicated. |

9.2.3.61 RRC Resume Cause

The purpose of the *RRC Resume Cause* IE is to indicate to the old NG-RAN node the reason for the RRC Connection Resume as received from the UE in the *ResumeCause* defined in TS 36.331 [14] and TS 38.331 [10]. In this version of the specification, this is limited to the case of RNA update.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------|----------|-------|------------------------------|-----------------------|
| RRC Resume Cause | M | | ENUMERATED (rna-Update, ...) | |

9.2.3.62 Priority Level

This IE indicates the Priority Level for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------|----------|-------|-----------------------|---|
| Priority Level | M | | INTEGER (1..127, ...) | Values ordered in decreasing order of priority, i.e. with 1 as the highest priority and 127 as the lowest priority. |

9.2.3.63 PDCP SN Length

The *PDCP SN Length* IE is used to indicate the PDCP SN length configuration of the bearer.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-------------------|----------|-------|----------------------------------|---|
| UL PDCP SN Length | M | | ENUMERATED (12bits, 18bits, ...) | This IE indicates the PDCP sequence number size for UL. |
| DL PDCP SN Length | M | | ENUMERATED (12bits, 18bits, ...) | This IE indicates the PDCP sequence number size for DL. |

9.2.3.64 UE History Information

The *UE History Information* IE contains information about cells that a UE has been served by in active state prior to the target cell. The overall mechanism is described in TS 36.300 [12].

NOTE: The definition of this IE is aligned with the definition of the *UE History Information* IE in TS 38.413 [5].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--------------------------------|----------|---|-----------------------|--|
| Last Visited Cell List | | <i>1..<maxnoofCellsinUEHistoryInfo></i> | | Most recent information is added to the top of this list |
| >Last Visited Cell Information | M | | 9.2.3.65 | |

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

9.2.3.65 Last Visited Cell Information

The Last Visited Cell Information may contain cell specific information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|----------------------------|
| CHOICE <i>Last Visited Cell Information</i> | M | | | |
| > <i>NG-RAN Cell</i> | | | | |
| >>Last Visited NG-RAN Cell Information | M | | OCTET STRING | Defined in TS 38.413 [5]. |
| > <i>E-UTRAN Cell</i> | | | | |
| >>Last Visited E-UTRAN Cell Information | M | | OCTET STRING | Defined in TS 36.413 [31]. |
| > <i>UTRAN Cell</i> | | | | |
| >>Last Visited UTRAN Cell Information | M | | OCTET STRING | Defined in TS 25.413 [32]. |
| > <i>GERAN Cell</i> | | | | |
| >>Last Visited GERAN Cell Information | M | | OCTET STRING | Defined in TS 36.413 [31]. |

9.2.3.66 Paging DRX

This IE indicates the RAN paging cycle as defined in TS 38.304 [33] and TS 36.304 [34].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|--|-----------------------|
| Paging DRX | M | | ENUMERATED (32, 64, 128, 256, ... , 512, 1024) | |

9.2.3.67 Security Result

This IE indicates whether the security policy indicated as "preferred" in the *Security Indication* IE is performed or not.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-----------------------------------|----------|-------|--|--|
| Integrity Protection Result | M | | ENUMERATED (performed, not performed, ...) | Indicates whether UP integrity protection is performed or not for the concerned PDU session. |
| Confidentiality Protection Result | M | | ENUMERATED (performed, not performed, ...) | Indicates whether UP ciphering is performed or not for the concerned PDU session. |

9.2.3.68 UE Context Kept Indicator

This IE indicates whether the UE Context is kept at the S-NG-RAN node in case of an M-NG-RAN node handover without S-NG-RAN node change.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------------------|----------|-------|------------------------|-----------------------|
| UE Context Kept Indicator | M | | ENUMERATED (true, ...) | |

9.2.3.69 PDU Session Aggregate Maximum Bit Rate

This IE is applicable for all Non-GBR QoS flows per PDU session which is defined for the downlink and the uplink direction and is provided at the Handover Preparation procedure to the target NG-RAN node and at the Retrieve UE Context procedure to the new NG-RAN node as received by the 5GC, during dual connectivity related procedures to the S-NG-RAN node as decided by the M-NG-RAN node, as specified in TS 37.340 [8].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|-----------------------|---|
| PDU session Aggregate Maximum Bit Rate | | 1 | | Applicable for Non-GBR QoS flows. |
| >PDU session Aggregate Maximum Bit Rate Downlink | M | | Bit Rate 9.2.3.4 | This IE indicates the PDU session Aggregate Maximum Bit Rate as specified in TS 23.501 [7] in the downlink direction. |
| >PDU session Aggregate Maximum Bit Rate Uplink | M | | Bit Rate 9.2.3.4 | This IE indicates the PDU session Aggregate Maximum Bit Rate as specified in TS 23.501 [7] in the uplink direction. |

9.2.3.70 LCID

This IE uniquely identifies a logical channel ID for the associated DRB.

| IE/Group Name | Presence | Range | IE type and | Semantics description |
|---------------|----------|-------|-------------|-----------------------|
|---------------|----------|-------|-------------|-----------------------|

| | | | reference | |
|------|---|--|----------------------|---|
| LCID | M | | INTEGER (1..32, ...) | Corresponds to the <i>LogicalChannelIdentity</i> defined in TS 38.331 [10]. |

9.2.3.71 Duplication Activation

The *Duplication Activation* IE indicates the initial status of UL PDCP duplication, i.e., whether UL PDCP Duplication is activated or not.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|------------------------|----------|-------|------------------------------------|-----------------------|
| Duplication Activation | M | | ENUMERATED (Active, Inactive, ...) | |

9.2.3.72 RRC Config Indication

This IE indicates the type of RRC configuration used at the S-NG-RAN node.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-----------------------|----------|-------|---|-----------------------|
| RRC Config Indication | M | | ENUMERATED (full config, delta config, ...) | |

9.2.3.73 Maximum Integrity Protected Data Rate

This IE indicates the maximum aggregate data rate for integrity protected DRBs for a UE as defined in TS 38.300 [9].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|--------------------------|--|-------------|----------------------|
| Maximum IP Rate Uplink | M | | Maximum IP Rate 9.2.3.89 | Indicates the maximum aggregate rate for integrity protected DRBs supported by the UE in UL. If the <i>Maximum IP Rate Downlink</i> IE is absent, this IE applies to both UL and DL. | – | |
| Maximum IP Rate Downlink | O | | Maximum IP Rate 9.2.3.89 | Indicates the maximum aggregate rate for integrity protected DRBs supported by the UE in the DL. | YES | ignore |

9.2.3.74 PDCP Change Indication

The PDCP Change Indication IE is used for S-NG-RAN node to either initiate the security key update or to request PDCP data recovery in M-NG-RAN node. The PDCP Change Indication IE is also used for M-NG-RAN node to request PDCP data recovery in S-NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------------|----------|-------|-----------------------|-----------------------|
| CHOICE <i>PDCP Change Indication</i> | M | | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|--|--|
| >From S-NG-RAN node | | | | |
| >>Indication from S-NG-RAN node to M-NG-RAN node | M | | ENUMERATED (S-NG-RAN node key update required, PDCP data recovery required, ...) | S-NG-RAN node key update required indicates that the security key in S-NG-RAN node needs to be updated. The value of PDCP data recovery required indicates that the M-NG-RAN node needs to perform PDCP data recovery. |
| >From M-NG-RAN node | | | | |
| >>Indication from M-NG-RAN node to S-NG-RAN node | M | | ENUMERATED (PDCP data recovery required, ...) | The value of PDCP data recovery required indicates that the S-NG-RAN node needs to perform PDCP data recovery. |

9.2.3.75 UL Configuration

This IE indicates how the UL PDCP is configured for the corresponding node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------|----------|-------|---|---|
| UL UE Configuration | M | | ENUMERATED (no-data, shared, only, ...) | Indicates how the UE uses the UL at the corresponding node. |

9.2.3.76 UP Transport Parameters

This IE contains Xn-U related information related to a DRB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------------------|----------|-------------------------|--------------------------------------|--|
| UP Transport Parameters | | 1 | | |
| >UP Transport Item | | 1..<maxnoofSCellGroups> | | |
| >>UP Transport Layer Information | M | | 9.2.3.30 | |
| >>Cell Group ID | M | | INTEGER (0..maxnoofSCellGroups, ...) | This IE corresponds to the <i>CellGroupID</i> as defined in TS 38.331 [10] (0=MCG, 1=SCG). In this version of the specification, values "2" and "3" shall not be set by the sender and ignored by the receiver. For E-UTRA Cell Groups, the same encoding is used as for NR Cell Groups. NOTE: There is no corresponding IE defined in TS 36.331 [14]. |

| Range bound | Explanation |
|--------------------|--|
| maxnoofSCellGroups | Maximum no of Secondary Cell Groups. Value is 3. |

9.2.3.77 Desired Activity Notification Level

This IE contains information on which level activity notification shall be performed.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------------|----------|-------|---|-----------------------|
| Desired Activity Notification Level | O | | ENUMERATED (None, QoS Flow, PDU session, UE, ...) | |

9.2.3.78 Number of DRB IDs

This IE indicates the number of DRB IDs.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------|----------|-------|-----------------------|-----------------------|
| Number of DRB IDs | M | | INTEGER (1..32, ...) | |

9.2.3.79 QoS Flow Mapping Indication

This IE is used to indicate whether only the uplink or the downlink of a QoS flow is mapped to a DRB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------|----------|-------|--------------------------|---|
| QoS Flow Mapping Indication | M | | ENUMERATED (ul, dl, ...) | This IE indicates whether only the uplink or the downlink QoS flow is mapped to the DRB |

9.2.3.80 RLC Status

The *RLC Status* IE indicates about the RLC configuration change included in the container towards the UE.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|----------------------------|----------|-------|---------------------------------|---|
| Reestablishment Indication | M | | ENUMERATED (reestablished, ...) | Indicates that following the change of the radio status, the RLC has been re-established. |

9.2.3.81 Expected UE Behaviour

This IE indicates the behaviour of a UE with predictable activity and/or mobility behaviour, to assist the NG-RAN node in determining the optimum RRC connection time and to help with the RRC_INACTIVE state transition and RNA configuration (e.g. size and shape of the RNA).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------------|----------|-------------------------------------|---|---|
| Expected UE Activity Behaviour | O | | 9.2.3.82 | |
| Expected HO Interval | O | | ENUMERATED (sec15, sec30, sec60, sec90, sec120, sec180, long-time, ...) | Indicates the expected time interval between inter NG-RAN node handovers. If "long-time" is included, the interval between inter NG-RAN node handovers is expected to be longer than 180 seconds. |
| Expected UE Mobility | O | | ENUMERATED (stationary, mobile, ...) | Indicates whether the UE is expected to be stationary or mobile. |
| Expected UE Moving Trajectory | | 0..1 | | Indicates the UE's expected geographical movement. |
| >Expected UE Moving Trajectory Item | | 1..<maxnoofCellsUEMovingTrajectory> | | Includes list of visited and non-visited cells, where visited cells are listed in the order the UE |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------|----------|-------|-----------------------|---|
| | | | | visited them with the most recent cell being the first in the list. Non-visited cells are included immediately after the visited cell they are associated with. |
| >>Global NG-RAN Cell Identity | M | | 9.2.2.27 | |
| >>Time Stayed in Cell | O | | INTEGER (0..4095) | Included for visited cells and indicates the time a UE stayed in a cell in seconds. If the UE stays in a cell more than 4095 seconds, this IE is set to 4095. |

| Range bound | Explanation |
|--------------------------------|--|
| maxnoofCellsUEMovingTrajectory | Maximum no. of cells of UE moving trajectory. Value is 16. |

9.2.3.82 Expected UE Activity Behaviour

This IE indicates information about the expected "UE activity behaviour" of the UE or the PDU session as defined in TS 23.501 [7].

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

9.2.3.83 AMF Region Information

This IE indicates the Global AMF Region IDs of the AMF Regions to which the NG-RAN node belongs.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------------|----------|------------------------|-----------------------|-----------------------|
| AMF Region Information | | 1 | | |
| >Global AMF Region Information Item | | 1..<maxnoofAMFRegions> | | |
| >>PLMN Identity | M | | 9.2.2.4 | |
| >>AMF Region Identifier | | 1 | | |
| >>>AMF Region ID | M | | BIT STRING (SIZE | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| | | | (8)) | |

| Range bound | Explanation |
|-------------------|---|
| maxnoofAMFRegions | Maximum no. of AMF Regions an NG-RAN node can be connected to. Value is 16. |

9.2.3.84 TNL Association Usage

This IE indicates the usage of the TNL association.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------|----------|-------|------------------------------------|--|
| TNL Association Usage | O | | ENUMERATED (ue, non-ue, both, ...) | Indicates whether the TNL association is only used for UE associated signalling, or non-UE associated signalling, or both. |

9.2.3.85 Network Instance

This IE provides the network instance to be used by the NG-RAN node when selecting a particular transport network resource as described in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------|----------|-------|-----------------------|-----------------------|
| Network Instance | M | | INTEGER (1..256, ...) | |

9.2.3.86 PDCP Duplication Configuration

The *PDCP Duplication Configuration* IE indicates whether PDCP Duplication is configured or de-configured.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|--------------------------------|----------|-------|---|-----------------------|
| PDCP Duplication Configuration | M | | ENUMERATED (configured, de-configured, ...) | |

9.2.3.87 Secondary RAT Usage Information

This IE provides information on the Secondary RAT resources used by a PDU Session with MR-DC as specified in TS 37.340 [8].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|----------------------|---|-----------------------|
| PDU Session Usage Report | | 0..1 | | |
| >RAT Type | M | | ENUMERATED (nR, e-UTRA, ..., nR-unlicensed, eUTRA-unlicensed) | |
| >PDU Session Timed Report List | M | | Volume Timed Report List 9.2.3.88 | |
| QoS Flows Usage Report List | | 0..1 | | |
| >QoS Flows Usage Report Item | | 1..<maxnoofQoSflows> | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------|----------|-------|--|-----------------------|
| >>QoS Flow Indicator | M | | 9.2.3.10 | |
| >>RAT Type | M | | ENUMERATED (nR, eutra, ..., nR-unlicensed, eUTRA-unlicensed) | |
| >>QoS Flows Timed Report List | M | | Volume Timed Report List 9.2.3.88 | |

| Range bound | Explanation |
|-----------------|---|
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

9.2.3.88 Volume Timed Report List

This IE provides information on the data usage.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------------|----------|------------------------------|---------------------------------|--|
| Volume Timed Report Item | | 1.. <maxnoofTime Periods> | | |
| >Start Timestamp | M | | OCTET STRING (SIZE(4)) | UTC time encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [37]. It indicates the start time of the collecting period of the included <i>Usage Count UL</i> IE and <i>Usage Count DL</i> IE. |
| >End Timestamp | M | | OCTET STRING (SIZE(4)) | UTC time encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [37]. It indicates the end time of the collecting period of the included <i>Usage Count UL</i> IE and <i>Usage Count DL</i> IE. |
| >Usage Count UL | M | | INTEGER (0..2 ⁶⁴ -1) | The unit is: octets. |
| >Usage Count DL | M | | INTEGER (0..2 ⁶⁴ -1) | The unit is: octets. |

| Range bound | Explanation |
|--------------------|--|
| maxnoofTimePeriods | Maximum no. of time reporting periods. Value is 2. |

9.2.3.89 Maximum IP Rate

This IE indicates the maximum aggregate data rate for integrity protected DRBs for a UE as defined in TS 38.300 [9].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------------------------------|----------|-------|---------------------------------------|--|
| Maximum Integrity Protected Data Rate | M | | ENUMERATED (64kbps, max UE rate, ...) | Defines the upper bound of the aggregate data rate of user plane integrity protected data. |

9.2.3.90 UL Forwarding

This element indicates a proposal for forwarding of uplink packets.

| IE/Group Name | Presence | Range | IE type and | Semantics description |
|---------------|----------|-------|-------------|-----------------------|
|---------------|----------|-------|-------------|-----------------------|

| | | | reference | |
|---------------|---|--|--|--|
| UL Forwarding | M | | ENUMERATED (UL forwarding proposed, ...) | |

9.2.3.91 UE Radio Capability for Paging

This IE contains paging specific UE Radio Capability information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|-----------------------|--|
| UE Radio Capability for Paging of NR | O | | OCTET STRING | Includes the RRC <i>UERadioPagingInformation</i> message as defined in TS 38.331 [18]. |
| UE Radio Capability for Paging of E-UTRA | O | | OCTET STRING | Includes the RRC <i>UERadioPagingInformation</i> message as defined in TS 36.331 [21]. |

9.2.3.92 Common Network Instance

This IE provides the common network instance to be used by the NG-RAN node when selecting a particular transport network resource as described in TS 23.501 [7] in a format common with 5GC.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------|-----------------------|--|
| Common Network Instance | M | | OCTET STRING | The octets of OCTET STRING are encoded as the Network Instance field of the <i>Network Instance</i> IE specified in TS 29.244 [45] |

9.2.3.93 Default DRB Allowed

This IE is used to indicate whether the SN is allowed to configure the default DRB for a PDU session or not.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------|----------|-------|-------------------------------|-----------------------|
| Default DRB Allowed | M | | ENUMERATED (true, false, ...) | |

9.2.3.94 Split Session Indicator

This IE indicates whether admitting the requested resources results in a split PDU session.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------|-------------------------|-----------------------|
| Split Session Indicator | M | | ENUMERATED (split, ...) | |

9.2.3.95 UL Forwarding Proposal

This IE indicates a proposal for forwarding of uplink packets.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|-------|---------------------------------|-----------------------|
| UL Forwarding Proposal | M | | ENUMERATED (UL data forwarding) | |

| | | | | |
|--|--|--|----------------|--|
| | | | proposed, ...) | |
|--|--|--|----------------|--|

9.2.3.96 TNL Configuration Info

This IE is used for signalling IP addresses of IPsec endpoints used for establishment of IPsec tunnels.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|---------------------|----------------------------------|---|
| Extended UP Transport Layer Addresses To Add List | | 0..1 | | |
| >Extended UP Transport Layer Addresses To Add Item | | 1..<maxnoofExtTLAs> | | |
| >>IP-Sec Transport Layer Address | M | | Transport Layer Address 9.2.3.29 | Transport Layer Addresses for IP-Sec endpoint. |
| >>>GTP Transport Layer Addresses To Add List | | 0..1 | | |
| >>>>GTP Transport Layer Addresses To Add Item | | 1..<maxnoofGTPTLAs> | | |
| >>>>>GTP Transport Layer Address Info | M | | Transport Layer Address 9.3.2.3 | GTP Transport Layer Addresses for GTP end-points. |
| Extended UP Transport Layer Addresses To Remove List | | 0..1 | | |
| >Extended UP Transport Layer Addresses To Remove Item | | 0..<maxnoofExtTLAs> | | |
| >>IP-Sec Transport Layer Address | O | | Transport Layer Address 9.2.3.29 | Transport Layer Addresses for IP-Sec endpoint. |
| >>>GTP Transport Layer Addresses To Remove List | | 0..1 | | |
| >>>>GTP Transport Layer Addresses To Remove Item | | 1..<maxnoofGTPTLAs> | | |
| >>>>>GTP Transport Layer Address Info | M | | Transport Layer Address 9.3.2.3 | GTP Transport Layer Addresses for GTP end-points. |

| Range bound | Explanation |
|----------------|---|
| maxnoofExtTLAs | Maximum no. of Extended Transport Layer Addresses in the message. Value is 16. |
| maxnoofGTPTLAs | Maximum no. of GTP Transport Layer Addresses for a GTP end-point in the message. Value is 16. |

9.2.3.97 NG-RAN Trace ID

This IE defines the NG-RAN Trace ID.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------|----------|-------|------------------------|---|
| NG-RAN Trace ID | M | | OCTET STRING (SIZE(8)) | This IE is composed of the following: Trace Reference defined in TS 32.422 [23] (leftmost 6 octets, with PLMN information encoded as in 9.2.2.4), and Trace Recording Session |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|--|
| | | | | Reference defined in TS 32.422 [23] (last 2 octets). |

9.2.3.98 Non-GBR Resources Offered

This IE indicates whether the MCG offers non-GBR resources for non-GBR QoS flows of the PDU Session Resource.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|------------------------|-----------------------|
| Non-GBR Resources Offered | M | | ENUMERATED (true, ...) | |

9.2.3.99 Extended RAT Restriction Information

This element provides RAT restrictions as specified in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|---|--|
| Primary RAT Restriction | M | | BIT STRING { e-UTRA (0), nR (1), nR-unlicensed (2)} (SIZE(8, ...)) | Each position in the bitmap represents a Primary RAT. If a bit is set to "1", the respective RAT is restricted for the UE. If a bit is set to "0", the respective RAT is not restricted for the UE. Bits 3-7 reserved for future use. The Primary RAT is the RAT used in the access cell, or target cell. |
| Secondary RAT Restriction | M | | BIT STRING { e-UTRA (0), nR (1), e-UTRA-unlicensed (2), nR-unlicensed (3)} (SIZE(8, ...)) | Each position in the bitmap represents a Secondary RAT. If a bit is set to "1", the respective RAT is restricted for the UE. If a bit is set to "0", the respective RAT is not restricted for the UE. Bits 4-7 reserved for future use. A Secondary RAT is a RAT, distinct from the UE's primary RAT, used in any cell serving the UE excluding the PCell. |

9.2.3.100 5GC Mobility Restriction List Container

This IE contains the *Mobility Restriction List* IE specified in TS 38.413 [5] as received by the NG-RAN from the 5GC.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|---|
| 5GC Mobility Restriction List Container | M | | OCTET STRING | The octets of the OCTET STRING are encoded according to the specifications of the <i>Mobility Restriction List</i> IE specified in TS 38.413 [5]. |

9.2.3.101 Maximum Number of CHO Preparations

This IE indicates the maximum number of concurrently prepared CHO candidate cells for a UE at a candidate target NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| | | | | |

| | | | | |
|------------------------------------|---|--|---------------------|--|
| Maximum Number of CHO Preparations | M | | INTEGER (1..8, ...) | |
|------------------------------------|---|--|---------------------|--|

9.2.3.102 Alternative QoS Parameters Set List

This IE contains alternative sets of QoS parameters which the NG-RAN node can indicate to be fulfilled when notification control is enabled and it cannot fulfil the requested list of QoS parameters.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|--------------------------------------|-----------------------|-----------------------|
| Alternative QoS Parameters Set Item | | <i>1..<maxnoofQoSparaSets></i> | | |
| >Alternative QoS Parameters Set Index | M | | 9.2.3.103 | |
| >Guaranteed Flow Bit Rate Downlink | O | | Bit Rate 9.3.1.4 | |
| >Guaranteed Flow Bit Rate Uplink | O | | Bit Rate 9.3.1.4 | |
| >Packet Delay Budget | O | | 9.3.1.80 | |
| >Packet Error Rate | O | | 9.3.1.81 | |

| Range bound | Explanation |
|--------------------|--|
| maxnoofQoSparaSets | Maximum no. of alternative sets of QoS Parameters allowed for the QoS profile. Value is 8. |

9.2.3.103 Alternative QoS Parameters Set Index

This IE indicates the QoS parameters set which can currently be fulfilled.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------------|----------|-------|-----------------------|---|
| Alternative QoS Parameters Set Index | M | | INTEGER (1..8, ...) | Indicates the index of the item within the <i>Alternative QoS Parameters Set List</i> IE corresponding to the currently fulfilled alternative QoS parameters set. |

9.2.3.104 Alternative QoS Parameters Set Notify Index

This IE indicates the QoS parameters set which can currently be fulfilled.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|---|
| Alternative QoS Parameters Set Notify Index | M | | INTEGER (0..8, ...) | Indicates the index of the item within the <i>Alternative QoS Parameters Set List</i> IE corresponding to the currently fulfilled alternative QoS parameters set. Value 0 indicates that NG-RAN cannot even fulfil the lowest alternative QoS parameters set. |

9.2.3.105 NR V2X Services Authorized

This IE provides information on the authorization status of the UE to use the NR sidelink for V2X services.

| IE/Group Name | Presence | Range | IE type and | Semantics description |
|---------------|----------|-------|-------------|-----------------------|
|---------------|----------|-------|-------------|-----------------------|

| | | | reference | |
|---------------|---|--|--|---|
| Vehicle UE | O | | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Vehicle UE |
| Pedestrian UE | O | | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Pedestrian UE |

9.2.3.106 LTE V2X Services Authorized

This IE provides information on the authorization status of the UE to use the LTE sidelink for V2X services.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|-----------------|--------------|--|---|
| Vehicle UE | O | | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Vehicle UE |
| Pedestrian UE | O | | ENUMERATED (authorized, not authorized, ...) | Indicates whether the UE is authorized as Pedestrian UE |

9.2.3.107 NR UE Sidelink Aggregate Maximum Bit Rate

This IE provides information on the Aggregate Maximum Bitrate of the UE's sidelink communication for NR V2X services.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|-----------------|--------------|------------------------------|--|
| NR UE Sidelink Aggregate Maximum Bit Rate | M | | Bit Rate 9.2.3.4 | Value 0 shall be considered as a logical error by the receiving NG-RAN node. |

9.2.3.108 LTE UE Sidelink Aggregate Maximum Bit Rate

This IE provides information on the Aggregate Maximum Bitrate of the UE's sidelink communication for LTE V2X services.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|-----------------|--------------|------------------------------|--|
| LTE UE Sidelink Aggregate Maximum Bit Rate | M | | Bit Rate 9.2.3.4 | Value 0 shall be considered as a logical error by the receiving NG-RAN node. |

9.2.3.109 PC5 QoS Parameters

This IE provides information on the PC5 QoS parameters of the UE's sidelink communication for NR PC5.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------|-----------------|-------------------------|------------------------------|---|
| PC5 QoS Flow List | | 1 | | |
| >PC5 QoS Flow Item | | 1..<maxnoofPC5QoSFlows> | | |
| >>PQI | M | | INTEGER (0..255, ...) | PQI is a special 5QI as specified in TS 23.501 [9]. |
| >>PC5 Flow Bit Rates | O | | | Only applies for GBR QoS Flows. |
| >>>Guaranteed Flow Bit Rate | M | | Bit Rate 9.2.3.4 | Guaranteed Bit Rate for the PC5 QoS flow. Details in TS 23.501 [9]. |
| >>>Maximum Flow Bit | M | | Bit Rate | Maximum Bit Rate for the PC5 |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------|----------|-------|---|-------------------------------------|
| Rate | | | 9.2.3.4 | QoS flow. Details in TS 23.501 [9]. |
| >>Range | O | | ENUMERATED (m50, m80, m180, m200, m350, m400, m500, m700, m1000, ...) | Only applies for groupcast. |
| PC5 Link Aggregate Bit Rates | O | | Bit Rate 9.2.3.4 | Only applies for non-GBR QoS Flows. |

| Range bound | Explanation |
|---------------------------|---|
| <i>maxnoofPC5QoSFlows</i> | Maximum no. of PC5 QoS flows allowed towards one UE. Value is 2048. NOTE: ASN.1 value definition of the <i>maxnoofPC5QoSFlows</i> is 2064. The size of the PC5 QoS Flow List shall not exceed 2048 items. |

9.2.3.110 UE History Information from the UE

This IE contains information about mobility history report for a UE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|-----------------------|--|
| CHOICE <i>UE History Information from the UE</i> | M | | | |
| >NR | | | | |
| >>NR Mobility History Report | M | | OCTET STRING | <i>VisitedCellInfoList</i> contained in the <i>UEInformationResponse</i> message (TS 38.331 [10]). |

9.2.3.111 RLC Duplication Information

This IE indicates the RLC duplication configuration in case that the indicated DRB is configured with more than two RLC entities as specified in TS 38.331 [9].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------|----------|--|------------------------------------|---|
| RLC Activation State List | | 1 | | |
| >RLC Activation State Items | | 1 .. < <i>maxnoofRLCDuplicationstate</i> > | | This IE indicates information on the initial secondary RLC activation state of UL PDCP duplication. Each position in the list represents a secondary RLC entity in ascending order by the LCH ID in the order of MCG and SCG. |
| >>Duplication State | M | | ENUMERATED (Active, Inactive, ...) | |
| Primary RLC Indication | O | | ENUMERATED (True, False, ...) | This IE is present when DC based PDCP duplication is configured. This IE indicates whether the primary RLC entity located at the assisting node. |

| Range bound | Explanation |
|-----------------------------------|---|
| <i>maxnoofRLCDuplicationstate</i> | Maximum no of Secondary RLC entities. Value is 3. |

9.2.3.112 Redundant PDU Session Information

This IE provides Redundancy information to be applied to a PDU Session.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|--------------------------|-----------------------|
| RSN | M | | ENUMERATED (v1, v2, ...) | |

9.2.3.113 Extended Packet Delay Budget

This IE indicates the Packet Delay Budget for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------|----------|-------|-------------------------|---|
| Extended Packet Delay Budget | M | | INTEGER (0..65535, ...) | Upper bound value for the delay that a packet may experience expressed in unit of 0.01ms. |

9.2.3.114 TSC Traffic Characteristics

This IE provides the traffic characteristics of TSC QoS flows.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------------|----------|-------|--------------------------------------|-----------------------|
| TSC Assistance Information Downlink | O | | TSC Assistance Information 9.2.3.115 | |
| TSC Assistance Information Uplink | O | | TSC Assistance Information 9.2.3.115 | |

9.2.3.115 TSC Assistance Information

This IE provides the TSC assistance information for a TSC QoS flow in the uplink or downlink (see TS 23.501 [7]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------|----------|-------|-----------------------|---|
| Periodicity | M | | 9.2.3.116 | Periodicity as specified in TS 23.501 [7]. |
| Burst Arrival Time | O | | 9.2.3.117 | Burst Arrival Time as specified in TS 23.501 [7]. |

9.2.3.116 Periodicity

This IE indicates the Periodicity of the TSC QoS flow as defined in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|--------------------------|---|
| Periodicity | M | | INTEGER (0..640000, ...) | Periodicity expressed in units of 1 us. |

9.2.3.117 Burst Arrival Time

This IE indicates the Burst Arrival Time of the TSC QoS flow as defined in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------|----------|-------|-----------------------|--|
| Burst Arrival Time | M | | OCTET STRING | Encoded in the same format as the <i>ReferenceTime</i> IE as defined in TS 38.331 [10]. The value is |

| | | | | |
|--|--|--|--|--------------------------------|
| | | | | truncated to 1 us granularity. |
|--|--|--|--|--------------------------------|

9.2.3.118 Redundant QoS Flow Indicator

This IE provides the Redundant QoS Flow Indicator for a QoS flows as specified in TS 23.501 [7].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------|----------|-------|--------------------------|---|
| Redundant QoS Flow Indicator | M | | ENUMERATED (true, false) | This IE indicates if this QoS flow is requested for the redundant transmission. Value "true" indicates that redundant transmission is requested for this QoS flow. Value "false" indicates that redundant transmission is requested to be stopped if started. |

9.2.3.119 NPN Mobility Information

This information element indicates the access restrictions related to an NPN.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|-----------------------|-----------------------|
| CHOICE <i>NPN Mobility Information</i> | M | | | |
| > <i>SNPN Mobility Information</i> | | | | |
| >>Serving NID | M | | NID 9.2.2.65 | |
| > <i>PNI-NPN Mobility Information</i> | | | | |
| >>Allowed PNI-NPN ID List | M | | 9.2.3.120 | |

9.2.3.120 Allowed PNI-NPN ID List

This IE contains information on allowed UE mobility in PNI-NPN including allowed PNI-NPNs and whether the UE is allowed to access non-CAG cells for each PLMN.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|---------------------------------------|-----------------------|-----------------------|
| Allowed PNI-NPN ID List | | <i>1..<maxnoofE PLMNs+1></i> | | |
| >PLMN Identity | M | | 9.2.2.4 | |
| >PNI-NPN Restricted Information | M | | 9.2.3.123 | |
| >Allowed CAG-Identifier List per PLMN | | <i>1..<maxnoofC AGsperPLMN></i> | | |
| >>CAG-Identifier | M | | 9.2.2.66 | |

| Range bound | Explanation |
|---------------------------|--|
| <i>maxnoofEPLMNs+1</i> | Maximum no. of equivalent PLMNs plus one serving PLMN. Value is 16. |
| <i>maxnoofCAGsperPLMN</i> | Maximum number of CAGs per PLMN in UE's Allowed PNI-NPN ID List. Value is 256. |

9.2.3.121 NPN Paging Assistance Information

This IE contains NPN Paging Assistance Information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|-----------------------|-----------------------|
| CHOICE <i>NPN Mobility Information</i> | M | | | |
| > <i>PNI-NPN Information</i> | | | | |
| >>Allowed PNI-NPN ID List | M | | 9.2.3.120 | |

9.2.3.122 Void

Void.

9.2.3.123 PNI-NPN Restricted Information

This IE indicates whether the UE is allowed to access cells that support PNI-NPNs for a PLMN.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------|----------|-------|--|---|
| PNI-NPN Restricted Information | M | | ENUMERATED (restricted, not-restricted, ...) | If set to "restricted", the IE indicates that the UE is not allowed to access non-CAG cells for a PLMN. |

9.2.3.124 URI

This IE is defined to contain a URI address.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|---|
| URI | M | | VisibleString | String representing URI (Uniform Resource Identifier) |

9.2.3.125 MDT Configuration

The IE defines the MDT configuration parameters.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------|-----------------------|-----------------------|
| MDT Configuration-NR | O | | 9.2.3.126 | |
| MDT Configuration-EUTRA | O | | 9.2.3.127 | |

9.2.3.126 MDT Configuration-NR

The IE defines the MDT configuration parameters of NR.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|----------------------------|---|-----------------------|
| MDT Activation | M | | ENUMERATED (Immediate MDT only, Logged MDT only, Immediate MDT and Trace,...) | |
| CHOICE <i>Area Scope of MDT-NR</i> | O | | | |
| > <i>Cell based</i> | | | | |
| >> Cell ID List for MDT-NR | | 1 .. <maxnoofCellIDforMDT> | | |
| >>>NR CGI | M | | 9.2.2.7 | |
| > <i>TA based</i> | | | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------------------|----------|---------------------------|--|--|
| >>TA List for MDT | | 1 .. <maxnoofTAforMDT> | | |
| >>>TAC | M | | OCTET STRING (SIZE (3)) | The TAI is derived using the current serving PLMN. |
| >TAI based | | | | |
| >>TAI List for MDT | | 1 | | |
| >>>TAI List for MDT Item | | 1 .. <maxnoofTAforMDT> | | |
| >>>>PLMN Identity | M | | 9.2.2.4 | |
| >>>>TAC | M | | 9.2.2.5 | |
| CHOICE MDT Mode | M | | | |
| >Immediate MDT-NR | | | | |
| >>Measurements to Activate | M | | BITSTRING (SIZE(8)) | Each position in the bitmap indicates a MDT measurement, as defined in TS 37.320 [43]. First Bit = M1, Second Bit= M2, Fourth Bit = M4, Fifth Bit = M5, Sixth Bit = logging of M1 from event triggered measurement reports according to existing RRM configuration, Seventh Bit = M6, Eighth Bit = M7. Value "1" indicates "activate" and value "0" indicates "do not activate". This version of the specification does not use bits 3. |
| >>M1 Configuration | C-ifM1 | | 9.2.3.128 | |
| >>M4 Configuration | C-ifM4 | | 9.2.3.129 | |
| >>M5 Configuration | C-ifM5 | | 9.2.3.130 | |
| >>MDT Location Information | O | | BITSTRING(SIZE(8)) | Each position in the bitmap represents requested location information as defined in TS 37.320 [43]. First Bit = GNSS Other bits are reserved for future use and are ignored if received. Value "1" indicates "activate" and value "0" indicates "do not activate". The eNB shall ignore the first bit unless the <i>Measurements to Activate</i> IE has the first bit or the sixth bit set to "1". |
| >>M6 Configuration | C-ifM6 | | 9.2.3.131 | |
| >>M7 Configuration | C-ifM7 | | 9.2.3.132 | |
| >>Bluetooth Measurement Configuration | O | | 9.2.3.11 | |
| >>WLAN Measurement Configuration | O | | 9.2.3.12 | |
| >>Sensor Measurement Configuration | O | | 9.2.3.136 | |
| >Logged MDT-NR | | | | |
| >>Logging interval | M | | ENUMERATED (ms320, ms640, ms1280, ms2560, ms5120, ms10240, ms20480, ms30720, | This IE is defined in TS 38.331 [10]. The value "infinity" represents one shot logging, i.e., only one log per event in the logged MDT report. |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------------------|----------|-------|--------------------------------------|---|
| | | | ms40960, ms61440, infinity, ...) | |
| >>Logging duration | M | | ENUMERATED (10, 20, 40, 60, 90, 120) | This IE is defined in TS 38.331 [10]. Unit: [minute]. |
| >>CHOICE <i>Report Type</i> | M | | | |
| >>> <i>Periodical</i> | | | | |
| >>> <i>Event Triggered</i> | | | | |
| >>>>Logged Event Trigger Config | M | | 9.2.3.137 | |
| >>Bluetooth Measurement Configuration | O | | 9.2.3.134 | |
| >>WLAN Measurement Configuration | O | | 9.2.3.135 | |
| >>Sensor Measurement Configuration | O | | 9.2.3.136 | |
| >>Area Scope of Neighbour Cells | O | | 9.2.3.140 | |
| Signalling based MDT PLMN List | O | | MDT PLMN List 9.2.3.133 | |

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

| Condition | Explanation |
|-----------|--|
| C-ifM1 | This IE shall be present if the <i>Measurements to Activate</i> IE has the first bit set to "1". |
| C-ifM4 | This IE shall be present if the <i>Measurements to Activate</i> IE has the fourth bit set to "1". |
| C-ifM5 | This IE shall be present if the <i>Measurements to Activate</i> IE has the fifth bit set to "1". |
| C-ifM6 | This IE shall be present if the <i>Measurements to Activate</i> IE has the seventh bit set to "1". |
| C-ifM7 | This IE shall be present if the <i>Measurements to Activate</i> IE has the eighth bit set to "1". |

9.2.3.127 MDT Configuration-EUTRA

The IE defines the MDT configuration parameters of EUTRA.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------------------------------|--|--|
| MDT Activation | M | | ENUMERATED(Immediate MDT only, Logged MDT only, Immediate MDT and Trace,...) | |
| CHOICE <i>Area Scope of MDT-E-UTRA</i> | O | | | |
| > <i>Cell based</i> | | | | |
| >>Cell ID List for MDT | | 1 .. <maxnoofCellIDforMDT> | | |
| >>>E-UTRA CGI | M | | 9.2.2.8 | |
| > <i>TA based</i> | | | | |
| >>TA List for MDT | | 1 .. <maxnoofTAforMDT> | | |
| >>>TAC | M | | OCTET STRING (SIZE (3)) | The TAI is derived using the current serving PLMN. |
| > <i>TAI based</i> | | | | |
| >>TAI List for MDT | | 1 | | |
| >>>TAI List for MDT Item | | 1 .. <maxnoofTAforMDT> | | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------|----------|-------|----------------------------|--|
| >>>>PLMN Identity | M | | 9.2.2.4 | |
| >>>>TAC | M | | 9.2.2.5 | |
| MDT Mode E-UTRA | M | | OCTET STRING | <i>MDTMode</i> IE defined in TS 36.413 [31]. |
| Signalling based MDT PLMN List | O | | MDT PLMN List 9.2.3.133 | |

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

9.2.3.128 M1 Configuration

This IE defines the parameters for M1 measurement collection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------------------|-------------------------|-------|--|---|-------------|----------------------|
| M1 Reporting Trigger | M | | ENUMERATED (periodic, A2event-triggered, A2event-triggered periodic, ...) | | – | |
| M1 Threshold Event A2 | C- ifM1A2trigger | | | Included in case of event-triggered or event-triggered periodic reporting for measurement M1. | – | |
| >CHOICE <i>Threshold</i> | M | | | | – | |
| >>RSRP | | | | | | |
| >>>Threshold RSRP | M | | INTEGER (0..127) | This IE is defined in TS 38.331 [18]. | – | |
| >>RSRQ | | | | | | |
| >>>Threshold RSRQ | M | | INTEGER (0..127) | This IE is defined in TS 38.331 [18]. | – | |
| >>SINR | | | | | | |
| >>>Threshold SINR | M | | INTEGER (0..127) | This IE is defined in TS 38.331 [18]. | – | |
| M1 Periodic reporting | C- ifperiodic MDT | | | Included in case of periodic or event-triggered periodic reporting for measurement M1. | – | |
| >Report interval | M | | ENUMERATED (ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, min1, min6, min12, min30, min60) | This IE is defined in TS 38.331 [18]. The value min60 is not used in the specification. | – | |
| >Report amount | M | | ENUMERATED (1, 2, 4, 8, 16, 32, 64, infinity) | Number of reports. | – | |
| >Extended Report interval | O | | ENUMERATED (ms20480, ms40960,...) | This IE is the extension of <i>Report interval</i> IE. If this IE is present, the <i>Report interval</i> IE | YES | ignore |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| | | | | is ignored. | | |

| Condition | Explanation |
|-----------------|--|
| C-ifM1A2trigger | This IE shall be present if the <i>Measurements to Activate</i> IE has the first bit set to "1" and the <i>M1 Reporting Trigger</i> IE is set to "A2event-triggered" or to "A2event-triggered periodic". |
| C-ifperiodicMDT | This IE shall be present if the <i>M1 Reporting Trigger</i> IE is set to "periodic", or to "A2event-triggered periodic". |

9.2.3.129 M4 Configuration

This IE defines the parameters for M4 measurement collection.

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

9.2.3.130 M5 Configuration

This IE defines the parameters for M5 measurement collection.

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

9.2.3.131 M6 Configuration

This IE defines the parameters for M6 measurement collection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------|----------|-------|---|-----------------------|
| M6 Report Interval | M | | ENUMERATED (ms120,ms240,ms480,ms640,ms1024,ms2048,ms5120,ms10240,ms20480,ms40960,min1,min6,min12,min30, ...) | |
| M6 Links to log | M | | ENUMERATED(uplink, downlink, both-uplink-and-downlink, ...) | |

9.2.3.132 M7 Configuration

This IE defines the parameters for M7 measurement collection.

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

9.2.3.133 MDT PLMN List

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

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-----------------------------------|-----------------------|-----------------------|
| MDT PLMN List | | <i>1..<maxnoofMDTPLMNs></i> | | |
| >PLMN Identity | M | | 9.2.2.4 | |

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

9.2.3.134 Bluetooth Measurement Configuration

This IE defines the parameters for Bluetooth measurement collection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|--|------------------------------|--|
| Bluetooth Measurement Configuration | M | | ENUMERATED (Setup, ...) | |
| Bluetooth Measurement Configuration Name List | | <i>0..1</i> | | This IE is present if the <i>Bluetooth Measurement Configuration</i> IE is set to "Setup". |
| >Bluetooth Measurement Configuration Name Item IEs | | <i>1..<maxnoofBluetoothName></i> | | |
| >>Bluetooth Measurement Configuration Name | M | | OCTET STRING (SIZE (1..248)) | |
| BT RSSI | O | | ENUMERATED (True, ...) | In case of Immediate MDT, it corresponds to M8 measurement as defined in 37.320 [43]. |

| Range bound | Explanation |
|----------------------|--|
| maxnoofBluetoothName | Maximum no. of Bluetooth local name used for Bluetooth measurement collection. Value is 4. |

9.2.3.135 WLAN Measurement Configuration

This IE defines the parameters for WLAN measurement collection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------------|-------------------------|---|
| WLAN Measurement Configuration | M | | ENUMERATED (Setup, ...) | |
| WLAN Measurement Configuration Name List | | <i>0..1</i> | | This IE is present if the <i>WLAN Measurement Configuration</i> IE is set to "Setup". |

| | | | | |
|---|---|---------------------------|-----------------------------|---|
| >WLAN Measurement Configuration Name Item IEs | | 1 .. <maxnoofWLANName> | | |
| >>WLAN Measurement Configuration Name | M | | OCTET STRING (SIZE (1..32)) | |
| WLAN RSSI | O | | ENUMERATED (True, ...) | In case of Immediate MDT, it corresponds to M8 as defined in 37.320 [43]. |
| WLAN RTT | O | | ENUMERATED (True, ...) | In case of Immediate MDT, it corresponds to M9 as defined in 37.320 [43]. |

| Range bound | Explanation |
|-----------------|--|
| maxnoofWLANName | Maximum no. of WLAN SSID used for WLAN measurement collection. Value is 4. |

9.2.3.136 Sensor Measurement Configuration

This IE defines the parameters for Sensor measurement collection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-----------------------------|-------------------------|-----------------------|
| Sensor Measurement Configuration | M | | ENUMERATED (Setup, ...) | |
| Sensor Measurement Configuration Name List | | 0..1 | | |
| >Sensor Measurement Configuration Name Item IEs | | 1 .. <maxnoofSensorName> | | |
| >>Uncompensated Barometric Configuration | O | | ENUMERATED (True, ...) | |
| >>UE Speed Configuration | O | | ENUMERATED (True, ...) | |
| >>UE Orientation Configuration | O | | ENUMERATED (True, ...) | |

| Range bound | Explanation |
|-------------------|---|
| maxnoofSensorName | Maximum no. of Sensor local name used for Sensor measurement collection. Value is 3 |

9.2.3.137 Logged Event Trigger Config

This IE configures with UE with specific events for triggering MDT configuration. Current specified event is based on out of coverage (OOC) detection.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|-------|------------------------|---------------------------------------|
| CHOICE <i>Event Type Trigger</i> | M | | | |
| >Out of Coverage | | | | |
| >>Out of Coverage Indication | | | ENUMERATED (true, ...) | |
| >L1 Event | | | | |
| >>CHOICE <i>L1 Event Threshold</i> | M | | | |
| >>>RSRP | | | | |
| >>>>Threshold RSRP | M | | INTEGER (0..127) | This IE is defined in TS 38.331 [18]. |
| >>>RSRQ | | | | |
| >>>>Threshold RSRQ | M | | INTEGER (0..127) | This IE is defined in TS 38.331 [18]. |

| | | | | |
|-------------------|--|--|--|---|
| >>Hysteresis | | | INTEGER (0..30) | This parameter is used within the entry and leave condition of an event triggered reporting condition. |
| >>Time to trigger | | | ENUMERATED (ms0, ms40, ms64, ms80, ms100, ms128, ms160, ms256, ms320, ms480, ms512, ms640, ms1024, ms1280, ms2560, ms5120) | Time during which specific criteria for the event needs to be met in order to trigger a measurement report. |

9.2.3.138 UE Radio Capability ID

This IE contains UE Capability ID as defined in TS 23.003 [22].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|-------|-----------------------|-----------------------|
| UE Radio Capability ID | M | | OCTET STRING | |

9.2.3.139 Extended Slice Support List

This IE indicates a list of supported slices.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------|----------|---------------------------|-----------------------|-----------------------|
| Slice Support Item | | 1..<maxnoofExtSliceltems> | | |
| >S-NSSAI | M | | 9.2.3.21 | |

| Range bound | Explanation |
|----------------------|---|
| maxnoofExtSliceltems | Maximum no. of signalled slice support items. Value is 65535. |

9.2.3.140 Area Scope of Neighbour Cells

This IE defines the area scope of neighbour cells for logged MDT.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------|----------|------------------------------|-----------------------|-----------------------|
| Area Scope of Neighbour Cells | M | 1 .. <maxnoofFreqforMDT> | | |
| >NR FreqInfo | M | | 9.2.2.19 | |
| >PCI List for MDT | O | 1 .. <maxnoofNeighPCIforMDT> | | |
| >> NRPCI | M | | INTEGER (0..1007) | NR Physical Cell ID |

| Range bound | Explanation |
|-----------------------|---|
| maxnoofFreqforMDT | Maximum no. of Frequency Information subject for MDT scope. Value is 8. |
| maxnoofNeighPCIforMDT | Maximum no. of Neighbour cells subject for MDT scope. Value is 32. |

9.2.3.141 Extended UE Identity Index Value

This IE is used by the target NG-RAN node to calculate the Paging Frame as specified in TS 36.304[34].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------------------|----------|-------|-----------------------|-----------------------|
| Extended UE Identity Index Value | M | | BIT STRING (SIZE(16)) | |

9.2.3.142 Paging eDRX Information

This IE indicates the Paging eDRX parameters for RRC_IDLE as defined in TS 36.304 [33], if configured by higher layers.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------|----------|-------|---|---|
| Paging eDRX Cycle | M | | ENUMERATED (hfhalf, hf1, hf2, hf4, hf6, hf8, hf10, hf12, hf14, hf16, hf32, hf64, hf128, hf256, ...) | TeDRX defined in TS 36.304 [34]. Unit: [number of hyperframes]. |
| Paging Time Window | O | | ENUMERATED (s1, s2, s3, s4, s5, s6, s7, s8, s9, s10, s11, s12, s13, s14, s15, s16, ...) | Unit: [1.28 second]. |

9.2.3.143 UE Specific DRX

This IE indicates the UE specific paging cycle as defined in TS 36.304 [34] and 38.304 [33].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------|----------|-------|------------------------------------|-----------------------|
| UE Specific DRX | M | | ENUMERATED (32, 64, 128, 256, ...) | |

9.2.3.144 QoS Mapping Information

This IE indicates the DSCP and/or IPv6 Flow Label field(s) of IP packets sent in the corresponding GTP-U tunnel.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| DSCP | O | | BIT STRING (SIZE(6)) | |
| Flow label | O | | BIT STRING (SIZE(20)) | |

9.2.3.144a Hashed UE Identity Index Value

This IE contains the 13 Most Significant Bits (MSBs) of the Hashed ID defined in TS 36.304 [34].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------|----------|-------|----------------------------|-----------------------|
| Hashed UE Identity Index Value | M | | BIT STRING (SIZE(13, ...)) | |

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

9.3.1 General

XnAP ASN.1 definition conforms to ITU-T Rec. X.680 [16] and ITU-T Rec. X.681 [17].

Sub clause 9.3 presents the Abstract Syntax of the XnAP protocol with ASN.1. In case there is contradiction between the ASN.1 definition in this sub clause and the tabular format in sub clause 9.1 and 9.2, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional elements, in which the tabular format shall take precedence.

The ASN.1 definition specifies the structure and content of XnAP messages. XnAP messages can contain any IEs specified in the object set definitions for that message without the order or number of occurrence being restricted by ASN.1. However, for this version of the standard, a sending entity shall construct an XnAP message according to the PDU definitions module and with the following additional rules:

- IEs shall be ordered (in an IE container) in the order they appear in object set definitions.
- Object set definitions specify how many times IEs may appear. An IE shall appear exactly once if the presence field in an object has value "mandatory". An IE may appear at most once if the presence field in an object has value "optional" or "conditional". If in a tabular format there is multiplicity specified for an IE (i.e. an IE list) then in the corresponding ASN.1 definition the list definition is separated into two parts. The first part defines an IE container list in which the list elements reside. The second part defines list elements. The IE container list appears as an IE of its own. For this version of the standard an IE container list may contain only one kind of list elements.

NOTE: In the above, "IE" means an IE in the object set with an explicit ID. If one IE needs to appear more than once in one object set, then the different occurrences have different IE IDs.

If an XnAP message that is not constructed as defined above is received, this shall be considered as Abstract Syntax Error, and the message shall be handled as defined for Abstract Syntax Error in clause 10.

9.3.2 Usage of Private Message Mechanism for Non-standard Use

The private message mechanism for non-standard use may be used:

- for special operator (and/or vendor) specific features considered not to be part of the basic functionality, i.e. the functionality required for a complete and high-quality specification in order to guarantee multivendor inter-operability.
- by vendors for research purposes, e.g. to implement and evaluate new algorithms/features before such features are proposed for standardisation.

The private message mechanism shall not be used for basic functionality. Such functionality shall be standardised.

9.3.3 Elementary Procedure Definitions

-- ASN1START

```
-- *****
--
-- Elementary Procedure definitions
--
-- *****

XnAP-PDU-Descriptions {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) xnap (2) version1 (1) xnap-PDU-Descriptions (0) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS
    Criticality,
    ProcedureCode

FROM XnAP-CommonDataTypes

    HandoverRequest,
    HandoverRequestAcknowledge,
    HandoverPreparationFailure,
    SNStatusTransfer,
    UEContextRelease,
    HandoverCancel,
    NotificationControlIndication,
    RANPaging,
    RetrieveUEContextRequest,
    RetrieveUEContextResponse,
    RetrieveUEContextFailure,
    XnUAddressIndication,
    SecondaryRATDataUsageReport,
    SNodeAdditionRequest,
    SNodeAdditionRequestAcknowledge,
    SNodeAdditionRequestReject,
    SNodeReconfigurationComplete,
    SNodeModificationRequest,
    SNodeModificationRequestAcknowledge,
    SNodeModificationRequestReject,
    SNodeModificationRequired,
    SNodeModificationConfirm,
    SNodeModificationRefuse,
    SNodeReleaseRequest,
    SNodeReleaseRequestAcknowledge,
    SNodeReleaseReject,
    SNodeReleaseRequired,
    SNodeReleaseConfirm,
```

SNodeCounterCheckRequest,
SNodeChangeRequired,
SNodeChangeConfirm,
SNodeChangeRefuse,
RRCTransfer,
XnRemovalRequest,
XnRemovalResponse,
XnRemovalFailure,
XnSetupRequest,
XnSetupResponse,
XnSetupFailure,
NGRANNodeConfigurationUpdate,
NGRANNodeConfigurationUpdateAcknowledge,
NGRANNodeConfigurationUpdateFailure,
E-UTRA-NR-CellResourceCoordinationRequest,
E-UTRA-NR-CellResourceCoordinationResponse,
ActivityNotification,
CellActivationRequest,
CellActivationResponse,
CellActivationFailure,
ResetRequest,
ResetResponse,
ErrorIndication,
PrivateMessage,
DeactivateTrace,
TraceStart,
HandoverSuccess,
ConditionalHandoverCancel,
EarlyStatusTransfer,
FailureIndication,
HandoverReport,
ResourceStatusRequest,
ResourceStatusResponse,
ResourceStatusFailure,
ResourceStatusUpdate,
MobilityChangeRequest,
MobilityChangeAcknowledge,
MobilityChangeFailure,
AccessAndMobilityIndication

FROM XnAP-PDU-Contents

id-handoverPreparation,
id-sNStatusTransfer,
id-handoverCancel,
id-notificationControl,
id-retrieveUEContext,
id-rANPaging,
id-xnUAddressIndication,
id-uEContextRelease,
id-secondaryRATDataUsageReport,
id-sNGRANnodeAdditionPreparation,
id-sNGRANnodeReconfigurationCompletion,

```

id-mNGRANnodeinitiatedSNGRANnodeModificationPreparation,
id-sNGRANnodeinitiatedSNGRANnodeModificationPreparation,
id-mNGRANnodeinitiatedSNGRANnodeRelease,
id-sNGRANnodeinitiatedSNGRANnodeRelease,
id-sNGRANnodeCounterCheck,
id-sNGRANnodeChange,
id-activityNotification,
id-rRCTransfer,
id-xnRemoval,
id-xnSetup,
id-nGRANnodeConfigurationUpdate,
id-e-UTRA-NR-CellResourceCoordination,
id-cellActivation,
id-reset,
id-errorIndication,
id-privateMessage,
id-deactivateTrace,
id-traceStart,
id-handoverSuccess,
id-conditionalHandoverCancel,
id-earlyStatusTransfer,
id-failureIndication,
id-handoverReport,
id-resourceStatusReportingInitiation,
id-resourceStatusReporting,
id-mobilitySettingsChange,
id-accessAndMobilityIndication

FROM XnAP-Constants;

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

XNAP-ELEMENTARY-PROCEDURE ::= CLASS {
    &InitiatingMessage          ,
    &SuccessfulOutcome          OPTIONAL,
    &UnsuccessfulOutcome        OPTIONAL,
    &procedureCode              ProcedureCode UNIQUE,
    &criticality                 Criticality   DEFAULT ignore
}
WITH SYNTAX {
    INITIATING MESSAGE          &InitiatingMessage
    [SUCCESSFUL OUTCOME         &SuccessfulOutcome]
    [UNSUCCESSFUL OUTCOME       &UnsuccessfulOutcome]
    PROCEDURE CODE              &procedureCode
    [CRITICALITY                 &criticality]
}

-- *****
--
-- Interface PDU Definition

```

```

--
-- *****
XnAP-PDU ::= CHOICE {
    initiatingMessage    InitiatingMessage,
    successfulOutcome    SuccessfulOutcome,
    unsuccessfulOutcome  UnsuccessfulOutcome,
    ...
}

InitiatingMessage ::= SEQUENCE {
    procedureCode    XNAP-ELEMENTARY-PROCEDURE.&procedureCode    ( { XNAP-ELEMENTARY-PROCEDURES } ),
    criticality      XNAP-ELEMENTARY-PROCEDURE.&criticality      ( { XNAP-ELEMENTARY-PROCEDURES } { @procedureCode } ),
    value           XNAP-ELEMENTARY-PROCEDURE.&InitiatingMessage ( { XNAP-ELEMENTARY-PROCEDURES } { @procedureCode } )
}

SuccessfulOutcome ::= SEQUENCE {
    procedureCode    XNAP-ELEMENTARY-PROCEDURE.&procedureCode    ( { XNAP-ELEMENTARY-PROCEDURES } ),
    criticality      XNAP-ELEMENTARY-PROCEDURE.&criticality      ( { XNAP-ELEMENTARY-PROCEDURES } { @procedureCode } ),
    value           XNAP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome ( { XNAP-ELEMENTARY-PROCEDURES } { @procedureCode } )
}

UnsuccessfulOutcome ::= SEQUENCE {
    procedureCode    XNAP-ELEMENTARY-PROCEDURE.&procedureCode    ( { XNAP-ELEMENTARY-PROCEDURES } ),
    criticality      XNAP-ELEMENTARY-PROCEDURE.&criticality      ( { XNAP-ELEMENTARY-PROCEDURES } { @procedureCode } ),
    value           XNAP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome ( { XNAP-ELEMENTARY-PROCEDURES } { @procedureCode } )
}

-- *****
--
-- Interface Elementary Procedure List
--
-- *****

XNAP-ELEMENTARY-PROCEDURES XNAP-ELEMENTARY-PROCEDURE ::= {
    XNAP-ELEMENTARY-PROCEDURES-CLASS-1    |
    XNAP-ELEMENTARY-PROCEDURES-CLASS-2    ,
    ...
}

XNAP-ELEMENTARY-PROCEDURES-CLASS-1 XNAP-ELEMENTARY-PROCEDURE ::= {
    handoverPreparation
    retrieveUEContext
    sNCRANnodeAdditionPreparation
    mNCRANnodeinitiatedSNGRANnodeModificationPreparation
    sNCRANnodeinitiatedSNGRANnodeModificationPreparation
    mNCRANnodeinitiatedSNGRANnodeRelease
    sNCRANnodeinitiatedSNGRANnodeRelease
    sNCRANnodeChange
    xnRemoval
    xnSetup
    nGRANnodeConfigurationUpdate
    e-UTRA-NR-CellResourceCoordination
    cellActivation
}

```

```

    reset
    resourceStatusReportingInitiation
    mobilitySettingsChange
    ...
}

XNAP-ELEMENTARY-PROCEDURES-CLASS-2 XNAP-ELEMENTARY-PROCEDURE ::= {
    sNStatusTransfer
    handoverCancel
    rANPaging
    xnUAddressIndication
    uEContextRelease
    sNGRANnodeReconfigurationCompletion
    sNGRANnodeCounterCheck
    rRCTransfer
    errorIndication
    privateMessage
    notificationControl
    activityNotification
    secondaryRATDataUsageReport
    deactivateTrace
    traceStart
    handoverSuccess
    conditionalHandoverCancel
    earlyStatusTransfer
    failureIndication
    handoverReport
    resourceStatusReporting
    accessAndMobilityIndication
    ...
}

-- *****
--
-- Interface Elementary Procedures
--
-- *****

handoverPreparation XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      HandoverRequest
    SUCCESSFUL OUTCOME      HandoverRequestAcknowledge
    UNSUCCESSFUL OUTCOME    HandoverPreparationFailure
    PROCEDURE CODE          id-handoverPreparation
    CRITICALITY              reject
}

sNStatusTransfer XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      sNStatusTransfer
    PROCEDURE CODE          id-sNStatusTransfer
    CRITICALITY              ignore
}

```

```
handoverCancel XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      HandoverCancel
  PROCEDURE CODE          id-handoverCancel
  CRITICALITY             ignore
}

retrieveUEContext XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      RetrieveUEContextRequest
  SUCCESSFUL OUTCOME      RetrieveUEContextResponse
  UNSUCCESSFUL OUTCOME    RetrieveUEContextFailure
  PROCEDURE CODE          id-retrieveUEContext
  CRITICALITY             reject
}

rANPaging XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      RANPaging
  PROCEDURE CODE          id-rANPaging
  CRITICALITY             reject
}

xnUAddressIndication XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      XnUAddressIndication
  PROCEDURE CODE          id-xnUAddressIndication
  CRITICALITY             reject
}

ueContextRelease XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      UEContextRelease
  PROCEDURE CODE          id-ueContextRelease
  CRITICALITY             reject
}

sNGRANnodeAdditionPreparation XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeAdditionRequest
  SUCCESSFUL OUTCOME      SNodeAdditionRequestAcknowledge
  UNSUCCESSFUL OUTCOME    SNodeAdditionRequestReject
  PROCEDURE CODE          id-sNGRANnodeAdditionPreparation
  CRITICALITY             reject
}

sNGRANnodeReconfigurationCompletion XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeReconfigurationComplete
  PROCEDURE CODE          id-sNGRANnodeReconfigurationCompletion
  CRITICALITY             reject
}
```



```

mNGRANnodeinitiatedSNGRANnodeModificationPreparation  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeModificationRequest
  SUCCESSFUL OUTCOME      SNodeModificationRequestAcknowledge
  UNSUCCESSFUL OUTCOME    SNodeModificationRequestReject
  PROCEDURE CODE          id-mNGRANnodeinitiatedSNGRANnodeModificationPreparation
  CRITICALITY             reject
}

```

```

sNGRANnodeinitiatedSNGRANnodeModificationPreparation  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeModificationRequired
  SUCCESSFUL OUTCOME      SNodeModificationConfirm
  UNSUCCESSFUL OUTCOME    SNodeModificationRefuse
  PROCEDURE CODE          id-sNGRANnodeinitiatedSNGRANnodeModificationPreparation
  CRITICALITY             reject
}

```

```

mNGRANnodeinitiatedSNGRANnodeRelease  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeReleaseRequest
  SUCCESSFUL OUTCOME      SNodeReleaseRequestAcknowledge
  UNSUCCESSFUL OUTCOME    SNodeReleaseReject
  PROCEDURE CODE          id-mNGRANnodeinitiatedSNGRANnodeRelease
  CRITICALITY             reject
}

```

```

sNGRANnodeinitiatedSNGRANnodeRelease  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeReleaseRequired
  SUCCESSFUL OUTCOME      SNodeReleaseConfirm
  PROCEDURE CODE          id-sNGRANnodeinitiatedSNGRANnodeRelease
  CRITICALITY             reject
}

```

```

sNGRANnodeCounterCheck  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeCounterCheckRequest
  PROCEDURE CODE          id-sNGRANnodeCounterCheck
  CRITICALITY             reject
}

```

```

sNGRANnodeChange  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      SNodeChangeRequired
  SUCCESSFUL OUTCOME      SNodeChangeConfirm
  UNSUCCESSFUL OUTCOME    SNodeChangeRefuse
  PROCEDURE CODE          id-sNGRANnodeChange
  CRITICALITY             reject
}

```

```

rRCTransfer  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      RRCTransfer
  PROCEDURE CODE          id-rRCTransfer
}

```

```
    CRITICALITY          reject
  }

xnRemoval  XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    XnRemovalRequest
  SUCCESSFUL OUTCOME    XnRemovalResponse
  UNSUCCESSFUL OUTCOME XnRemovalFailure
  PROCEDURE CODE       id-xnRemoval
  CRITICALITY          reject
}

xnSetup XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    XnSetupRequest
  SUCCESSFUL OUTCOME    XnSetupResponse
  UNSUCCESSFUL OUTCOME XnSetupFailure
  PROCEDURE CODE       id-xnSetup
  CRITICALITY          reject
}

nGRANnodeConfigurationUpdate XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    NGRANNodeConfigurationUpdate
  SUCCESSFUL OUTCOME    NGRANNodeConfigurationUpdateAcknowledge
  UNSUCCESSFUL OUTCOME NGRANNodeConfigurationUpdateFailure
  PROCEDURE CODE       id-nGRANnodeConfigurationUpdate
  CRITICALITY          reject
}

e-UTRA-NR-CellResourceCoordination XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    E-UTRA-NR-CellResourceCoordinationRequest
  SUCCESSFUL OUTCOME    E-UTRA-NR-CellResourceCoordinationResponse
  PROCEDURE CODE       id-e-UTRA-NR-CellResourceCoordination
  CRITICALITY          reject
}

cellActivation XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    CellActivationRequest
  SUCCESSFUL OUTCOME    CellActivationResponse
  UNSUCCESSFUL OUTCOME CellActivationFailure
  PROCEDURE CODE       id-cellActivation
  CRITICALITY          reject
}

reset XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    ResetRequest
  SUCCESSFUL OUTCOME    ResetResponse
  PROCEDURE CODE       id-reset
  CRITICALITY          reject
}
```

```
errorIndication XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ErrorIndication
    PROCEDURE CODE          id-errorIndication
    CRITICALITY             ignore
}

notificationControl XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      NotificationControlIndication
    PROCEDURE CODE          id-notificationControl
    CRITICALITY             ignore
}

activityNotification XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ActivityNotification
    PROCEDURE CODE          id-activityNotification
    CRITICALITY             ignore
}

privateMessage XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PrivateMessage
    PROCEDURE CODE          id-privateMessage
    CRITICALITY             ignore
}

secondaryRATDataUsageReport XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      SecondaryRATDataUsageReport
    PROCEDURE CODE          id-secondaryRATDataUsageReport
    CRITICALITY             reject
}

deactivateTrace XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DeactivateTrace
    PROCEDURE CODE          id-deactivateTrace
    CRITICALITY             ignore
}

traceStart XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      TraceStart
    PROCEDURE CODE          id-traceStart
    CRITICALITY             ignore
}

handoverSuccess XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      HandoverSuccess
    PROCEDURE CODE          id-handoverSuccess
    CRITICALITY             ignore
}

conditionalHandoverCancel XNAP-ELEMENTARY-PROCEDURE ::= {
```

```
INITIATING MESSAGE      ConditionalHandoverCancel
PROCEDURE CODE          id-conditionalHandoverCancel
CRITICALITY             ignore
}

earlyStatusTransfer     XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    EarlyStatusTransfer
  PROCEDURE CODE        id-earlyStatusTransfer
  CRITICALITY           ignore
}

failureIndication XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    FailureIndication
  PROCEDURE CODE        id-failureIndication
  CRITICALITY           ignore
}

handoverReport XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    HandoverReport
  PROCEDURE CODE        id-handoverReport
  CRITICALITY           ignore
}

resourceStatusReportingInitiation XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    ResourceStatusRequest
  SUCCESSFUL OUTCOME    ResourceStatusResponse
  UNSUCCESSFUL OUTCOME ResourceStatusFailure
  PROCEDURE CODE        id-resourceStatusReportingInitiation
  CRITICALITY           reject
}

resourceStatusReporting XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    ResourceStatusUpdate
  PROCEDURE CODE        id-resourceStatusReporting
  CRITICALITY           ignore
}

mobilitySettingsChange XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    MobilityChangeRequest
  SUCCESSFUL OUTCOME    MobilityChangeAcknowledge
  UNSUCCESSFUL OUTCOME MobilityChangeFailure
  PROCEDURE CODE        id-mobilitySettingsChange
  CRITICALITY           reject
}

accessAndMobilityIndication XNAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    AccessAndMobilityIndication
  PROCEDURE CODE        id-accessAndMobilityIndication
  CRITICALITY           ignore
}

END
-- ASN1STOP
```

9.3.4 PDU Definitions

```
-- ASN1START
-- *****
--
-- PDU definitions for XnAP.
--
-- *****

XnAP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) xnap (2) version1 (1) xnap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS

    ActivationIDforCellActivation,
    AMF-Region-Information,
    AMF-UE-NGAP-ID,
    AS-SecurityInformation,
    AssistanceDataForRANPaging,
    BitRate,
    Cause,
    CellAndCapacityAssistanceInfo-EUTRA,
    CellAndCapacityAssistanceInfo-NR,
    CellAssistanceInfo-EUTRA,
    CellAssistanceInfo-NR,
    CHOinformation-Req,
    CHOinformation-Ack,
    CHO-MRDC-EarlyDataForwarding,
    CHO-MRDC-Indicator,
    CPTransportLayerInformation,
    TNLA-To-Add-List,
    TNLA-To-Update-List,
    TNLA-To-Remove-List,
    TNLA-Setup-List,
    TNLA-Failed-To-Setup-List,
    CriticalityDiagnostics,
    XnUAddressInfoPerPDUSession-List,
    DAPSResponseInfo-List,
    DataTrafficResourceIndication,
    DeliveryStatus,
    DesiredActNotificationLevel,
```

DRB-ID,
DRB-List,
DRB-Number,
DRBsSubjectToDLDiscarding-List,
DRBsSubjectToEarlyStatusTransfer-List,
DRBsSubjectToStatusTransfer-List,
DRBToQoSFlowMapping-List,
E-UTRA-CGI,
ExpectedUEActivityBehaviour,
ExpectedUEBehaviour,
ExtendedUEIdentityIndexValue,
FiveGCMobilityRestrictionListContainer,
GlobalCell-ID,
GlobalNG-RANNode-ID,
GlobalNG-RANCell-ID,
GUAMI,
InterfaceInstanceIndication,
I-RNTI,
LocationInformationSNReporting,
LocationReportingInformation,
LowerLayerPresenceStatusChange,
LTEUESidelinkAggregateMaximumBitRate,
LTEV2XServicesAuthorized,
MR-DC-ResourceCoordinationInfo,
ServedCells-E-UTRA,
ServedCells-NR,
ServedCellsToUpdate-E-UTRA,
ServedCellsToUpdate-NR,
MAC-I,
MaskedIMEISV,
MDT-Configuration,
MDTPLMNList,
MobilityRestrictionList,
NG-RAN-Cell-Identity,
NG-RANnodeUEXnAPID,
NR-CGI,
NE-DC-TDM-Pattern,
NRUESidelinkAggregateMaximumBitRate,
NRV2XServicesAuthorized,
PagingDRX,
PagingDRXInformation,
PagingPriority,
PartialListIndicator,
PLMN-Identity,
PDCPChangeIndication,
PDUSessionAggregateMaximumBitRate,
PDUSession-ID,
PDUSession-List,
PDUSession-List-withCause,
PDUSession-List-withDataForwardingFromTarget,
PDUSession-List-withDataForwardingRequest,
PDUSessionResourcesAdmitted-List,
PDUSessionResourcesNotAdmitted-List,
PDUSessionResourcesToBeSetup-List,

PDUSessionResourceChangeRequiredInfo-SNterminated,
PDUSessionResourceChangeRequiredInfo-MNterminated,
PDUSessionResourceChangeConfirmInfo-SNterminated,
PDUSessionResourceChangeConfirmInfo-MNterminated,
PDUSessionResourceSecondaryRATUsageList,
PDUSessionResourceSetupInfo-SNterminated,
PDUSessionResourceSetupInfo-MNterminated,
PDUSessionResourceSetupResponseInfo-SNterminated,
PDUSessionResourceSetupResponseInfo-MNterminated,
PDUSessionResourceModificationInfo-SNterminated,
PDUSessionResourceModificationInfo-MNterminated,
PDUSessionResourceModificationResponseInfo-SNterminated,
PDUSessionResourceModificationResponseInfo-MNterminated,
PDUSessionResourceModConfirmInfo-SNterminated,
PDUSessionResourceModConfirmInfo-MNterminated,
PDUSessionResourceModRqdInfo-SNterminated,
PDUSessionResourceModRqdInfo-MNterminated,
PDUSessionType,
PC5QoSParameters,
QoSFlowIdentifier,
QoSFlowNotificationControlIndicationInfo,
QoSFlows-List,
RANPagingArea,
ResetRequestTypeInfo,
ResetResponseTypeInfo,
RFSP-Index,
RRCConfigIndication,
RRCResumeCause,
SCGConfigurationQuery,
SecurityIndication,
S-NG-RANnode-SecurityKey,
SpectrumSharingGroupID,
SplitSRBsTypes,
S-NG-RANnode-Addition-Trigger-Ind,
S-NSSAI,
TargetCellList,
TAISupport-List,
Target-CGI,
TimeToWait,
TraceActivation,
UEAggregateMaximumBitRate,
UEContextID,
UEContextInfoRetrUECtxtResp,
UEContextKeptIndicator,
UEHistoryInformation,
UEIdentityIndexValue,
UERadioCapabilityForPaging,
UERadioCapabilityID,
UERANPagingIdentity,
UESecurityCapabilities,
UPTransportLayerInformation,
UserPlaneTrafficActivityReport,
XnBenefitValue,
RANPagingFailure,

TNLConfigurationInfo,
MaximumCellListSize,
MessageOversizeNotification,
NG-RANTraceID,
MobilityInformation,
InitiatingCondition-FailureIndication,
HandoverReportType,
TargetCellInEUTRAN,
C-RNTI,
UERLFReportContainer,
Measurement-ID,
RegistrationRequest,
ReportCharacteristics,
CellToReport,
ReportingPeriodicity,
CellMeasurementResult,
UEHistoryInformationFromTheUE,
MobilityParametersInformation,
MobilityParametersModificationRange,
RACHReportInformation,
IABNodeIndication,
SNTriggered,
SCGIndicator,
UESpecificDRX,
DirectForwardingPathAvailability,
HashedUEIdentityIndexValue

FROM XnAP-IEs

PrivateIE-Container{},
ProtocolExtensionContainer{},
ProtocolIE-Container{},
ProtocolIE-ContainerList{},
ProtocolIE-ContainerPair{},
ProtocolIE-ContainerPairList{},
ProtocolIE-Single-Container{},
XNAP-PRIVATE-IES,
XNAP-PROTOCOL-EXTENSION,
XNAP-PROTOCOL-IES,
XNAP-PROTOCOL-IES-PAIR

FROM XnAP-Containers

id-ActivatedServedCells,
id-ActivationIDForCellActivation,
id-AdditionalDRBIDs,
id-AMF-Region-Information,
id-AMF-Region-Information-To-Add,
id-AMF-Region-Information-To-Delete,
id-AssistanceDataForRANPaging,
id-AvailableDRBIDs,
id-Cause,
id-cellAssistanceInfo-EUTRA,

id-cellAssistanceInfo-NR,
id-CellAndCapacityAssistanceInfo-EUTRA,
id-CellAndCapacityAssistanceInfo-NR,
id-ConfigurationUpdateInitiatingNodeChoice,
id-UEContextID,
id-CriticalityDiagnostics,
id-XnUAddressInfoPerPDUSession-List,
id-DesiredActNotificationLevel,
id-DRBsSubjectToStatusTransfer-List,
id-ExpectedUEBehaviour,
id-ExtendedUEIdentityIndexValue,
id-FiveGCMobilityRestrictionListContainer,
id-GlobalNG-RAN-node-ID,
id-GUAMI,
id-indexToRatFrequSelectionPriority,
id-List-of-served-cells-E-UTRA,
id-List-of-served-cells-NR,
id-LocationInformationSN,
id-LocationInformationSNReporting,
id-LocationReportingInformation,
id-LTEUESidelinkAggregateMaximumBitRate,
id-LTEV2XServicesAuthorized,
id-MAC-I,
id-MaskedIMEISV,
id-MDT-Configuration,
id-MDTPLMNList,
id-MN-to-SN-Container,
id-MobilityRestrictionList,
id-M-NG-RANnodeUEXnAPID,
id-new-NG-RAN-Cell-Identity,
id-newNG-RANnodeUEXnAPID,
id-NRUESidelinkAggregateMaximumBitRate,
id-NRV2XServicesAuthorized,
id-oldNG-RANnodeUEXnAPID,
id-OldtoNewNG-RANnodeResumeContainer,
id-PagingDRX,
id-PagingDRXInformation,
id-PagingPriority,
id-PartialListIndicator-EUTRA,
id-PartialListIndicator-NR,
id-PCellID,
id-PDUSessionResourceSecondaryRATUsageList,
id-PDUSessionResourcesActivityNotifyList,
id-PDUSessionResourcesAdmitted-List,
id-PDUSessionResourcesNotAdmitted-List,
id-PDUSessionResourcesNotifyList,
id-PDUSessionToBeAddedAddReq,
id-PDUSessionToBeReleased-RelReqAck,
id-procedureStage,
id-RANPagingArea,
id-requestedSplitSRB,
id-RequiredNumberOfDRBIDs,
id-ResetRequestTypeInfo,
id-ResetResponseTypeInfo,

id-RespondingNodeTypeConfigUpdateAck,
id-RRCResumeCause,
id-selectedPLMN,
id-ServedCellsToActivate,
id-servedCellsToUpdate-E-UTRA,
id-ServedCellsToUpdateInitiatingNodeChoice,
id-servedCellsToUpdate-NR,
id-sourceNG-RANnodeUEXnAPID,
id-SpareDRBIDs,
id-S-NG-RANnodeMaxIPDataRate-UL,
id-S-NG-RANnodeMaxIPDataRate-DL,
id-S-NG-RANnodeUEXnAPID,
id-TAISupport-list,
id-Target2SourceNG-RANnodeTranspContainer,
id-targetCellGlobalID,
id-targetNG-RANnodeUEXnAPID,
id-TimeToWait,
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-TraceActivation,
id-UEContextInfoHOREquest,
id-UEContextInfoRetrUECtxtResp,
id-UEContextKeptIndicator,
id-UEContextRefAtSN-HOREquest,
id-UEHistoryInformation,
id-UEIdentityIndexValue,
id-UERANPagingIdentity,
id-UESecurityCapabilities,
id-UserPlaneTrafficActivityReport,
id-XnRemovalThreshold,
id-PDUSessionAdmittedAddedAddReqAck,
id-PDUSessionNotAdmittedAddReqAck,
id-SN-to-MN-Container,
id-RRCCConfigIndication,
id-SplitSRB-RRCTransfer,
id-UEReportRRCTransfer,
id-PDUSessionReleasedList-RelConf,
id-BearersSubjectToCounterCheck,
id-PDUSessionToBeReleasedList-RelRqd,
id-ResponseInfo-ReconfCompl,
id-initiatingNodeType-ResourceCoordRequest,
id-respondingNodeType-ResourceCoordResponse,
id-PDUSessionToBeReleased-RelReq,
id-PDUSession-SNChangeRequired-List,
id-PDUSession-SNChangeConfirm-List,
id-PDCPChangeIndication,
id-PC5QoSParameters,
id-SCGConfigurationQuery,
id-UEContextInfo-SNModRequest,
id-requestedSplitSRBrelease,
id-PDUSessionAdmitted-SNModResponse,

id-PDUSessionNotAdmitted-SNModResponse,
id-admittedSplitSRB,
id-admittedSplitSRBrelease,
id-PDUSessionAdmittedModSNModConfirm,
id-PDUSessionReleasedSNModConfirm,
id-s-ng-RANnode-SecurityKey,
id-PDUSessionToBeModifiedSNModRequired,
id-S-NG-RANnodeUE-AMBR,
id-PDUSessionToBeReleasedSNModRequired,
id-target-S-NG-RANnodeID,
id-S-NSSAI,
id-MR-DC-ResourceCoordinationInfo,
id-RANPagingFailure,
id-UERadioCapabilityForPaging,
id-PDUSessionDataForwarding-SNModResponse,
id-Secondary-MN-Xn-U-TNLInfoatM,
id-NE-DC-TDM-Pattern,
id-InterfaceInstanceIndication,
id-S-NG-RANnode-Addition-Trigger-Ind,
id-SNTriggered,
id-DRBs-transferred-to-MN,
id-TNLConfigurationInfo,
id-MessageOversizeNotification,
id-NG-RANTraceID,
id-FastMCGRecoveryRRCTransfer-SN-to-MN,
id-FastMCGRecoveryRRCTransfer-MN-to-SN,
id-RequestedFastMCGRecoveryViaSRB3,
id-AvailableFastMCGRecoveryViaSRB3,
id-RequestedFastMCGRecoveryViaSRB3Release,
id-ReleaseFastMCGRecoveryViaSRB3,
id-CHOinformation-Req,
id-CHOinformation-Ack,
id-targetCellsToCancel,
id-requestedTargetCellGlobalID,
id-DAPSResponseInfo-List,
id-CHO-MRDC-EarlyDataForwarding,
id-CHO-MRDC-Indicator,
id-MobilityInformation,
id-InitiatingCondition-FailureIndication,
id-UEHistoryInformationFromTheUE,
id-HandoverReportType,
id-HandoverCause,
id-SourceCellCGI,
id-TargetCellCGI,
id-ReEstablishmentCellCGI,
id-TargetCellinEUTRAN,
id-SourceCellCRNTI,
id-UERLFReportContainer,
id-NGRAN-Node1-Measurement-ID,
id-NGRAN-Node2-Measurement-ID,
id-RegistrationRequest,
id-ReportCharacteristics,
id-CellToReport,
id-ReportingPeriodicity,

```

id-CellMeasurementResult,
id-NG-RANnode1CellID,
id-NG-RANnode2CellID,
id-NG-RANnode1MobilityParameters,
id-NG-RANnode2ProposedMobilityParameters,
id-MobilityParametersModificationRange,
id-RACHReportInformation,
id-IABNodeIndication,
id-UERadioCapabilityID,
id-SCGIndicator,
id-UESpecificDRX,
id-PDUSessionExpectedUEActivityBehaviour,
id-DirectForwardingPathAvailability,
id-SourceNG-RAN-node-ID,
id-TargetNodeID,
id-HashedUEIdentityIndexValue,

maxnoofCellsinNG-RANnode,
maxnoofDRBs,
maxnoofPDUSessions,
maxnoofQoSFlows
FROM XnAP-Constants;

-- *****
--
-- HANDOVER REQUEST
--
-- *****

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

HandoverRequest-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-sourceNG-RANnodeUEXnAPIID          CRITICALITY reject TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory }|
    { ID id-Cause                               CRITICALITY reject TYPE Cause                               PRESENCE mandatory }|
    { ID id-targetCellGlobalID                  CRITICALITY reject TYPE Target-CGI                               PRESENCE mandatory }|
    { ID id-GUAMI                               CRITICALITY reject TYPE GUAMI                               PRESENCE mandatory }|
    { ID id-UEContextInfoHOREquest              CRITICALITY reject TYPE UEContextInfoHOREquest          PRESENCE mandatory }|
    { ID id-TraceActivation                      CRITICALITY ignore  TYPE TraceActivation          PRESENCE optional }|
    { ID id-MaskedIMEISV                        CRITICALITY ignore  TYPE MaskedIMEISV            PRESENCE optional }|
    { ID id-UEHistoryInformation                CRITICALITY ignore  TYPE UEHistoryInformation     PRESENCE mandatory }|
    { ID id-UEContextRefAtSN-HOREquest          CRITICALITY ignore  TYPE UEContextRefAtSN-HOREquest PRESENCE optional }|
    { ID id-CHOinformation-Req                  CRITICALITY reject TYPE CHOinformation-Req       PRESENCE optional }|
    { ID id-NRV2XServicesAuthorized             CRITICALITY ignore  TYPE NRV2XServicesAuthorized  PRESENCE optional }|
    { ID id-LTEV2XServicesAuthorized            CRITICALITY ignore  TYPE LTEV2XServicesAuthorized  PRESENCE optional }|
    { ID id-PC5QoSParameters                    CRITICALITY ignore  TYPE PC5QoSParameters         PRESENCE optional }|
    { ID id-MobilityInformation                 CRITICALITY ignore  TYPE MobilityInformation       PRESENCE optional }|
    { ID id-UEHistoryInformationFromTheUE       CRITICALITY ignore  TYPE UEHistoryInformationFromTheUE PRESENCE optional }|
    { ID id-IABNodeIndication                   CRITICALITY reject  TYPE IABNodeIndication        PRESENCE optional }|
    ...
}

```

```

}
UEContextInfoHORequest ::= SEQUENCE {
    ng-c-UE-reference          AMF-UE-NGAP-ID,
    cp-TNL-info-source         CPTransportLayerInformation,
    ueSecurityCapabilities     UESecurityCapabilities,
    securityInformation        AS-SecurityInformation,
    indexToRatFrequencySelectionPriority RFSP-Index OPTIONAL,
    ue-AMBR                    UEAggregateMaximumBitRate,
    pduSessionResourcesToBeSetup-List PDUSessionResourcesToBeSetup-List,
    rrc-Context                 OCTET STRING,
    locationReportingInformation LocationReportingInformation OPTIONAL,
    mrl                         MobilityRestrictionList OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { {UEContextInfoHORequest-ExtIEs} } OPTIONAL,
    ...
}

UEContextInfoHORequest-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-FiveGCMobilityRestrictionListContainer CRITICALITY ignore EXTENSION FiveGCMobilityRestrictionListContainer PRESENCE optional } |
    { ID id-NRUESidelinkAggregateMaximumBitRate CRITICALITY ignore EXTENSION NRUESidelinkAggregateMaximumBitRate PRESENCE optional } |
    { ID id-LTEUESidelinkAggregateMaximumBitRate CRITICALITY ignore EXTENSION LTEUESidelinkAggregateMaximumBitRate PRESENCE optional } |
    { ID id-MDTPLMNList CRITICALITY ignore EXTENSION MDTPLMNList PRESENCE optional } |
    { ID id-UERadioCapabilityID CRITICALITY reject EXTENSION UERadioCapabilityID PRESENCE optional },
    ...
}

UEContextRefAtSN-HORequest ::= SEQUENCE {
    globalNG-RANNode-ID        GlobalNG-RANNode-ID,
    sN-NG-RANnodeUEXnAPID     NG-RANnodeUEXnAPID,
    iE-Extensions              ProtocolExtensionContainer { {UEContextRefAtSN-HORequest-ExtIEs} } OPTIONAL,
    ...
}

UEContextRefAtSN-HORequest-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- HANOVER REQUEST ACKNOWLEDGE
--
-- *****

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

HandoverRequestAcknowledge-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-sourceNG-RANnodeUEXnAPID CRITICALITY ignore TYPE NG-RANnodeUEXnAPID PRESENCE mandatory } |
    { ID id-targetNG-RANnodeUEXnAPID CRITICALITY ignore TYPE NG-RANnodeUEXnAPID PRESENCE mandatory } |
    { ID id-PDUSessionResourcesAdmitted-List CRITICALITY ignore TYPE PDUSessionResourcesAdmitted-List PRESENCE mandatory } |
    { ID id-PDUSessionResourcesNotAdmitted-List CRITICALITY ignore TYPE PDUSessionResourcesNotAdmitted-List PRESENCE optional } |
    { ID id-Target2SourceNG-RANnodeTranspContainer CRITICALITY ignore TYPE OCTET STRING PRESENCE mandatory }
}

```

```

    { ID id-UEContextKeptIndicator          CRITICALITY ignore TYPE UEContextKeptIndicator PRESENCE optional } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional } |
    { ID id-DRBs-transferred-to-MN         CRITICALITY ignore TYPE DRB-List PRESENCE optional } |
    { ID id-DAPSResponseInfo-List          CRITICALITY reject TYPE DAPSResponseInfo-List PRESENCE optional } |
    { ID id-CHOinformation-Ack              CRITICALITY reject TYPE CHOinformation-Ack PRESENCE optional } |
    ...
}

-- *****
--
-- HANDOVER PREPARATION FAILURE
--
-- *****

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

HandoverPreparationFailure-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-sourceNG-RANnodeUEXnAPIID      CRITICALITY ignore TYPE NG-RANnodeUEXnAPIID PRESENCE mandatory } |
    { ID id-Cause                           CRITICALITY ignore TYPE Cause PRESENCE mandatory } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional } |
    { ID id-requestedTargetCellGlobalID     CRITICALITY reject TYPE Target-CGI PRESENCE optional } |
    ...
}

-- *****
--
-- SN STATUS TRANSFER
--
-- *****

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

SNStatusTransfer-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-sourceNG-RANnodeUEXnAPIID      CRITICALITY reject TYPE NG-RANnodeUEXnAPIID PRESENCE mandatory } |
    { ID id-targetNG-RANnodeUEXnAPIID     CRITICALITY reject TYPE NG-RANnodeUEXnAPIID PRESENCE mandatory } |
    { ID id-DRBsSubjectToStatusTransfer-List CRITICALITY ignore TYPE DRBsSubjectToStatusTransfer-List PRESENCE mandatory } |
    ...
}

-- *****
--
-- UE CONTEXT RELEASE
--
-- *****

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

```

```

}
UEContextRelease-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-sourceNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory } |
  { ID id-targetNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory },
  ...
}
-- *****
--
-- HANDOVER CANCEL
--
-- *****

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

HandoverCancel-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-sourceNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory } |
  { ID id-targetNG-RANnodeUEXnAPID          CRITICALITY ignore         TYPE NG-RANnodeUEXnAPID          PRESENCE optional } |
  { ID id-Cause          CRITICALITY ignore         TYPE Cause                        PRESENCE mandatory } |
  { ID id-targetCellsToCancel          CRITICALITY reject          TYPE TargetCellList              PRESENCE optional },
  ...
}
-- *****
--
-- HANDOVER SUCCESS
--
-- *****

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

HandoverSuccess-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-sourceNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory } |
  { ID id-targetNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory } |
  { ID id-requestedTargetCellGlobalID          CRITICALITY reject          TYPE Target-CGI                  PRESENCE mandatory },
  ...
}
-- *****
--
-- CONDITIONAL HANDOVER CANCEL
--
-- *****

ConditionalHandoverCancel ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container    {{ ConditionalHandoverCancel-Ies}},
  ...
}

```

```

}

ConditionalHandoverCancel-Ies XNAP-PROTOCOL-IES ::= {
  { ID id-sourceNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory} |
  { ID id-targetNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory} |
  { ID id-Cause                              CRITICALITY ignore            TYPE Cause                        PRESENCE mandatory} |
  { ID id-targetCellsToCancel                CRITICALITY reject            TYPE TargetCellList              PRESENCE optional},
  ...
}

-- *****
--
-- EARLY STATUS TRANSFER
--
-- *****

EarlyStatusTransfer ::= SEQUENCE {
  protocolIES          ProtocolIE-Container   {{ EarlyStatusTransfer-Ies}},
  ...
}

EarlyStatusTransfer-Ies XNAP-PROTOCOL-IES ::= {
  { ID id-sourceNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory} |
  { ID id-targetNG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory} |
  { ID id-procedureStage                     CRITICALITY reject          TYPE ProcedureStageChoice        PRESENCE mandatory},
  ...
}

ProcedureStageChoice ::= CHOICE {
  first-dl-count          FirstDLCount,
  dl-discarding           DLDiscarding,
  choice-extension        ProtocolIE-Single-Container { {ProcedureStageChoice-ExtIEs} }
}

ProcedureStageChoice-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

FirstDLCount ::= SEQUENCE {
  dRBsSubjectToEarlyStatusTransfer          DRBsSubjectToEarlyStatusTransfer-List,
  iE-Extension                              ProtocolExtensionContainer { {FirstDLCount-ExtIEs} } OPTIONAL,
  ...
}

FirstDLCount-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

DLDiscarding ::= SEQUENCE {
  dRBsSubjectToDLDiscarding          DRBsSubjectToDLDiscarding-List,
  iE-Extension                      ProtocolExtensionContainer { {DLDiscarding-ExtIEs} } OPTIONAL,
  ...
}

```



```

DLDiscarding-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *****
--
-- RAN PAGING
--
-- *****

RANPaging ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container   {{RANPaging-Ies}},
  ...
}

RANPaging-Ies XNAP-PROTOCOL-IES ::= {
  { ID id-UEIdentityIndexValue          CRITICALITY reject          TYPE UEIdentityIndexValue          PRESENCE mandatory }|
  { ID id-UERANPagingIdentity            CRITICALITY ignore         TYPE UERANPagingIdentity           PRESENCE mandatory }|
  { ID id-PagingDRX                      CRITICALITY ignore         TYPE PagingDRX                     PRESENCE mandatory }|
  { ID id-RANPagingArea                  CRITICALITY reject          TYPE RANPagingArea                 PRESENCE mandatory }|
  { ID id-PagingPriority                  CRITICALITY ignore         TYPE PagingPriority                 PRESENCE optional }|
  { ID id-AssistanceDataForRANPaging     CRITICALITY ignore         TYPE AssistanceDataForRANPaging    PRESENCE optional }|
  { ID id-UERadioCapabilityForPaging     CRITICALITY ignore         TYPE UERadioCapabilityForPaging    PRESENCE optional }|
  { ID id-ExtendedUEIdentityIndexValue   CRITICALITY ignore         TYPE ExtendedUEIdentityIndexValue  PRESENCE optional }|
  { ID id-PagingDRXInformation           CRITICALITY ignore         TYPE PagingDRXInformation          PRESENCE optional }|
  { ID id-UESpecificDRX                  CRITICALITY ignore         TYPE UESpecificDRX                 PRESENCE optional }|
  { ID id-HashedUEIdentityIndexValue     CRITICALITY ignore         TYPE HashedUEIdentityIndexValue    PRESENCE optional }|
  ...
}

-- *****
--
-- RETRIEVE UE CONTEXT REQUEST
--
-- *****

RetrieveUEContextRequest ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container   {{RetrieveUEContextRequest-Ies}},
  ...
}

RetrieveUEContextRequest-Ies XNAP-PROTOCOL-IES ::= {
  { ID id-newNG-RANnodeUEXnAPIID        CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory }|
  { ID id-UEContextID                    CRITICALITY reject          TYPE UEContextID                   PRESENCE mandatory }|
  { ID id-MAC-I                          CRITICALITY reject          TYPE MAC-I                         PRESENCE mandatory }|
  { ID id-new-NG-RAN-Cell-Identity       CRITICALITY reject          TYPE NG-RAN-Cell-Identity          PRESENCE mandatory }|
  { ID id-RRCResumeCause                  CRITICALITY ignore         TYPE RRCResumeCause                PRESENCE optional }|
  ...
}

-- *****
--
-- RETRIEVE UE CONTEXT RESPONSE
--

```

```

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

RetrieveUEContextResponse-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-newNG-RANnodeUEXnAPIID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-oldNG-RANnodeUEXnAPIID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-GUAMI                            CRITICALITY reject      TYPE GUAMI                          PRESENCE mandatory}|
    { ID id-UEContextInfoRetrUECtxtResp     CRITICALITY reject      TYPE UEContextInfoRetrUECtxtResp   PRESENCE mandatory}|
    { ID id-TraceActivation                 CRITICALITY ignore      TYPE TraceActivation                PRESENCE optional}|
    { ID id-MaskedIMEISV                    CRITICALITY ignore      TYPE MaskedIMEISV                   PRESENCE optional}|
    { ID id-LocationReportingInformation     CRITICALITY ignore      TYPE LocationReportingInformation    PRESENCE optional}|
    { ID id-CriticalityDiagnostics           CRITICALITY ignore      TYPE CriticalityDiagnostics         PRESENCE optional}|
    { ID id-NRV2XServicesAuthorized         CRITICALITY ignore      TYPE NRV2XServicesAuthorized        PRESENCE optional}|
    { ID id-LTEV2XServicesAuthorized        CRITICALITY ignore      TYPE LTEV2XServicesAuthorized       PRESENCE optional}|
    { ID id-PC5QoSParameters                CRITICALITY ignore      TYPE PC5QoSParameters               PRESENCE optional}|
    { ID id-UEHistoryInformation            CRITICALITY ignore      TYPE UEHistoryInformation            PRESENCE optional}|
    { ID id-UEHistoryInformationFromTheUE   CRITICALITY ignore      TYPE UEHistoryInformationFromTheUE  PRESENCE optional}|
    { ID id-MDTPLMNList                     CRITICALITY ignore      TYPE MDTPLMNList                    PRESENCE optional}|
    ...
}

-- *****
--
-- RETRIEVE UE CONTEXT FAILURE
--
-- *****

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

RetrieveUEContextFailure-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-newNG-RANnodeUEXnAPIID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-OldtoNewNG-RANnodeResumeContainer CRITICALITY ignore      TYPE OCTET STRING                  PRESENCE optional}|
    { ID id-Cause                            CRITICALITY ignore      TYPE Cause                          PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics           CRITICALITY ignore      TYPE CriticalityDiagnostics        PRESENCE optional}|
    ...
}

-- *****
--
-- XN-U ADDRESS INDICATION
--
-- *****

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

```

```

XnUAddressIndication-IES XNAP-PROTOCOL-IES ::= {
  { ID id-newNG-RANnodeUEXnAPID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory }|
  { ID id-oldNG-RANnodeUEXnAPID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory }|
  { ID id-XnUAddressInfoPerPDUSession-List CRITICALITY reject       TYPE XnUAddressInfoPerPDUSession-List PRESENCE mandatory }|
  { ID id-CHO-MRDC-Indicator              CRITICALITY reject       TYPE CHO-MRDC-Indicator          PRESENCE optional   }|
  { ID id-CHO-MRDC-EarlyDataForwarding    CRITICALITY ignore      TYPE CHO-MRDC-EarlyDataForwarding PRESENCE optional   },
  ...
}

-- *****
--
-- S-NODE ADDITION REQUEST
--
-- *****

SNodeAdditionRequest ::= SEQUENCE {
  protocolIES          ProtocolIE-Container   {{ SNodeAdditionRequest-IEs}},
  ...
}

SNodeAdditionRequest-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY reject       TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory }|
  { ID id-UESecurityCapabilities         CRITICALITY reject       TYPE UESecurityCapabilities       PRESENCE mandatory }|
  { ID id-s-ng-RANnode-SecurityKey       CRITICALITY reject       TYPE S-NG-RANnode-SecurityKey     PRESENCE mandatory }|
  { ID id-S-NG-RANnodeUE-AMBR            CRITICALITY reject       TYPE UEAggregateMaximumBitRate    PRESENCE mandatory }|
  { ID id-selectedPLMN                   CRITICALITY ignore      TYPE PLMN-Identity                PRESENCE optional   }|
  { ID id-MobilityRestrictionList        CRITICALITY ignore      TYPE MobilityRestrictionList      PRESENCE optional   }|
  { ID id-indexToRatFrequSelectionPriority CRITICALITY reject       TYPE RFSP-Index                   PRESENCE optional   }|
  { ID id-PDUSessionToBeAddedAddReq      CRITICALITY reject       TYPE PDUSessionToBeAddedAddReq    PRESENCE mandatory }|
  { ID id-MN-to-SN-Container              CRITICALITY reject       TYPE OCTET STRING                 PRESENCE mandatory }|
  { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY reject       TYPE NG-RANnodeUEXnAPID          PRESENCE optional   }|
  { ID id-ExpectedUEBehaviour            CRITICALITY ignore      TYPE ExpectedUEBehaviour          PRESENCE optional   }|
  { ID id-requestedSplitSRB              CRITICALITY reject       TYPE SplitSRBsTypes               PRESENCE optional   }|
  { ID id-PCellID                        CRITICALITY reject       TYPE GlobalNG-RANCell-ID          PRESENCE optional   }|
  { ID id-DesiredActNotificationLevel     CRITICALITY ignore      TYPE DesiredActNotificationLevel  PRESENCE optional   }|
  { ID id-AvailableDRBIDs                CRITICALITY reject       TYPE DRB-List                     PRESENCE conditional}|
  -- The IE shall be present if there is at least one PDUSessionResourceSetupInfo-SNterminated included --|
  { ID id-S-NG-RANnodeMaxIPDataRate-UL   CRITICALITY reject       TYPE BitRate                       PRESENCE optional   }|
  { ID id-S-NG-RANnodeMaxIPDataRate-DL   CRITICALITY reject       TYPE BitRate                       PRESENCE optional   }|
  { ID id-LocationInformationSNReporting  CRITICALITY ignore      TYPE LocationInformationSNReporting PRESENCE optional   }|
  { ID id-MR-DC-ResourceCoordinationInfo  CRITICALITY ignore      TYPE MR-DC-ResourceCoordinationInfo PRESENCE optional   }|
  { ID id-MaskedIMEISV                   CRITICALITY ignore      TYPE MaskedIMEISV                 PRESENCE optional   }|
  { ID id-NE-DC-TDM-Pattern               CRITICALITY ignore      TYPE NE-DC-TDM-Pattern            PRESENCE optional   }|
  { ID id-S-NG-RANnode-Addition-Trigger-Ind CRITICALITY reject       TYPE S-NG-RANnode-Addition-Trigger-Ind PRESENCE optional   }|
  { ID id-TraceActivation                 CRITICALITY ignore      TYPE TraceActivation              PRESENCE optional   }|
  { ID id-RequestedFastMCGRecoveryViaSRB3 CRITICALITY ignore      TYPE RequestedFastMCGRecoveryViaSRB3 PRESENCE optional   }|
  { ID id-UERadioCapabilityID            CRITICALITY reject       TYPE UERadioCapabilityID          PRESENCE optional   }|
  { ID id-SourceNG-RAN-node-ID           CRITICALITY ignore      TYPE GlobalNG-RANNode-ID          PRESENCE optional   },
  ...
}

PDUSessionToBeAddedAddReq ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionToBeAddedAddReq-Item

```

```

PDUSSessionToBeAddedAddReq-Item ::= SEQUENCE {
    pduSessionId          PDUSSession-ID,
    s-NSSAI               S-NSSAI,
    sN-PDUSSessionAMBR    PDUSSessionAggregateMaximumBitRate      OPTIONAL,
    sn-terminated         PDUSSessionResourceSetupInfo-SNterminated OPTIONAL,
    mn-terminated         PDUSSessionResourceSetupInfo-MNterminated OPTIONAL,
-- NOTE: If neither the PDU Session Resource Setup Info - SN terminated IE
-- nor the PDU Session Resource Setup Info - MN terminated IE is present,
-- abnormal conditions as specified in clause 8.3.1.4 apply.
    iE-Extension         ProtocolExtensionContainer { {PDUSSessionToBeAddedAddReq-Item-ExtIEs} }  OPTIONAL,
    ...
}

PDUSSessionToBeAddedAddReq-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RequestedFastMCGRecoveryViaSRB3 ::= ENUMERATED {true, ...}

-- *****
--
-- S-NODE ADDITION REQUEST ACKNOWLEDGE
--
-- *****

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

SNodeAdditionRequestAcknowledge-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory } |
    { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory } |
    { ID id-PDUSSessionAdmittedAddedAddReqAck CRITICALITY ignore          TYPE PDUSSessionAdmittedAddedAddReqAck PRESENCE mandatory } |
    { ID id-PDUSSessionNotAdmittedAddReqAck CRITICALITY ignore          TYPE PDUSSessionNotAdmittedAddReqAck PRESENCE optional } |
    { ID id-SN-to-MN-Container              CRITICALITY reject          TYPE OCTET STRING                PRESENCE mandatory } |
    { ID id-admittedSplitSRB               CRITICALITY reject          TYPE SplitSRBsTypes              PRESENCE optional } |
    { ID id-RRCCConfigIndication            CRITICALITY reject          TYPE RRCCConfigIndication        PRESENCE optional } |
    { ID id-CriticalityDiagnostics          CRITICALITY ignore          TYPE CriticalityDiagnostics      PRESENCE optional } |
    { ID id-LocationInformationSN           CRITICALITY ignore          TYPE Target-CGI                  PRESENCE optional } |
    { ID id-MR-DC-ResourceCoordinationInfo  CRITICALITY ignore          TYPE MR-DC-ResourceCoordinationInfo PRESENCE optional } |
    { ID id-AvailableFastMCGRecoveryViaSRB3 CRITICALITY ignore          TYPE AvailableFastMCGRecoveryViaSRB3 PRESENCE optional } |
    { ID id-DirectForwardingPathAvailability CRITICALITY ignore          TYPE DirectForwardingPathAvailability PRESENCE optional } |
    ...
}

PDUSSessionAdmittedAddedAddReqAck ::= SEQUENCE (SIZE(1..maxnoofPDUSSessions)) OF PDUSSessionAdmittedAddedAddReqAck-Item

PDUSSessionAdmittedAddedAddReqAck-Item ::= SEQUENCE {
    pduSessionId          PDUSSession-ID,
    sn-terminated         PDUSSessionResourceSetupResponseInfo-SNterminated  OPTIONAL,
    mn-terminated         PDUSSessionResourceSetupResponseInfo-MNterminated  OPTIONAL,
-- NOTE: If neither the PDU Session Resource Setup Response Info - SN terminated IE
-- nor the PDU Session Resource Setup Response Info - MN terminated IE is present,

```

```

-- abnormal conditions as specified in clause 8.3.1.4 apply.
  iE-Extension          ProtocolExtensionContainer { {PDUSessionAdmittedAddedAddReqAck-Item-ExtIEs} } OPTIONAL,
  ...
}

PDUSessionAdmittedAddedAddReqAck-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDUSessionNotAdmittedAddReqAck ::= SEQUENCE {
  pduSessionResourcesNotAdmitted-SNterminated          PDUSessionResourcesNotAdmitted-List OPTIONAL,
  pduSessionResourcesNotAdmitted-MNterminated          PDUSessionResourcesNotAdmitted-List OPTIONAL,
  iE-Extension          ProtocolExtensionContainer { {PDUSessionNotAdmittedAddReqAck-ExtIEs} } OPTIONAL,
  ...
}

PDUSessionNotAdmittedAddReqAck-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

AvailableFastMCGRecoveryViaSRB3 ::= ENUMERATED {true, ...}

-- *****
--
-- S-NODE ADDITION REQUEST REJECT
--
-- *****

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

SNodeAdditionRequestReject-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
  { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
  { ID id-Cause                           CRITICALITY ignore         TYPE Cause                          PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics           CRITICALITY ignore         TYPE CriticalityDiagnostics         PRESENCE optional },
  ...
}

-- *****
--
-- S-NODE RECONFIGURATION COMPLETE
--
-- *****

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

SNodeReconfigurationComplete-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|

```

```

    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-ResponseInfo-ReconfCompl       CRITICALITY ignore       TYPE ResponseInfo-ReconfCompl    PRESENCE mandatory},
    ...
}

ResponseInfo-ReconfCompl ::= SEQUENCE {
    responseType-ReconfComplete      ResponseType-ReconfComplete,
    iE-Extensions                     ProtocolExtensionContainer { {ResponseInfo-ReconfCompl-ExtIEs} } OPTIONAL,
    ...
}

ResponseInfo-ReconfCompl-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResponseType-ReconfComplete ::= CHOICE {
    configuration-successfully-applied      Configuration-successfully-applied,
    configuration-rejected-by-M-NG-RANNode  Configuration-rejected-by-M-NG-RANNode,
    choice-extension                        ProtocolIE-Single-Container { {ResponseType-ReconfComplete-ExtIEs} }
}

ResponseType-ReconfComplete-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

Configuration-successfully-applied ::= SEQUENCE {
    m-NG-RANNode-to-S-NG-RANNode-Container  OCTET STRING          OPTIONAL,
    iE-Extensions                           ProtocolExtensionContainer { {Configuration-successfully-applied-ExtIEs} } OPTIONAL,
    ...
}

Configuration-successfully-applied-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

Configuration-rejected-by-M-NG-RANNode ::= SEQUENCE {
    cause                                     Cause,
    m-NG-RANNode-to-S-NG-RANNode-Container  OCTET STRING          OPTIONAL,
    iE-Extensions                           ProtocolExtensionContainer { {Configuration-rejected-by-M-NG-RANNode-ExtIEs} } OPTIONAL,
    ...
}

Configuration-rejected-by-M-NG-RANNode-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- S-NODE MODIFICATION REQUEST
--
-- *****

SNodeModificationRequest ::= SEQUENCE {

```

```

    protocolIEs          ProtocolIE-Container    {{ SNodeModificationRequest-IEs}},
    ...
}

SNodeModificationRequest-IEs XNAP-PROTOCOL-IEs ::= {
  { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory }
  { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory }
  { ID id-Cause                           CRITICALITY ignore      TYPE Cause                         PRESENCE mandatory }
  { ID id-PDCPChangeIndication            CRITICALITY ignore      TYPE PDCPChangeIndication          PRESENCE optional }
  { ID id-selectedPLMN                    CRITICALITY ignore      TYPE PLMN-Identity                 PRESENCE optional }
  { ID id-MobilityRestrictionList         CRITICALITY ignore      TYPE MobilityRestrictionList       PRESENCE optional }
  { ID id-SCGConfigurationQuery           CRITICALITY ignore      TYPE SCGConfigurationQuery         PRESENCE optional }
  { ID id-UEContextInfo-SNModRequest      CRITICALITY reject      TYPE UEContextInfo-SNModRequest    PRESENCE optional }
  { ID id-MN-to-SN-Container              CRITICALITY ignore      TYPE OCTET STRING                  PRESENCE optional }
  { ID id-requestedSplitSRB               CRITICALITY ignore      TYPE SplitSRBsTypes               PRESENCE optional }
  { ID id-requestedSplitSRBrelease        CRITICALITY ignore      TYPE SplitSRBsTypes               PRESENCE optional }
  { ID id-DesiredActNotificationLevel     CRITICALITY ignore      TYPE DesiredActNotificationLevel   PRESENCE optional }
  { ID id-AdditionalDRBs                  CRITICALITY reject      TYPE DRB-List                      PRESENCE optional }
  { ID id-S-NG-RANnodeMaxIPDataRate-UL   CRITICALITY reject      TYPE BitRate                       PRESENCE optional }
  { ID id-S-NG-RANnodeMaxIPDataRate-DL   CRITICALITY reject      TYPE BitRate                       PRESENCE optional }
  { ID id-LocationInformationSNReporting  CRITICALITY ignore      TYPE LocationInformationSNReporting PRESENCE optional }
  { ID id-MR-DC-ResourceCoordinationInfo CRITICALITY ignore      TYPE MR-DC-ResourceCoordinationInfo PRESENCE optional }
  { ID id-PCellID                         CRITICALITY reject      TYPE GlobalNG-RANCell-ID          PRESENCE optional }
  { ID id-NE-DC-TDM-Pattern               CRITICALITY ignore      TYPE NE-DC-TDM-Pattern            PRESENCE optional }
  { ID id-RequestedFastMCGRecoveryViaSRB3 CRITICALITY ignore      TYPE RequestedFastMCGRecoveryViaSRB3 PRESENCE optional }
  { ID id-RequestedFastMCGRecoveryViaSRB3Release CRITICALITY ignore      TYPE RequestedFastMCGRecoveryViaSRB3Release PRESENCE optional }
  { ID id-SNTriggered                     CRITICALITY ignore      TYPE SNTriggered                   PRESENCE optional }
  { ID id-TargetNodeID                   CRITICALITY ignore      TYPE GlobalNG-RANNode-ID          PRESENCE optional }
  ...
}

UEContextInfo-SNModRequest ::= SEQUENCE {
  ueSecurityCapabilities          UESecurityCapabilities          OPTIONAL,
  s-ng-RANnode-SecurityKey        S-NG-RANnode-SecurityKey       OPTIONAL,
  s-ng-RANnodeUE-AMBR             UEAggregateMaximumBitRate      OPTIONAL,
  indexToRatFrequencySelectionPriority RFSP-Index                     OPTIONAL,
  lowerLayerPresenceStatusChange LowerLayerPresenceStatusChange  OPTIONAL,
  pduSessionResourceToBeAdded     PDUSESSIONS-TO-BE-ADDED-SNMOD-REQUEST-LIST OPTIONAL,
  pduSessionResourceToBeModified  PDUSESSIONS-TO-BE-MODIFIED-SNMOD-REQUEST-LIST OPTIONAL,
  pduSessionResourceToBeReleased  PDUSESSIONS-TO-BE-RELEASED-SNMOD-REQUEST-LIST OPTIONAL,
  iE-Extension                    ProtocolExtensionContainer { {UEContextInfo-SNModRequest-ExtIEs} } OPTIONAL,
  ...
}

UEContextInfo-SNModRequest-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDUSESSIONS-TO-BE-ADDED-SNMOD-REQUEST-LIST ::= SEQUENCE (SIZE(1..maxnoofPDUSESSIONS)) OF PDUSESSIONS-TO-BE-ADDED-SNMOD-REQUEST-ITEM

PDUSESSIONS-TO-BE-ADDED-SNMOD-REQUEST-ITEM ::= SEQUENCE {
  pduSessionId                    PDUSESSION-ID,
  s-NSSAI                         S-NSSAI,
  sN-PDUSESSIONAMBR               PDUSESSIONAGGREGATEMAXIMUMBITRATE          OPTIONAL,

```

```

    sn-terminated          PDUSessionResourceSetupInfo-SNterminated  OPTIONAL,
    mn-terminated          PDUSessionResourceSetupInfo-MNterminated  OPTIONAL,
-- NOTE: If neither the PDU Session Resource Setup Info - SN terminated IE
-- nor the PDU Session Resource Setup Info - MN terminated IE is present,
-- abnormal conditions as specified in clause 8.3.3.4 apply.
    iE-Extension          ProtocolExtensionContainer { {PDUSessionsToBeAdded-SNModRequest-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionsToBeAdded-SNModRequest-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    {ID id-PDUSessionExpectedUEActivityBehaviour          CRITICALITY ignore  EXTENSION ExpectedUEActivityBehaviour          PRESENCE optional},
    ...
}

PDUSessionsToBeModified-SNModRequest-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionsToBeModified-SNModRequest-Item

PDUSessionsToBeModified-SNModRequest-Item ::= SEQUENCE {
    pduSessionId          PDUSession-ID,
    sN-PDUSessionAMBR      PDUSessionAggregateMaximumBitRate          OPTIONAL,
    sn-terminated          PDUSessionResourceModificationInfo-SNterminated OPTIONAL,
    mn-terminated          PDUSessionResourceModificationInfo-MNterminated OPTIONAL,
-- NOTE: If neither the PDU Session Resource Modification Info - SN terminated IE
-- nor the PDU Session Resource Modification Info - MN terminated IE is present,
-- abnormal conditions as specified in clause 8.3.3.4 apply.
    iE-Extension          ProtocolExtensionContainer { {PDUSessionsToBeModified-SNModRequest-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionsToBeModified-SNModRequest-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    {ID id-S-NSSAI          CRITICALITY reject  EXTENSION S-NSSAI          PRESENCE optional}|
    {ID id-PDUSessionExpectedUEActivityBehaviour          CRITICALITY ignore  EXTENSION ExpectedUEActivityBehaviour          PRESENCE optional},
    ...
}

PDUSessionsToBeReleased-SNModRequest-List ::= SEQUENCE {
    pdu-session-list      PDUSession-List-withCause          OPTIONAL,
    iE-Extension          ProtocolExtensionContainer { {PDUSessionsToBeReleased-SNModRequest-List-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionsToBeReleased-SNModRequest-List-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RequestedFastMCGRecoveryViaSRB3Release ::= ENUMERATED {true, ...}

-- *****
--
-- S-NODE MODIFICATION REQUEST ACKNOWLEDGE
--
-- *****

SNodeModificationRequestAcknowledge ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container  {{ SNodeModificationRequestAcknowledge-IEs}},

```



```

}
...
}
SNodeModificationRequestAcknowledge-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-M-NG-RANnodeUEXnAPIID CRITICALITY ignore TYPE NG-RANnodeUEXnAPIID PRESENCE mandatory } |
  { ID id-S-NG-RANnodeUEXnAPIID CRITICALITY ignore TYPE NG-RANnodeUEXnAPIID PRESENCE mandatory } |
  { ID id-PDUSessionAdmitted-SNModResponse CRITICALITY ignore TYPE PDUSessionAdmitted-SNModResponse PRESENCE optional } |
  { ID id-PDUSessionNotAdmitted-SNModResponse CRITICALITY ignore TYPE PDUSessionNotAdmitted-SNModResponse PRESENCE optional } |
  { ID id-SN-to-MN-Container CRITICALITY ignore TYPE OCTET STRING PRESENCE optional } |
  { ID id-admittedSplitSRB CRITICALITY ignore TYPE SplitsRBsTypes PRESENCE optional } |
  { ID id-admittedSplitSRBrelease CRITICALITY ignore TYPE SplitsRBsTypes PRESENCE optional } |
  { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional } |
  { ID id-LocationInformationSN CRITICALITY ignore TYPE Target-CGI PRESENCE optional } |
  { ID id-MR-DC-ResourceCoordinationInfo CRITICALITY ignore TYPE MR-DC-ResourceCoordinationInfo PRESENCE optional } |
  { ID id-PDUSessionDataForwarding-SNModResponse CRITICALITY ignore TYPE PDUSessionDataForwarding-SNModResponse PRESENCE optional } |
  { ID id-RRCCConfigIndication CRITICALITY reject TYPE RRCCConfigIndication PRESENCE optional } |
  { ID id-AvailableFastMCGRecoveryViaSRB3 CRITICALITY ignore TYPE AvailableFastMCGRecoveryViaSRB3 PRESENCE optional } |
  { ID id-ReleaseFastMCGRecoveryViaSRB3 CRITICALITY ignore TYPE ReleaseFastMCGRecoveryViaSRB3 PRESENCE optional } |
  { ID id-DirectForwardingPathAvailability CRITICALITY ignore TYPE DirectForwardingPathAvailability PRESENCE optional } ,
  ...
}
}
PDUSessionAdmitted-SNModResponse ::= SEQUENCE {
  pduSessionResourcesAdmittedToBeAdded PDUSessionAdmittedToBeAddedSNModResponse OPTIONAL,
  pduSessionResourcesAdmittedToBeModified PDUSessionAdmittedToBeModifiedSNModResponse OPTIONAL,
  pduSessionResourcesAdmittedToBeReleased PDUSessionAdmittedToBeReleasedSNModResponse OPTIONAL,
  iE-Extension ProtocolExtensionContainer { {PDUSessionAdmitted-SNModResponse-ExtIEs} } OPTIONAL,
  ...
}
}
PDUSessionAdmitted-SNModResponse-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}
}
PDUSessionAdmittedToBeAddedSNModResponse ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionAdmittedToBeAddedSNModResponse-Item
PDUSessionAdmittedToBeAddedSNModResponse-Item ::= SEQUENCE {
  pduSessionId PDUSession-ID,
  sn-terminated PDUSessionResourceSetupResponseInfo-SNterminated OPTIONAL,
  mn-terminated PDUSessionResourceSetupResponseInfo-MNterminated OPTIONAL,
  -- NOTE: If neither the PDU Session Resource Setup Response Info - SN terminated IE
  -- nor the PDU Session Resource Setup Response Info - MN terminated IE is present,
  -- abnormal conditions as specified in clause 8.3.3.4 apply.
  iE-Extension ProtocolExtensionContainer { {PDUSessionAdmittedToBeAddedSNModResponse-Item-ExtIEs} } OPTIONAL,
  ...
}
}
PDUSessionAdmittedToBeAddedSNModResponse-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}
}
PDUSessionAdmittedToBeModifiedSNModResponse ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionAdmittedToBeModifiedSNModResponse-Item
PDUSessionAdmittedToBeModifiedSNModResponse-Item ::= SEQUENCE {
  pduSessionId PDUSession-ID,
  sn-terminated PDUSessionResourceModificationResponseInfo-SNterminated OPTIONAL,
  mn-terminated PDUSessionResourceModificationResponseInfo-MNterminated OPTIONAL,

```

```

-- NOTE: If neither the PDU Session Resource Modification Response Info - SN terminated IE
-- nor the PDU Session Resource Modification Response Info - MN terminated IE is present,
-- abnormal conditions as specified in clause 8.3.3.4 apply.
    iE-Extension          ProtocolExtensionContainer { {PDUSessionAdmittedToBeModifiedSNModResponse-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionAdmittedToBeModifiedSNModResponse-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionAdmittedToBeReleasedSNModResponse ::= SEQUENCE {
    sn-terminated          PDUSession-List-withDataForwardingRequest          OPTIONAL,
    mn-terminated          PDUSession-List-withCause                          OPTIONAL,
    iE-Extension          ProtocolExtensionContainer { {PDUSessionAdmittedToBeReleasedSNModResponse-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionAdmittedToBeReleasedSNModResponse-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionNotAdmitted-SNModResponse ::= SEQUENCE {
    pdu-Session-List      PDUSession-List OPTIONAL,
    iE-Extension          ProtocolExtensionContainer { {PDUSessionNotAdmitted-SNModResponse-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionNotAdmitted-SNModResponse-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionDataForwarding-SNModResponse ::= SEQUENCE {
    sn-terminated          PDUSession-List-withDataForwardingRequest,
    iE-Extensions          ProtocolExtensionContainer { {PDUSessionDataForwarding-SNModResponse-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionDataForwarding-SNModResponse-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ReleaseFastMCGRecoveryViaSRB3 ::= ENUMERATED {true, ...}

-- *****
--
-- S-NODE MODIFICATION REQUEST REJECT
--
-- *****

SNodeModificationRequestReject ::= SEQUENCE {

```

```

    protocolIEs          ProtocolIE-Container    {{ SNodeModificationRequestReject-IEs}},
    ...
}

SNodeModificationRequestReject-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
  { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
  { ID id-Cause                          CRITICALITY ignore      TYPE Cause                        PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics         CRITICALITY ignore      TYPE CriticalityDiagnostics       PRESENCE optional  },
  ...
}

-- *****
--
-- S-NODE MODIFICATION REQUIRED
--
-- *****

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

SNodeModificationRequired-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
  { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
  { ID id-Cause                          CRITICALITY ignore      TYPE Cause                        PRESENCE mandatory}|
  { ID id-PDCPChangeIndication          CRITICALITY ignore      TYPE PDCPChangeIndication        PRESENCE optional  }|
  { ID id-PDUSessionToBeModifiedSNModRequired CRITICALITY ignore      TYPE PDUSessionToBeModifiedSNModRequired PRESENCE optional  }|
  { ID id-PDUSessionToBeReleasedSNModRequired CRITICALITY ignore      TYPE PDUSessionToBeReleasedSNModRequired PRESENCE optional  }|
  { ID id-SN-to-MN-Container             CRITICALITY ignore      TYPE OCTET STRING                 PRESENCE optional  }|
  { ID id-SpareDRBIDs                   CRITICALITY ignore      TYPE DRB-List                     PRESENCE optional  }|
  { ID id-RequiredNumberOfDRBIDs        CRITICALITY ignore      TYPE DRB-Number                   PRESENCE optional  }|
  { ID id-LocationInformationSN          CRITICALITY ignore      TYPE Target-CGI                   PRESENCE optional  }|
  { ID id-MR-DC-ResourceCoordinationInfo CRITICALITY ignore      TYPE MR-DC-ResourceCoordinationInfo PRESENCE optional  }|
  { ID id-RRCCongfigIndication          CRITICALITY reject      TYPE RRCCongfigIndication         PRESENCE optional  }|
  { ID id-AvailableFastMCGRecoveryViaSRB3 CRITICALITY ignore      TYPE AvailableFastMCGRecoveryViaSRB3 PRESENCE optional  }|
  { ID id-ReleaseFastMCGRecoveryViaSRB3 CRITICALITY ignore      TYPE ReleaseFastMCGRecoveryViaSRB3 PRESENCE optional  }|
  { ID id-SCGIndicator                  CRITICALITY ignore      TYPE SCGIndicator                 PRESENCE optional  },
  ...
}

PDUSessionToBeModifiedSNModRequired ::= SEQUENCE (SIZE (1.. maxnoofPDUSessions)) OF PDUSessionToBeModifiedSNModRequired-Item

PDUSessionToBeModifiedSNModRequired-Item ::= SEQUENCE {
  pduSessionId          PDUSession-ID,
  sn-terminated          PDUSessionResourceModRqdInfo-SNterminated OPTIONAL,
  mn-terminated          PDUSessionResourceModRqdInfo-MNterminated OPTIONAL,
-- NOTE: If neither the PDU Session Resource Modification Required Info - SN terminated IE
-- nor the PDU Session Resource Modification Required Info - MN terminated IE is present,
-- abnormal conditions as specified in clause 8.3.4.4 apply.
  iE-Extension          ProtocolExtensionContainer { {PDUSessionToBeModifiedSNModRequired-Item-ExtIEs} } OPTIONAL,
  ...
}

```

```

PDUSessionToBeModifiedSNModRequired-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDUSessionToBeReleasedSNModRequired ::= SEQUENCE {
  sn-terminated          PDUSession-List-withDataForwardingRequest    OPTIONAL,
  mn-terminated          PDUSession-List-withCause                    OPTIONAL,
  iE-Extension           ProtocolExtensionContainer { {PDUSessionToBeReleasedSNModRequired-ExtIEs} } OPTIONAL,
  ...
}

PDUSessionToBeReleasedSNModRequired-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *****
--
-- S-NODE MODIFICATION CONFIRM
--
-- *****

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

SNodeModificationConfirm-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory } |
  { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory } |
  { ID id-PDUSessionAdmittedModSNModConfirm CRITICALITY ignore      TYPE PDUSessionAdmittedModSNModConfirm PRESENCE optional } |
  { ID id-PDUSessionReleasedSNModConfirm CRITICALITY ignore      TYPE PDUSessionReleasedSNModConfirm PRESENCE optional } |
  { ID id-MN-to-SN-Container              CRITICALITY ignore      TYPE OCTET STRING                 PRESENCE optional } |
  { ID id-AdditionalDRBIDs                CRITICALITY reject      TYPE DRB-List                     PRESENCE optional } |
  { ID id-CriticalityDiagnostics          CRITICALITY ignore      TYPE CriticalityDiagnostics       PRESENCE optional } |
  { ID id-MR-DC-ResourceCoordinationInfo  CRITICALITY ignore      TYPE MR-DC-ResourceCoordinationInfo PRESENCE optional } |
  ...
}

PDUSessionAdmittedModSNModConfirm ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionAdmittedModSNModConfirm-Item

PDUSessionAdmittedModSNModConfirm-Item ::= SEQUENCE {
  pduSessionId          PDUSession-ID,
  sn-terminated          PDUSessionResourceModConfirmInfo-SNterminated OPTIONAL,
  mn-terminated          PDUSessionResourceModConfirmInfo-MNterminated OPTIONAL,
  -- NOTE: If neither the PDU Session Resource Modification Confirm Info - SN terminated IE
  -- nor the PDU Session Resource Modification Confirm Info - MN terminated IE is present,
  -- abnormal conditions as specified in clause 8.3.4.4 apply.
  iE-Extension           ProtocolExtensionContainer { {PDUSessionAdmittedModSNModConfirm-Item-ExtIEs} } OPTIONAL,
  ...
}

PDUSessionAdmittedModSNModConfirm-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

```

```

PDUSessionReleasedSNModConfirm ::= SEQUENCE {
    sn-terminated          PDUSession-List-withDataForwardingFromTarget          OPTIONAL,
    mn-terminated          PDUSession-List                                       OPTIONAL,
    IE-Extension           ProtocolExtensionContainer { {PDUSessionAdmittedToBeReleasedSNModConfirm-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionAdmittedToBeReleasedSNModConfirm-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- S-NODE MODIFICATION REFUSE
--
-- *****

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

SNodeModificationRefuse-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-Cause                           CRITICALITY ignore      TYPE Cause                         PRESENCE mandatory}|
    { ID id-MN-to-SN-Container              CRITICALITY ignore      TYPE OCTET STRING                  PRESENCE optional }|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore      TYPE CriticalityDiagnostics        PRESENCE optional },
    ...
}

-- *****
--
-- S-NODE RELEASE REQUEST
--
-- *****

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

SNodeReleaseRequest-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject       TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject       TYPE NG-RANnodeUEXnAPIID          PRESENCE optional }|
    { ID id-Cause                           CRITICALITY ignore       TYPE Cause                         PRESENCE mandatory}|
    { ID id-PDUSessionToBeReleased-RelReq   CRITICALITY ignore       TYPE PDUSession-List-withCause     PRESENCE mandatory}|
    { ID id-UEContextKeptIndicator          CRITICALITY ignore       TYPE UEContextKeptIndicator        PRESENCE optional }|
    { ID id-MN-to-SN-Container              CRITICALITY ignore       TYPE OCTET STRING                  PRESENCE optional }|
    { ID id-DRBs-transferred-to-MN          CRITICALITY ignore       TYPE DRB-List                      PRESENCE optional },
    ...
}

```

```

}
-- *****
--
-- S-NODE RELEASE REQUEST ACKNOWLEDGE
--
-- *****

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

SNodeReleaseRequestAcknowledge-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE optional  }|
    { ID id-PDUSessionToBeReleased-RelReqAck CRITICALITY ignore          TYPE PDUSessionToBeReleasedList-RelReqAck PRESENCE optional }|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore          TYPE CriticalityDiagnostics       PRESENCE optional  },
    ...
}

PDUSessionToBeReleasedList-RelReqAck ::= SEQUENCE {
    pduSessionsToBeReleasedList-SNterminated PDUSession-List-withDataForwardingRequest          OPTIONAL,
    IE-Extensions                             ProtocolExtensionContainer { {PDUSessionToBeReleasedList-RelReqAck-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionToBeReleasedList-RelReqAck-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- S-NODE RELEASE REJECT
--
-- *****

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

SNodeReleaseReject-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE optional  }|
    { ID id-Cause                           CRITICALITY ignore          TYPE Cause                          PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore          TYPE CriticalityDiagnostics         PRESENCE optional  },
    ...
}

-- *****
--
-- S-NODE RELEASE REQUIRED
--

```

```

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

SNodeReleaseRequired-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-PDUSessionToBeReleasedList-RelRqd CRITICALITY ignore          TYPE PDUSessionToBeReleasedList-RelRqd PRESENCE optional }|
    { ID id-Cause                          CRITICALITY ignore          TYPE Cause                        PRESENCE mandatory}|
    { ID id-SN-to-MN-Container              CRITICALITY ignore          TYPE OCTET STRING                 PRESENCE optional },
    ...
}

PDUSessionToBeReleasedList-RelRqd ::= SEQUENCE {
    pduSessionsToBeReleasedList-SNterminated PDUSession-List-withDataForwardingRequest OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { {PDUSessionToBeReleasedList-RelRqd-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionToBeReleasedList-RelRqd-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- S-NODE RELEASE CONFIRM
--
-- *****

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

SNodeReleaseConfirm-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-PDUSessionReleasedList-RelConf CRITICALITY ignore          TYPE PDUSessionReleasedList-RelConf PRESENCE optional }|
    { ID id-CriticalityDiagnostics         CRITICALITY ignore          TYPE CriticalityDiagnostics       PRESENCE optional },
    ...
}

PDUSessionReleasedList-RelConf ::= SEQUENCE {
    pduSessionsReleasedList-SNterminated PDUSession-List-withDataForwardingFromTarget OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { {PDUSessionReleasedList-RelConf-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionReleasedList-RelConf-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

}

-- *****
--
-- S-NODE COUNTER CHECK REQUEST
--
-- *****

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

SNodeCounterCheckRequest-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
    { ID id-BearersSubjectToCounterCheck  CRITICALITY ignore       TYPE BearersSubjectToCounterCheck-List  PRESENCE mandatory},
    ...
}

BearersSubjectToCounterCheck-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF BearersSubjectToCounterCheck-Item

BearersSubjectToCounterCheck-Item ::= SEQUENCE {
    drb-ID                DRB-ID,
    ul-count              INTEGER (0.. 4294967295),
    dl-count              INTEGER (0.. 4294967295),
    iE-Extensions        ProtocolExtensionContainer { {BearersSubjectToCounterCheck-Item-ExtIEs} } OPTIONAL,
    ...
}

BearersSubjectToCounterCheck-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- S-NODE CHANGE REQUIRED
--
-- *****

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

SNodeChangeRequired-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
    { ID id-target-S-NG-RANnodeID         CRITICALITY reject      TYPE GlobalNG-RANNode-ID         PRESENCE mandatory}|
    { ID id-Cause                       CRITICALITY ignore     TYPE Cause                        PRESENCE mandatory}|
    { ID id-PDUSession-SNChangeRequired-List CRITICALITY ignore     TYPE PDUSession-SNChangeRequired-List PRESENCE optional }|
    { ID id-SN-to-MN-Container            CRITICALITY reject     TYPE OCTET STRING                 PRESENCE mandatory},
}

```



```

}
...
}

PDUSession-SNChangeRequired-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSession-SNChangeRequired-Item

PDUSession-SNChangeRequired-Item ::= SEQUENCE {
    pduSessionId          PDUSession-ID,
    sn-terminated          PDUSessionResourceChangeRequiredInfo-SNterminated OPTIONAL,
    mn-terminated          PDUSessionResourceChangeRequiredInfo-MNterminated OPTIONAL,
-- NOTE: If the PDU Session Resource Change Required Info - SN terminated IE is not present,
-- abnormal conditions as specified in clause 8.3.5.4 apply.
    iE-Extension          ProtocolExtensionContainer { {PDUSession-SNChangeRequired-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSession-SNChangeRequired-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- S-NODE CHANGE CONFIRM
--
-- *****

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

SNodeChangeConfirm-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory}|
    { ID id-PDUSession-SNChangeConfirm-List CRITICALITY ignore          TYPE PDUSession-SNChangeConfirm-List PRESENCE optional }|
    { ID id-CriticalityDiagnostics        CRITICALITY ignore          TYPE CriticalityDiagnostics        PRESENCE optional },
    ...
}

PDUSession-SNChangeConfirm-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSession-SNChangeConfirm-Item

PDUSession-SNChangeConfirm-Item ::= SEQUENCE {
    pduSessionId          PDUSession-ID,
    sn-terminated          PDUSessionResourceChangeConfirmInfo-SNterminated OPTIONAL,
    mn-terminated          PDUSessionResourceChangeConfirmInfo-MNterminated OPTIONAL,
-- NOTE: If the PDU Session Resource Change Confirm Info - SN terminated IE is not present,
-- abnormal conditions as specified in clause 8.3.5.4 apply.
    iE-Extension          ProtocolExtensionContainer { {PDUSession-SNChangeConfirm-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSession-SNChangeConfirm-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

-- *****
--
-- S-NODE CHANGE REFUSE
--
-- *****

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

SNodeChangeRefuse-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-Cause                           CRITICALITY ignore          TYPE Cause                         PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore          TYPE CriticalityDiagnostics        PRESENCE optional },
    ...
}

-- *****
--
-- RRC TRANSFER
--
-- *****

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

RRCTransfer-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory}|
    { ID id-SplitSRB-RRCTransfer           CRITICALITY reject          TYPE SplitSRB-RRCTransfer         PRESENCE optional }|
    { ID id-UEReportRRCTransfer            CRITICALITY reject          TYPE UEReportRRCTransfer          PRESENCE optional }|
    { ID id-FastMCGRecoveryRRCTransfer-SN-to-MN CRITICALITY ignore          TYPE FastMCGRecoveryRRCTransfer    PRESENCE optional }|
    { ID id-FastMCGRecoveryRRCTransfer-MN-to-SN CRITICALITY ignore          TYPE FastMCGRecoveryRRCTransfer    PRESENCE optional },
    ...
}

SplitSRB-RRCTransfer ::= SEQUENCE {
    rrcContainer          OCTET STRING                                OPTIONAL,
    srbType               ENUMERATED {srb1, srb2, ...},
    deliveryStatus        DeliveryStatus                            OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { {SplitSRB-RRCTransfer-ExtIEs} } OPTIONAL,
    ...
}

SplitSRB-RRCTransfer-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

UEReportRRCTransfer ::= SEQUENCE {

```

```

rrcContainer          OCTET STRING,
iE-Extensions        ProtocolExtensionContainer { {UEReportRRCTransfer-ExtIEs} } OPTIONAL,
...
}

UEReportRRCTransfer-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
...
}

FastMCGRecoveryRRCTransfer ::= SEQUENCE {
rrcContainer          OCTET STRING,
iE-Extensions        ProtocolExtensionContainer { { FastMCGRecoveryRRCTransfer-ExtIEs} } OPTIONAL,
...
}

FastMCGRecoveryRRCTransfer-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
...
}

-- *****
--
-- NOTIFICATION CONTROL INDICATION
--
-- *****

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

NotificationControlIndication-IEs XNAP-PROTOCOL-IES ::= {
{ ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory } |
{ ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory } |
{ ID id-PDUSessionResourcesNotifyList  CRITICALITY reject          TYPE PDUSessionResourcesNotifyList PRESENCE optional },
...
}

PDUSessionResourcesNotifyList ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionResourcesNotify-Item

PDUSessionResourcesNotify-Item ::= SEQUENCE {
pduSessionId        PDUSession-ID,
qosFlowsNotificationContrIndInfo  QoSFlowNotificationControlIndicationInfo,
iE-Extensions        ProtocolExtensionContainer { {PDUSessionResourcesNotify-Item-ExtIEs} } OPTIONAL,
...
}

PDUSessionResourcesNotify-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
...
}

-- *****
--
-- ACTIVITY NOTIFICATION
--

```

```

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

ActivityNotification-IEs XNAP-PROTOCOL-IEs ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory } |
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY ignore          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory } |
    { ID id-UserPlaneTrafficActivityReport CRITICALITY ignore          TYPE UserPlaneTrafficActivityReport PRESENCE optional } |
    { ID id-PDUSessionResourcesActivityNotifyList CRITICALITY ignore          TYPE PDUSessionResourcesActivityNotifyList PRESENCE optional } |
    { ID id-RANPagingFailure                CRITICALITY ignore          TYPE RANPagingFailure                PRESENCE optional },
    ...
}

PDUSessionResourcesActivityNotifyList ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionResourcesActivityNotify-Item

PDUSessionResourcesActivityNotify-Item ::= SEQUENCE {
    pduSessionId          PDUSession-ID,
    pduSessionLevelUPactivityreport    UserPlaneTrafficActivityReport          OPTIONAL,
    qosFlowsActivityNotifyList    QoSFlowsActivityNotifyList          OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {PDUSessionResourcesActivityNotify-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourcesActivityNotify-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSFlowsActivityNotifyList ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsActivityNotifyItem

QoSFlowsActivityNotifyItem ::= SEQUENCE {
    qosFlowIdentifier      QoSFlowIdentifier,
    pduSessionLevelUPactivityreport    UserPlaneTrafficActivityReport,
    iE-Extensions          ProtocolExtensionContainer { {QoSFlowsActivityNotifyItem-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsActivityNotifyItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- XN SETUP REQUEST
--
-- *****

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

```

```

XnSetupRequest-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-GlobalNG-RAN-node-ID          CRITICALITY reject TYPE GlobalNG-RANNode-ID          PRESENCE mandatory }|
  { ID id-TAISupport-list                CRITICALITY reject TYPE TAISupport-List                PRESENCE mandatory }|
  { ID id-AMF-Region-Information         CRITICALITY reject TYPE AMF-Region-Information         PRESENCE mandatory }|
  { ID id-List-of-served-cells-NR       CRITICALITY reject TYPE ServedCells-NR                 PRESENCE optional  }|
  { ID id-List-of-served-cells-E-UTRA   CRITICALITY reject TYPE ServedCells-E-UTRA             PRESENCE optional  }|
  { ID id-InterfaceInstanceIndication    CRITICALITY reject TYPE InterfaceInstanceIndication    PRESENCE optional  }|
  { ID id-TNLConfigurationInfo           CRITICALITY ignore TYPE TNLConfigurationInfo           PRESENCE optional  }|
  { ID id-PartialListIndicator-NR        CRITICALITY ignore TYPE PartialListIndicator            PRESENCE optional  }|
  { ID id-CellAndCapacityAssistanceInfo-NR CRITICALITY ignore TYPE CellAndCapacityAssistanceInfo-NR PRESENCE optional  }|
  { ID id-PartialListIndicator-EUTRA     CRITICALITY ignore TYPE PartialListIndicator            PRESENCE optional  }|
  { ID id-CellAndCapacityAssistanceInfo-EUTRA CRITICALITY ignore TYPE CellAndCapacityAssistanceInfo-EUTRA PRESENCE optional },
  ...
}

-- *****
--
-- XN SETUP RESPONSE
--
-- *****

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

XnSetupResponse-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-GlobalNG-RAN-node-ID          CRITICALITY reject TYPE GlobalNG-RANNode-ID          PRESENCE mandatory }|
  { ID id-TAISupport-list                CRITICALITY reject TYPE TAISupport-List                PRESENCE mandatory }|
  { ID id-List-of-served-cells-NR       CRITICALITY reject TYPE ServedCells-NR                 PRESENCE optional  }|
  { ID id-List-of-served-cells-E-UTRA   CRITICALITY reject TYPE ServedCells-E-UTRA             PRESENCE optional  }|
  { ID id-CriticalityDiagnostics         CRITICALITY ignore TYPE CriticalityDiagnostics         PRESENCE optional  }|
  { ID id-AMF-Region-Information         CRITICALITY reject TYPE AMF-Region-Information         PRESENCE optional  }|
  { ID id-InterfaceInstanceIndication    CRITICALITY reject TYPE InterfaceInstanceIndication    PRESENCE optional  }|
  { ID id-TNLConfigurationInfo           CRITICALITY ignore TYPE TNLConfigurationInfo           PRESENCE optional  }|
  { ID id-PartialListIndicator-NR        CRITICALITY ignore TYPE PartialListIndicator            PRESENCE optional  }|
  { ID id-CellAndCapacityAssistanceInfo-NR CRITICALITY ignore TYPE CellAndCapacityAssistanceInfo-NR PRESENCE optional  }|
  { ID id-PartialListIndicator-EUTRA     CRITICALITY ignore TYPE PartialListIndicator            PRESENCE optional  }|
  { ID id-CellAndCapacityAssistanceInfo-EUTRA CRITICALITY ignore TYPE CellAndCapacityAssistanceInfo-EUTRA PRESENCE optional },
  ...
}

-- *****
--
-- XN SETUP FAILURE
--
-- *****

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

XnSetupFailure-IEs XNAP-PROTOCOL-IES ::= {

```

```

    { ID id-Cause                CRITICALITY ignore TYPE Cause                PRESENCE mandatory }|
    { ID id-TimeToWait           CRITICALITY ignore TYPE TimeToWait           PRESENCE optional  }|
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional  }|
    { ID id-InterfaceInstanceIndication CRITICALITY reject TYPE InterfaceInstanceIndication PRESENCE optional }|
    { ID id-MessageOversizeNotification CRITICALITY ignore TYPE MessageOversizeNotification PRESENCE optional },
    ...
}

-- *****
--
-- NG-RAN NODE CONFIGURATION UPDATE
--
-- *****

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

NGRANNodeConfigurationUpdate-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-TAISupport-list                CRITICALITY reject TYPE TAISupport-List                PRESENCE optional }|
    { ID id-ConfigurationUpdateInitiatingNodeChoice CRITICALITY ignore TYPE ConfigurationUpdateInitiatingNodeChoice PRESENCE mandatory }|
    { ID id-TNLA-To-Add-List                CRITICALITY ignore TYPE TNLA-To-Add-List                PRESENCE optional }|
    { ID id-TNLA-To-Remove-List            CRITICALITY ignore TYPE TNLA-To-Remove-List            PRESENCE optional }|
    { ID id-TNLA-To-Update-List            CRITICALITY ignore TYPE TNLA-To-Update-List            PRESENCE optional }|
    { ID id-GlobalNG-RAN-node-ID           CRITICALITY reject TYPE GlobalNG-RANNode-ID           PRESENCE optional }|
    { ID id-AMF-Region-Information-To-Add   CRITICALITY reject TYPE AMF-Region-Information           PRESENCE optional }|
    { ID id-AMF-Region-Information-To-Delete CRITICALITY reject TYPE AMF-Region-Information           PRESENCE optional }|
    { ID id-InterfaceInstanceIndication     CRITICALITY reject TYPE InterfaceInstanceIndication     PRESENCE optional }|
    { ID id-TNLConfigurationInfo           CRITICALITY ignore TYPE TNLConfigurationInfo           PRESENCE optional },
    ...
}

ConfigurationUpdateInitiatingNodeChoice ::= CHOICE {
    gNB                                     ProtocolIE-Container    { {ConfigurationUpdate-gNB} },
    ng-eNB                                 ProtocolIE-Container    { {ConfigurationUpdate-ng-eNB} },
    choice-extension                       ProtocolIE-Single-Container { {ServedCellsToUpdateInitiatingNodeChoice-ExtIEs} }
}

ServedCellsToUpdateInitiatingNodeChoice-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

ConfigurationUpdate-gNB XNAP-PROTOCOL-IES ::= {
    { ID id-servedCellsToUpdate-NR          CRITICALITY ignore TYPE ServedCellsToUpdate-NR          PRESENCE optional }|
    { ID id-cellAssistanceInfo-NR          CRITICALITY ignore TYPE CellAssistanceInfo-NR          PRESENCE optional }|
    { ID id-cellAssistanceInfo-EUTRA       CRITICALITY ignore TYPE CellAssistanceInfo-EUTRA       PRESENCE optional },
    ...
}

ConfigurationUpdate-ng-eNB XNAP-PROTOCOL-IES ::= {
    { ID id-servedCellsToUpdate-E-UTRA     CRITICALITY ignore TYPE ServedCellsToUpdate-E-UTRA     PRESENCE optional }|
    { ID id-cellAssistanceInfo-NR          CRITICALITY ignore TYPE CellAssistanceInfo-NR          PRESENCE optional }|

```

```

    { ID id-cellAssistanceInfo-EUTRA          CRITICALITY ignore TYPE CellAssistanceInfo-EUTRA          PRESENCE optional },
    ...
}

-- *****
--
-- NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE
--
-- *****

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

NGRANNodeConfigurationUpdateAcknowledge-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-RespondingNodeTypeConfigUpdateAck  CRITICALITY ignore TYPE RespondingNodeTypeConfigUpdateAck  PRESENCE mandatory}|
    { ID id-TNLA-Setup-List                    CRITICALITY ignore TYPE TNLA-Setup-List                    PRESENCE optional }|
    { ID id-TNLA-Failed-To-Setup-List          CRITICALITY ignore TYPE TNLA-Failed-To-Setup-List          PRESENCE optional }|
    { ID id-CriticalityDiagnostics             CRITICALITY ignore TYPE CriticalityDiagnostics             PRESENCE optional }|
    { ID id-InterfaceInstanceIndication        CRITICALITY reject  TYPE InterfaceInstanceIndication        PRESENCE optional }|
    { ID id-TNLConfigurationInfo               CRITICALITY ignore TYPE TNLConfigurationInfo               PRESENCE optional },
    ...
}

RespondingNodeTypeConfigUpdateAck ::= CHOICE {
    ng-eNB          RespondingNodeTypeConfigUpdateAck-ng-eNB,
    gNB             RespondingNodeTypeConfigUpdateAck-gNB,
    choice-extension ProtocolIE-Single-Container { {RespondingNodeTypeConfigUpdateAck-ExtIEs} }
}

RespondingNodeTypeConfigUpdateAck-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

RespondingNodeTypeConfigUpdateAck-ng-eNB ::= SEQUENCE {
    iE-Extension          ProtocolExtensionContainer { {RespondingNodeTypeConfigUpdateAck-ng-eNB-ExtIEs} }  OPTIONAL,
    ...
}

RespondingNodeTypeConfigUpdateAck-ng-eNB-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-List-of-served-cells-E-UTRA          CRITICALITY ignore EXTENSION ServedCells-E-UTRA          PRESENCE optional }|
    { ID id-PartialListIndicator-EUTRA           CRITICALITY ignore EXTENSION PartialListIndicator           PRESENCE optional }|
    { ID id-CellAndCapacityAssistanceInfo-EUTRA CRITICALITY ignore EXTENSION CellAndCapacityAssistanceInfo-EUTRA PRESENCE optional },
    ...
}

RespondingNodeTypeConfigUpdateAck-gNB ::= SEQUENCE {
    served-NR-Cells      ServedCells-NR          OPTIONAL,
    iE-Extension          ProtocolExtensionContainer { {RespondingNodeTypeConfigUpdateAck-gNB-ExtIEs} }  OPTIONAL,
    ...
}

```

```

RespondingNodeTypeConfigUpdateAck-gNB-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-PartialListIndicator-NR          CRITICALITY ignore  EXTENSION PartialListIndicator          PRESENCE optional }|
  { ID id-CellAndCapacityAssistanceInfo-NR CRITICALITY ignore  EXTENSION CellAndCapacityAssistanceInfo-NR      PRESENCE optional },
  ...
}

-- *****
--
-- NG-RAN NODE CONFIGURATION UPDATE FAILURE
--
-- *****

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

NGRANNodeConfigurationUpdateFailure-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-Cause          CRITICALITY ignore  TYPE Cause          PRESENCE mandatory }|
  { ID id-TimeToWait     CRITICALITY ignore  TYPE TimeToWait     PRESENCE optional }|
  { ID id-CriticalityDiagnostics CRITICALITY ignore  TYPE CriticalityDiagnostics PRESENCE optional }|
  { ID id-InterfaceInstanceIndication CRITICALITY reject  TYPE InterfaceInstanceIndication PRESENCE optional },
  ...
}

-- *****
--
-- E-UTRA NR CELL RESOURCE COORDINATION REQUEST
--
-- *****

E-UTRA-NR-CellResourceCoordinationRequest ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container  {{E-UTRA-NR-CellResourceCoordinationRequest-IEs}},
  ...
}

E-UTRA-NR-CellResourceCoordinationRequest-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-initiatingNodeType-ResourceCoordRequest CRITICALITY reject  TYPE InitiatingNodeType-ResourceCoordRequest PRESENCE mandatory }|
  { ID id-InterfaceInstanceIndication            CRITICALITY reject  TYPE InterfaceInstanceIndication            PRESENCE optional },
  ...
}

InitiatingNodeType-ResourceCoordRequest ::= CHOICE {
  ng-eNB          ResourceCoordRequest-ng-eNB-initiated,
  gNB             ResourceCoordRequest-gNB-initiated,
  choice-extension ProtocolIE-Single-Container { {InitiatingNodeType-ResourceCoordRequest-ExtIEs} }
}

InitiatingNodeType-ResourceCoordRequest-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

```



```

ResourceCoordRequest-ng-eNB-initiated ::= SEQUENCE {
    dataTrafficResourceIndication    DataTrafficResourceIndication,
    spectrumSharingGroupID           SpectrumSharingGroupID,
    listOfE-UTRACells                SEQUENCE (SIZE(1.. maxnoofCellsinNG-RANnode)) OF E-UTRA-CGI          OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { {ResourceCoordRequest-ng-eNB-initiated-ExtIEs} } OPTIONAL,
    ...
}

ResourceCoordRequest-ng-eNB-initiated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResourceCoordRequest-gNB-initiated ::= SEQUENCE {
    dataTrafficResourceIndication    DataTrafficResourceIndication,
    listOfE-UTRACells                SEQUENCE (SIZE(1.. maxnoofCellsinNG-RANnode)) OF E-UTRA-CGI          OPTIONAL,
    spectrumSharingGroupID           SpectrumSharingGroupID,
    listOfNRCells                    SEQUENCE (SIZE(1.. maxnoofCellsinNG-RANnode)) OF NR-CGI              OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { {ResourceCoordRequest-gNB-initiated-ExtIEs} } OPTIONAL,
    ...
}

ResourceCoordRequest-gNB-initiated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- E-UTRA NR CELL RESOURCE COORDINATION RESPONSE
--
-- *****

E-UTRA-NR-CellResourceCoordinationResponse ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    {{E-UTRA-NR-CellResourceCoordinationResponse-IEs}},
    ...
}

E-UTRA-NR-CellResourceCoordinationResponse-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-respondingNodeType-ResourceCoordResponse    CRITICALITY reject  TYPE RespondingNodeType-ResourceCoordResponse  PRESENCE mandatory } |
    { ID id-InterfaceInstanceIndication                 CRITICALITY reject  TYPE InterfaceInstanceIndication          PRESENCE optional  },
    ...
}

RespondingNodeType-ResourceCoordResponse ::= CHOICE {
    ng-eNB          ResourceCoordResponse-ng-eNB-initiated,
    gNB             ResourceCoordResponse-gNB-initiated,
    choice-extension ProtocolIE-Single-Container { {RespondingNodeType-ResourceCoordResponse-ExtIEs} }
}

RespondingNodeType-ResourceCoordResponse-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

```

```

ResourceCoordResponse-ng-eNB-initiated ::= SEQUENCE {
    dataTrafficResourceIndication    DataTrafficResourceIndication,
    spectrumSharingGroupID           SpectrumSharingGroupID,
    listOfE-UTRACells                SEQUENCE (SIZE(1.. maxnoofCellsinNG-RANnode)) OF E-UTRA-CGI    OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { {ResourceCoordResponse-ng-eNB-initiated-ExtIEs} }    OPTIONAL,
    ...
}

ResourceCoordResponse-ng-eNB-initiated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResourceCoordResponse-gNB-initiated ::= SEQUENCE {
    dataTrafficResourceIndication    DataTrafficResourceIndication,
    spectrumSharingGroupID           SpectrumSharingGroupID,
    listOfNRCells                   SEQUENCE (SIZE(1.. maxnoofCellsinNG-RANnode)) OF NR-CGI    OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { {ResourceCoordResponse-gNB-initiated-ExtIEs} }    OPTIONAL,
    ...
}

ResourceCoordResponse-gNB-initiated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- SECONDARY RAT DATA USAGE REPORT
--
-- *****

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

SecondaryRATDataUsageReport-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory} |
    { ID id-S-NG-RANnodeUEXnAPIID          CRITICALITY reject          TYPE NG-RANnodeUEXnAPIID          PRESENCE mandatory} |
    { ID id-PDUSessionResourceSecondaryRATUsageList CRITICALITY reject          TYPE PDUSessionResourceSecondaryRATUsageList PRESENCE mandatory},
    ...
}

-- *****
--
-- XN REMOVAL REQUEST
--
-- *****

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

```

```

}

XnRemovalRequest-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-GlobalNG-RAN-node-ID          CRITICALITY reject  TYPE GlobalNG-RANNode-ID          PRESENCE mandatory }|
  { ID id-XnRemovalThreshold            CRITICALITY reject  TYPE XnBenefitValue              PRESENCE optional  }|
  { ID id-InterfaceInstanceIndication   CRITICALITY reject  TYPE InterfaceInstanceIndication PRESENCE optional  },
  ...
}

-- *****
--
-- XN REMOVAL RESPONSE
--
-- *****

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

XnRemovalResponse-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-GlobalNG-RAN-node-ID          CRITICALITY reject  TYPE GlobalNG-RANNode-ID          PRESENCE mandatory }|
  { ID id-CriticalityDiagnostics        CRITICALITY ignore  TYPE CriticalityDiagnostics        PRESENCE optional  }|
  { ID id-InterfaceInstanceIndication   CRITICALITY reject  TYPE InterfaceInstanceIndication   PRESENCE optional  },
  ...
}

-- *****
--
-- XN REMOVAL FAILURE
--
-- *****

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

XnRemovalFailure-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-Cause                        CRITICALITY ignore  TYPE Cause                        PRESENCE mandatory }|
  { ID id-CriticalityDiagnostics        CRITICALITY ignore  TYPE CriticalityDiagnostics        PRESENCE optional  }|
  { ID id-InterfaceInstanceIndication   CRITICALITY reject  TYPE InterfaceInstanceIndication   PRESENCE optional  },
  ...
}

-- *****
--
-- CELL ACTIVATION REQUEST
--
-- *****

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

```

```

}

CellActivationRequest-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-ServedCellsToActivate          CRITICALITY reject      TYPE ServedCellsToActivate          PRESENCE mandatory}|
  { ID id-ActivationIDforCellActivation  CRITICALITY reject      TYPE ActivationIDforCellActivation  PRESENCE mandatory}|
  { ID id-InterfaceInstanceIndication    CRITICALITY reject      TYPE InterfaceInstanceIndication    PRESENCE optional },
  ...
}

ServedCellsToActivate ::= CHOICE {
  nr-cells                SEQUENCE (SIZE(1..maxnoofCellsinNG-RANnode)) OF NR-CGI,
  e-utra-cells            SEQUENCE (SIZE(1..maxnoofCellsinNG-RANnode)) OF E-UTRA-CGI,
  choice-extension        ProtocolIE-Single-Container { {ServedCellsToActivate-ExtIEs} }
}

ServedCellsToActivate-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

-- *****
--
-- CELL ACTIVATION RESPONSE
--
-- *****

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

CellActivationResponse-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-ActivatedServedCells          CRITICALITY reject      TYPE ActivatedServedCells          PRESENCE mandatory}|
  { ID id-ActivationIDforCellActivation CRITICALITY reject      TYPE ActivationIDforCellActivation PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics        CRITICALITY ignore     TYPE CriticalityDiagnostics        PRESENCE optional }|
  { ID id-InterfaceInstanceIndication   CRITICALITY reject      TYPE InterfaceInstanceIndication   PRESENCE optional },
  ...
}

ActivatedServedCells ::= CHOICE {
  nr-cells                SEQUENCE (SIZE(1..maxnoofCellsinNG-RANnode)) OF NR-CGI,
  e-utra-cells            SEQUENCE (SIZE(1..maxnoofCellsinNG-RANnode)) OF E-UTRA-CGI,
  choice-extension        ProtocolIE-Single-Container { {ActivatedServedCells-ExtIEs} }
}

ActivatedServedCells-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

-- *****
--
-- CELL ACTIVATION FAILURE
--

```

```

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

CellActivationFailure-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-ActivationIDforCellActivation          CRITICALITY reject          TYPE ActivationIDforCellActivation          PRESENCE mandatory }|
    { ID id-Cause                                  CRITICALITY ignore          TYPE Cause                                  PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics                 CRITICALITY ignore          TYPE CriticalityDiagnostics                PRESENCE optional }|
    { ID id-InterfaceInstanceIndication           CRITICALITY reject          TYPE InterfaceInstanceIndication           PRESENCE optional },
    ...
}

-- *****
--
-- RESET REQUEST
--
-- *****

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

ResetRequest-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-ResetRequestTypeInfo                  CRITICALITY reject          TYPE ResetRequestTypeInfo                  PRESENCE mandatory }|
    { ID id-Cause                                  CRITICALITY ignore          TYPE Cause                                  PRESENCE mandatory }|
    { ID id-InterfaceInstanceIndication           CRITICALITY reject          TYPE InterfaceInstanceIndication           PRESENCE optional },
    ...
}

-- *****
--
-- RESET RESPONSE
--
-- *****

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

ResetResponse-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-ResetResponseTypeInfo                 CRITICALITY reject          TYPE ResetResponseTypeInfo                 PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics                CRITICALITY ignore          TYPE CriticalityDiagnostics                PRESENCE optional }|
    { ID id-InterfaceInstanceIndication           CRITICALITY reject          TYPE InterfaceInstanceIndication           PRESENCE optional },
    ...
}

-- *****
--
-- ERROR INDICATION

```

```

--
-- *****
ErrorIndication ::= SEQUENCE {
    protocolIES      ProtocolIE-Container    {{ErrorIndication-IEs}},
    ...
}

ErrorIndication-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-oldNG-RANnodeUEXnAPID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID          PRESENCE optional }|
    { ID id-newNG-RANnodeUEXnAPID          CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID          PRESENCE optional }|
    { ID id-Cause                           CRITICALITY ignore      TYPE Cause                        PRESENCE optional }|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore      TYPE CriticalityDiagnostics       PRESENCE optional }|
    { ID id-InterfaceInstanceIndication     CRITICALITY reject      TYPE InterfaceInstanceIndication  PRESENCE optional },
    ...
}

-- *****
--
-- PRIVATE MESSAGE
--
-- *****

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

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

-- *****
--
-- TRACE START
--
-- *****

TraceStart ::= SEQUENCE {
    protocolIES      ProtocolIE-Container    { {TraceStartIEs} },
    ...
}

TraceStartIEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory }|
    { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY reject      TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory }|
    { ID id-TraceActivation                CRITICALITY ignore      TYPE TraceActivation              PRESENCE optional },
    ...
}

-- *****
--
-- DEACTIVATE TRACE

```

```

--
-- *****
DeactivateTrace ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { {DeactivateTraceIEs} },
    ...
}

DeactivateTraceIEs XNAP-PROTOCOL-IES ::= {
    { ID id-M-NG-RANnodeUEXnAPID          CRITICALITY reject  TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory }|
    { ID id-S-NG-RANnodeUEXnAPID          CRITICALITY reject  TYPE NG-RANnodeUEXnAPID          PRESENCE mandatory }|
    { ID id-NG-RANTraceID                  CRITICALITY ignore   TYPE NG-RANTraceID              PRESENCE mandatory },
    ...
}

-- *****
--
-- FAILURE INDICATION
--
-- *****

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

FailureIndication-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-InitiatingCondition-FailureIndication  CRITICALITY reject      TYPE InitiatingCondition-FailureIndication  PRESENCE mandatory },
    ...
}

-- *****
--
-- HANDOVER REPORT
--
-- *****

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

HandoverReport-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-HandoverReportType              CRITICALITY ignore     TYPE HandoverReportType              PRESENCE mandatory }|
    { ID id-HandoverCause                    CRITICALITY ignore     TYPE Cause                            PRESENCE mandatory }|
    { ID id-SourceCellCGI                    CRITICALITY ignore     TYPE GlobalNG-RANCell-ID             PRESENCE mandatory }|
    { ID id-TargetCellCGI                    CRITICALITY ignore     TYPE GlobalNG-RANCell-ID             PRESENCE mandatory }|
    { ID id-ReEstablishmentCellCGI           CRITICALITY ignore     TYPE GlobalCell-ID                   PRESENCE conditional }|
-- This IE shall be present if the Handover Report Type IE is set to the value "HO to wrong cell"
    { ID id-TargetCellinEUTRAN              CRITICALITY ignore     TYPE TargetCellinEUTRAN              PRESENCE conditional }|
-- This IE shall be present if the Handover Report Type IE is set to the value "Inter-system ping-pong"
    { ID id-SourceCellCRNTI                  CRITICALITY ignore     TYPE C-RNTI                           PRESENCE optional }|
    { ID id-MobilityInformation              CRITICALITY ignore     TYPE MobilityInformation              PRESENCE optional }|
    { ID id-UERLFRReportContainer            CRITICALITY ignore     TYPE UERLFRReportContainer            PRESENCE optional },
}

```

```

}
...
}
-- *****
--
-- RESOURCE STATUS REQUEST
--
-- *****

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

ResourceStatusRequest-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-NGRAN-Node1-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID          PRESENCE mandatory}|
    { ID id-NGRAN-Node2-Measurement-ID          CRITICALITY ignore   TYPE Measurement-ID          PRESENCE conditional}|
-- This IE shall be present if the Registration Request IE is set to the value "stop", "partial stop" or "add".
    { ID id-RegistrationRequest                 CRITICALITY reject  TYPE RegistrationRequest     PRESENCE mandatory}|
    { ID id-ReportCharacteristics               CRITICALITY reject  TYPE ReportCharacteristics    PRESENCE conditional}|
-- This IE shall be present if the Registration Request IE is set to the value "start".
    { ID id-CellToReport                        CRITICALITY ignore  TYPE CellToReport            PRESENCE optional }|
    { ID id-ReportingPeriodicity               CRITICALITY ignore  TYPE ReportingPeriodicity     PRESENCE optional },
    ...
}

-- *****
--
-- RESOURCE STATUS RESPONSE
--
-- *****

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

ResourceStatusResponse-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-NGRAN-Node1-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID          PRESENCE mandatory}|
    { ID id-NGRAN-Node2-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID          PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics   PRESENCE optional },
    ...
}

-- *****
--
-- RESOURCE STATUS FAILURE
--
-- *****

ResourceStatusFailure ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container    {{ResourceStatusFailure-IEs}},

```



```

}
...
ResourceStatusFailure-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-NGRAN-Node1-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID          PRESENCE mandatory }|
  { ID id-NGRAN-Node2-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID          PRESENCE mandatory }|
  { ID id-Cause                               CRITICALITY ignore  TYPE Cause                   PRESENCE mandatory }|
  { ID id-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics  PRESENCE optional  },
  ...
}

-- *****
--
-- RESOURCE STATUS UPDATE
--
-- *****

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

ResourceStatusUpdate-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-NGRAN-Node1-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID          PRESENCE mandatory }|
  { ID id-NGRAN-Node2-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID          PRESENCE mandatory }|
  { ID id-CellMeasurementResult              CRITICALITY ignore  TYPE CellMeasurementResult    PRESENCE mandatory },
  ...
}

-- *****
--
-- MOBILITY CHANGE REQUEST
--
-- *****

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

MobilityChangeRequest-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-NG-RANnode1CellID                   CRITICALITY reject  TYPE GlobalNG-RANCell-ID     PRESENCE mandatory }|
  { ID id-NG-RANnode2CellID                   CRITICALITY reject  TYPE GlobalNG-RANCell-ID     PRESENCE mandatory }|
  { ID id-NG-RANnode1MobilityParameters       CRITICALITY reject  TYPE MobilityParametersInformation PRESENCE optional }|
  { ID id-NG-RANnode2ProposedMobilityParameters CRITICALITY reject  TYPE MobilityParametersInformation PRESENCE mandatory }|
  { ID id-Cause                               CRITICALITY ignore  TYPE Cause                   PRESENCE mandatory },
  ...
}

-- *****
--
-- MOBILITY CHANGE ACKNOWLEDGE

```

```
--
-- *****
MobilityChangeAcknowledge ::= SEQUENCE {
  protocolIEs      ProtocolIE-Container    {{MobilityChangeAcknowledge-IEs}},
  ...
}

MobilityChangeAcknowledge-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-NG-RANnode1CellID          CRITICALITY reject  TYPE GlobalNG-RANCell-ID          PRESENCE mandatory}|
  { ID id-NG-RANnode2CellID          CRITICALITY reject  TYPE GlobalNG-RANCell-ID          PRESENCE mandatory}|
  { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics       PRESENCE optional},
  ...
}

-- *****
--
-- MOBILITY CHANGE FAILURE
--
-- *****

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

MobilityChangeFailure-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-NG-RANnode1CellID          CRITICALITY reject  TYPE GlobalNG-RANCell-ID          PRESENCE mandatory}|
  { ID id-NG-RANnode2CellID          CRITICALITY reject  TYPE GlobalNG-RANCell-ID          PRESENCE mandatory}|
  { ID id-Cause                       CRITICALITY ignore  TYPE Cause                        PRESENCE mandatory}|
  { ID id-MobilityParametersModificationRange CRITICALITY reject  TYPE MobilityParametersModificationRange PRESENCE optional}|
  { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics       PRESENCE optional},
  ...
}

-- *****
--
-- ACCESS AND MOBILITY INDICATION
--
-- *****

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

AccessAndMobilityIndication-IEs XNAP-PROTOCOL-IES ::= {
  { ID id-RACHReportInformation      CRITICALITY ignore  TYPE RACHReportInformation        PRESENCE optional},
  ...
}

END
```

```
-- ASN1STOP
```

9.3.5 Information Element definitions

```
-- ASN1START
-- *****
--
-- Information Element Definitions
--
-- *****

XnAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) xnap (2) version1 (1) xnap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

    id-CNTypeRestrictionsForEquivalent,
    id-CNTypeRestrictionsForServing,
    id-Additional-UL-NG-U-TNLatUPF-List,
    id-ConfiguredTACIndication,
    id-AlternativeQoSParaSetList,
    id-CurrentQoSParaSetIndex,
    id-DefaultDRB-Allowed,
    id-DLCarrierList,
    id-EndpointIPAddressAndPort,
    id-ExtendedReportIntervalMDT,
    id-ExtendedTAISliceSupportList,
    id-FiveGCMobilityRestrictionListContainer,
    id-SecondarydataForwardingInfoFromTarget-List,
    id-LastE-UTRANPLMNIdentity,
    id-IntendedTDD-DL-ULConfiguration-NR,
    id-MaxIPrate-DL,
    id-SecurityResult,
    id-OldQoSFlowMap-ULendmarkerexpected,
    id-PDUSessionCommonNetworkInstance,
    id-BPLMN-ID-Info-EUTRA,
    id-BPLMN-ID-Info-NR,
    id-DRBsNotAdmittedSetupModifyList,
    id-Secondary-MN-Xn-U-TNLInfoatM,
    id-ULForwardingProposal,
    id-DRB-IDs-takenintouse,
    id-SplitSessionIndicator,
    id-NonGBRRResources-Offered,
    id-MDT-Configuration,
    id-TraceCollectionEntityURI,
    id-NPN-Broadcast-Information,
    id-NPNPagingAssistanceInformation,
```

id-NPNMobilityInformation,
id-NPN-Support,
id-LTEUESidelinkAggregateMaximumBitRate,
id-NRUESidelinkAggregateMaximumBitRate,
id-ExtendedRATRestrictionInformation,
id-QoSMonitoringRequest,
id-QoSMonitoringDisabled,
id-QoSMonitoringReportingFrequency,
id-DAPSRequestInfo,
id-OffsetOfNbiotChannelNumberToDL-EARFCN,
id-OffsetOfNbiotChannelNumberToUL-EARFCN,
id-NBIOt-UL-DL-AlignmentOffset,
id-TDDULDLConfigurationCommonNR,
id-CarrierList,
id-ULCarrierList,
id-FrequencyShift7p5khz,
id-SSB-PositionsInBurst,
id-NRCellPRACHConfig,
id-Redundant-UL-NG-U-TNLatUPF,
id-Redundant-DL-NG-U-TNLatNG-RAN,
id-CNPacketDelayBudgetDownlink,
id-CNPacketDelayBudgetUplink,
id-ExtendedPacketDelayBudget,
id-Additional-Redundant-UL-NG-U-TNLatUPF-List,
id-RedundantCommonNetworkInstance,
id-TSCTrafficCharacteristics,
id-RedundantQoSFlowIndicator,
id-Additional-PDCP-Duplication-TNL-List,
id-RedundantPDUSessionInformation,
id-UsedRSNInformation,
id-RLCDuplicationInformation,
id-CSI-RSTransmissionIndication,
id-UERadioCapabilityID,
id-secondary-SN-UL-PDCP-UP-TNLInfo,
id-pdcpDuplicationConfiguration,
id-duplicationActivation,
id-NPRACHConfiguration,
id-QoSFlowsMappedtoDRB-SetupResponse-MNterminated,
id-DL-scheduling-PDCCH-CCE-usage,
id-UL-scheduling-PDCCH-CCE-usage,
id-SFN-Offset,
id-QoS-Mapping-Information,
id-AdditionLocationInformation,
id-dataForwardingInfoFromTargetE-UTRANnode,
id-Cause,
id-SecurityIndication,
id-RRConnReestab-Indicator,
id-SourceDLForwardingIPAddress,
id-SourceNodeDLForwardingIPAddress,
id-UERLFReportContainerLTEExtension,
id-QoSFlowMappingIndication,
maxEARFCN,
maxnoofAllowedAreas,
maxnoofAMFRegions,

maxnoofAoIs,
maxnoofBPLMNs,
maxnoofCAGs,
maxnoofCAGsperPLMN,
maxnoofCellsInAoI,
maxnoofCellsInNG-RANnode,
maxnoofCellsInRNA,
maxnoofCellsInUEHistoryInfo,
maxnoofCellsUEMovingTrajectory,
maxnoofDRBs,
maxnoofEPLMNs,
maxnoofEPLMNsplus1,
maxnoofEUTRABands,
maxnoofEUTRABPLMNs,
maxnoofForbiddenTACs,
maxnoofMBSFNUEUTRA,
maxnoofMultiConnectivityMinusOne,
maxnoofNeighbours,
maxnoofNIDs,
maxnoofNRCellBands,
maxnoofPDUSessions,
maxnoofPLMNs,
maxnoofProtectedResourcePatterns,
maxnoofQoSFlows,
maxnoofQoSParaSets,
maxnoofRANAreaCodes,
maxnoofRANAreasInRNA,
maxnoofSCellGroups,
maxnoofSCellGroupsplus1,
maxnoofSliceItems,
maxnoofExtSliceItems,
maxnoofSNPNIDs,
maxnoofSupportedTACs,
maxnoofSupportedPLMNs,
maxnoofTAI,
maxnoofTAIInAoI,
maxnoofTNLAssociations,
maxnoofUEContexts,
maxNRARFCN,
maxNrOfErrors,
maxnoofRANNodesInAoI,
maxnoofTimePeriods,
maxnoofSlots,
maxnoofExtTLAs,
maxnoofGTPTLAs,
maxnoofCHOcells,
maxnoofPC5QoSFlows,
maxnoofSSBAreas,
maxnoofNRSCSs,
maxnoofPhysicalResourceBlocks,
maxnoofRACHReports,
maxnoofAdditionalPDCPDuplicationTNL,
maxnoofRLCDuplicationstate,
maxnoofBluetoothName,

```

    maxnoofCellIDforMDT,
    maxnoofMDTPLMNs,
    maxnoofTAforMDT,
    maxnoofWLANName,
    maxnoofSensorName,
    maxnoofNeighPCIforMDT,
    maxnoofFreqforMDT,
    maxnoofNonAnchorCarrierFreqConfig,
    maxnoofDataForwardingTunneltoE-UTRAN

FROM XnAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage
FROM XnAP-CommonDataTypes

    ProtocolExtensionContainer{},
    ProtocolIE-Single-Container{},

    XNAP-PROTOCOL-EXTENSION,
    XNAP-PROTOCOL-IES
FROM XnAP-Containers;

-- A

AdditionLocationInformation ::= ENUMERATED {
    includePSCell,
    ...
}

Additional-PDCP-Duplication-TNL-List ::= SEQUENCE (SIZE(1..maxnoofAdditionalPDCPDuplicationTNL)) OF Additional-PDCP-Duplication-TNL-Item
Additional-PDCP-Duplication-TNL-Item ::= SEQUENCE {
    additional-PDCP-Duplication-UP-TNL-Information UPTransportLayerInformation,
    iE-Extensions ProtocolExtensionContainer { { Additional-PDCP-Duplication-TNL-ExtIEs } } OPTIONAL,
    ...
}
Additional-PDCP-Duplication-TNL-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

Additional-UL-NG-U-TNLatUPF-Item ::= SEQUENCE {
    additional-UL-NG-U-TNLatUPF UPTransportLayerInformation,
    iE-Extensions ProtocolExtensionContainer { { Additional-UL-NG-U-TNLatUPF-Item-ExtIEs } } OPTIONAL,
    ...
}

Additional-UL-NG-U-TNLatUPF-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-PDUSessionCommonNetworkInstance CRITICALITY ignore EXTENSION PDUSessionCommonNetworkInstance PRESENCE optional},
    ...
}

```

Additional-UL-NG-U-TNLatUPF-List ::= SEQUENCE (SIZE(1..maxnoofMultiConnectivityMinusOne)) OF Additional-UL-NG-U-TNLatUPF-Item

ActivationIDforCellActivation ::= INTEGER (0..255)

AllocationandRetentionPriority ::= SEQUENCE {
 priorityLevel INTEGER (0..15,...),
 pre-emption-capability ENUMERATED {shall-not-trigger-preemptdatDion, may-trigger-preemption, ...},
 pre-emption-vulnerability ENUMERATED {not-preemptable, preemptable, ...},
 iE-Extensions ProtocolExtensionContainer { {AllocationandRetentionPriority-ExtIEs} } OPTIONAL,
 ...
}

AllocationandRetentionPriority-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
 ...
}

ActivationSFN ::= INTEGER (0..1023)

AllowedCAG-ID-List-perPLMN ::= SEQUENCE (SIZE(1..maxnoofCAGsperPLMN)) OF CAG-Identifier

AllowedPNI-NPN-ID-List ::= SEQUENCE (SIZE(1..maxnoofEPLMNsplus1)) OF AllowedPNI-NPN-ID-Item

AllowedPNI-NPN-ID-Item ::= SEQUENCE {
 plmn-id PLMN-Identity,
 pni-npn-restricted-information PNI-NPN-Restricted-Information,
 allowed-CAG-id-list-per-plmn AllowedCAG-ID-List-perPLMN,
 iE-Extensions ProtocolExtensionContainer { {AllowedPNI-NPN-ID-Item-ExtIEs} } OPTIONAL,
 ...
}

AllowedPNI-NPN-ID-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
 ...
}

AlternativeQoSParaSetList ::= SEQUENCE (SIZE(1..maxnoofQoSParaSets)) OF AlternativeQoSParaSetItem

AlternativeQoSParaSetItem ::= SEQUENCE {
 alternativeQoSParaSetIndex QoSParaSetIndex,
 guaranteedFlowBitRateDL BitRate OPTIONAL,
 guaranteedFlowBitRateUL BitRate OPTIONAL,
 packetDelayBudget PacketDelayBudget OPTIONAL,
 packetErrorRate PacketErrorRate OPTIONAL,
 iE-Extensions ProtocolExtensionContainer { {AlternativeQoSParaSetItem-ExtIEs} } OPTIONAL,
 ...
}

AlternativeQoSParaSetItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
 ...
}

AMF-Region-Information ::= SEQUENCE (SIZE (1..maxnoofAMFRegions)) OF GlobalAMF-Region-Information

```

GlobalAMF-Region-Information ::= SEQUENCE {
    plmn-ID          PLMN-Identity,
    amf-region-id   BIT STRING (SIZE (8)),
    iE-Extensions   ProtocolExtensionContainer { {GlobalAMF-Region-Information-ExtIEs} } OPTIONAL,
    ...
}

GlobalAMF-Region-Information-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

AMF-UE-NGAP-ID ::= INTEGER (0..1099511627775)

AreaOfInterestInformation ::= SEQUENCE (SIZE(1..maxnoofAoIs)) OF AreaOfInterest-Item

AreaOfInterest-Item ::= SEQUENCE {
    listOfTAIsinAoI      ListOfTAIsinAoI          OPTIONAL,
    listOfCellsinAoI     ListOfCells              OPTIONAL,
    listOfRANNodesinAoI ListOfRANNodesinAoI        OPTIONAL,
    requestReferenceID   RequestReferenceID,
    iE-Extensions       ProtocolExtensionContainer { {AreaOfInterest-Item-ExtIEs} } OPTIONAL,
    ...
}

AreaOfInterest-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

AreaScopeOfMDT-NR ::= CHOICE {
    cellBased          CellBasedMDT-NR,
    tABased            TABasedMDT,
    tAIBased           TAIBasedMDT,
    ...,
    choice-extension   ProtocolIE-Single-Container { {AreaScopeOfMDT-NR-ExtIEs} }
}

AreaScopeOfMDT-NR-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

AreaScopeOfMDT-EUTRA ::= CHOICE {
    cellBased          CellBasedMDT-EUTRA,
    tABased            TABasedMDT,
    tAIBased           TAIBasedMDT,
    ...,
    choice-extension   ProtocolIE-Single-Container { {AreaScopeOfMDT-EUTRA-ExtIEs} }
}

AreaScopeOfMDT-EUTRA-ExtIEs XNAP-PROTOCOL-IES ::= {

```



```

}
...
}

AreaScopeOfNeighCellsList ::= SEQUENCE (SIZE(1..maxnoofFreqforMDT)) OF AreaScopeOfNeighCellsItem
AreaScopeOfNeighCellsItem ::= SEQUENCE {
    nrFrequencyInfo          NRFrequencyInfo,
    pciListForMDT            PCIListForMDT          OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { { AreaScopeOfNeighCellsItem-ExtIEs } } OPTIONAL,
    ...
}

AreaScopeOfNeighCellsItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

AS-SecurityInformation ::= SEQUENCE {
    key-NG-RAN-Star          BIT STRING (SIZE(256)),
    ncc                      INTEGER (0..7),
    iE-Extensions            ProtocolExtensionContainer { {AS-SecurityInformation-ExtIEs} } OPTIONAL,
    ...
}

AS-SecurityInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

AssistanceDataForRANPaging ::= SEQUENCE {
    ran-paging-attempt-info  RANPagingAttemptInfo  OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { {AssistanceDataForRANPaging-ExtIEs} } OPTIONAL,
    ...
}

AssistanceDataForRANPaging-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-NPNPagingAssistanceInformation CRITICALITY ignore EXTENSION NPNPagingAssistanceInformation PRESENCE optional },
    ...
}

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

AvailableRRCCapacityValue ::= INTEGER (0..100)

AveragingWindow ::= INTEGER (0..4095, ...)

-- B

BluetoothMeasurementConfiguration ::= SEQUENCE {
    bluetoothMeasConfig      BluetoothMeasConfig,
    bluetoothMeasConfigNameList BluetoothMeasConfigNameList  OPTIONAL,

```

```

    bt-rssi                ENUMERATED {true, ...}                OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { BluetoothMeasurementConfiguration-ExtIEs } } OPTIONAL,
    ...
}

BluetoothMeasurementConfiguration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

BluetoothMeasConfigNameList ::= SEQUENCE (SIZE(1..maxnoofBluetoothName)) OF BluetoothName

BluetoothMeasConfig ::= ENUMERATED {setup, ...}

BluetoothName ::= OCTET STRING (SIZE (1..248))

BPLMN-ID-Info-EUTRA ::= SEQUENCE (SIZE(1..maxnoofEUTRABPLMNs)) OF BPLMN-ID-Info-EUTRA-Item

BPLMN-ID-Info-EUTRA-Item ::= SEQUENCE {
    broadcastPLMNs          BroadcastEUTRAPLMNs,
    tac                    TAC,
    e-utraCI               E-UTRA-Cell-Identity,
    ranac                  RANAC OPTIONAL,
    iE-Extension           ProtocolExtensionContainer { {BPLMN-ID-Info-EUTRA-Item-ExtIEs} } OPTIONAL,
    ...
}

BPLMN-ID-Info-EUTRA-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

BPLMN-ID-Info-NR ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF BPLMN-ID-Info-NR-Item

BPLMN-ID-Info-NR-Item ::= SEQUENCE {
    broadcastPLMNs          BroadcastPLMNs,
    tac                    TAC,
    nr-CI                  NR-Cell-Identity,
    ranac                  RANAC OPTIONAL,
    iE-Extension           ProtocolExtensionContainer { {BPLMN-ID-Info-NR-Item-ExtIEs} } OPTIONAL,
    ...
}

BPLMN-ID-Info-NR-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-ConfiguredTACIndication    CRITICALITY ignore  EXTENSION ConfiguredTACIndication    PRESENCE optional }|
    { ID id-NPN-Broadcast-Information  CRITICALITY reject  EXTENSION NPN-Broadcast-Information  PRESENCE optional },
    ...
}

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

BroadcastCAG-Identifier-List ::= SEQUENCE (SIZE(1..maxnoofCAGs)) OF BroadcastCAG-Identifier-Item

```

```

BroadcastCAG-Identifier-Item ::= SEQUENCE {
    cag-Identifier          CAG-Identifier,
    iE-Extension           ProtocolExtensionContainer { {BroadcastCAG-Identifier-Item-ExtIEs} } OPTIONAL,
    ...
}

BroadcastCAG-Identifier-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

BroadcastNID-List ::= SEQUENCE (SIZE(1..maxnoofNIDs)) OF BroadcastNID-Item

BroadcastNID-Item ::= SEQUENCE {
    nid                    NID,
    iE-Extension           ProtocolExtensionContainer { {BroadcastNID-Item-ExtIEs} } OPTIONAL,
    ...
}

BroadcastNID-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

BroadcastPLMNs ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF PLMN-Identity

BroadcastEUTRABPLMNs ::= SEQUENCE (SIZE(1..maxnoofEUTRABPLMNs)) OF PLMN-Identity

BroadcastPLMNinTAISupport-Item ::= SEQUENCE {
    plmn-id                PLMN-Identity,
    tAISliceSupport-List   SliceSupport-List,
    iE-Extension           ProtocolExtensionContainer { {BroadcastPLMNinTAISupport-Item-ExtIEs} } OPTIONAL,
    ...
}

BroadcastPLMNinTAISupport-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-NPN-Support          CRITICALITY reject EXTENSION NPN-Support          PRESENCE optional} |
    { ID id-ExtendedTAISliceSupportList CRITICALITY reject EXTENSION ExtendedSliceSupportList PRESENCE optional},
    ...
}

BroadcastPNI-NPN-ID-Information ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF BroadcastPNI-NPN-ID-Information-Item

BroadcastPNI-NPN-ID-Information-Item ::= SEQUENCE {
    plmn-id                PLMN-Identity,
    broadcastCAG-Identifier-List BroadcastCAG-Identifier-List,
    iE-Extension           ProtocolExtensionContainer { {BroadcastPNI-NPN-ID-Information-Item-ExtIEs} } OPTIONAL,
    ...
}

BroadcastPNI-NPN-ID-Information-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

}

BroadcastSNPNID-List ::= SEQUENCE (SIZE(1..maxnoofSNPNIDs)) OF BroadcastSNPNID

```

BroadcastSNPNID ::= SEQUENCE {
    plmn-id                PLMN-Identity,
    broadcastNID-List      BroadcastNID-List,
    iE-Extension           ProtocolExtensionContainer { {BroadcastSNPNID-ExtIEs} } OPTIONAL,
    ...
}

```

```

BroadcastSNPNID-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

-- C

CAG-Identifier ::= BIT STRING (SIZE (32))

CapacityValue ::= INTEGER (0..100)

```

CapacityValueInfo ::= SEQUENCE {
    capacityValue          CapacityValue,
    ssbAreaCapacityValueList SSBAreaCapacityValue-List OPTIONAL,
    iE-Extension           ProtocolExtensionContainer { {CapacityValueInfo-ExtIEs} } OPTIONAL,
    ...
}

```

```

CapacityValueInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

Cause ::= CHOICE {
    radioNetwork          CauseRadioNetworkLayer,
    transport             CauseTransportLayer,
    protocol              CauseProtocol,
    misc                 CauseMisc,
    choice-extension      ProtocolIE-Single-Container { {Cause-ExtIEs} }
}

```

```

Cause-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

```

```

CauseRadioNetworkLayer ::= ENUMERATED {
    cell-not-available,
}

```

handover-desirable-for-radio-reasons,
handover-target-not-allowed,
invalid-AMF-Set-ID,
no-radio-resources-available-in-target-cell,
partial-handover,
reduce-load-in-serving-cell,
resource-optimisation-handover,
time-critical-handover,
tXnRELOCoverall-expiry,
tXnRELOCprep-expiry,
unknown-GUAMI-ID,
unknown-local-NG-RAN-node-UE-XnAP-ID,
inconsistent-remote-NG-RAN-node-UE-XnAP-ID,
encryption-and-or-integrity-protection-algorithms-not-supported,
protection-algorithms-not-supported,
multiple-PDU-session-ID-instances,
unknown-PDU-session-ID,
unknown-QoS-Flow-ID,
multiple-QoS-Flow-ID-instances,
switch-off-ongoing,
not-supported-5QI-value,
tXnDCoverall-expiry,
tXnDCprep-expiry,
action-desirable-for-radio-reasons,
reduce-load,
resource-optimisation,
time-critical-action,
target-not-allowed,
no-radio-resources-available,
invalid-QoS-combination,
encryption-algorithms-not-supported,
procedure-cancelled,
rRM-purpose,
improve-user-bit-rate,
user-inactivity,
radio-connection-with-UE-lost,
failure-in-the-radio-interface-procedure,
bearer-option-not-supported,
up-integrity-protection-not-possible,
up-confidentiality-protection-not-possible,
resources-not-available-for-the-slice-s,
ue-max-IP-data-rate-reason,
cP-integrity-protection-failure,
uP-integrity-protection-failure,
slice-not-supported-by-NG-RAN,
mN-Mobility,
sN-Mobility,
count-reaches-max-value,
unknown-old-NG-RAN-node-UE-XnAP-ID,
pDCP-Overload,
drb-id-not-available,
unspecified,
...,
ue-context-id-not-known,

```

    non-relocation-of-context,
    cho-cpc-resources-tobechanged,
    rSN-not-available-for-the-UP,
    npn-access-denied,
    report-characteristics-empty,
    existing-measurement-ID,
    measurement-temporarily-not-available,
    measurement-not-supported-for-the-object,
    ue-power-saving,
    unknown-NG-RAN-node2-Measurement-ID,
    insufficient-ue-capabilities,
    normal-release,
    value-out-of-allowed-range
}

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

CauseProtocol ::= ENUMERATED {
    transfer-syntax-error,
    abstract-syntax-error-reject,
    abstract-syntax-error-ignore-and-notify,
    message-not-compatible-with-receiver-state,
    semantic-error,
    abstract-syntax-error-falsely-constructed-message,
    unspecified,
    ...
}

CauseMisc ::= ENUMERATED {
    control-processing-overload,
    hardware-failure,
    o-and-M-intervention,
    not-enough-user-plane-processing-resources,
    unspecified,
    ...
}

CellAssistanceInfo-NR ::= CHOICE {
    limitedNR-List          SEQUENCE (SIZE(1..maxnoofCellsinNG-RANnode)) OF NR-CGI,
    full-List              ENUMERATED {all-served-cells-NR, ...},
    choice-extension       ProtocolIE-Single-Container { {CellAssistanceInfo-NR-ExtIEs} }
}

CellAssistanceInfo-NR-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

CellAndCapacityAssistanceInfo-NR ::= SEQUENCE {
    maximumCellListSize      MaximumCellListSize                OPTIONAL,
    cellAssistanceInfo-NR    CellAssistanceInfo-NR              OPTIONAL,
}

```

```

    iE-Extensions          ProtocolExtensionContainer { { CellAndCapacityAssistanceInfo-NR-ExtIEs } } OPTIONAL,
    ...
}

CellAndCapacityAssistanceInfo-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CellAndCapacityAssistanceInfo-EUTRA ::= SEQUENCE {
    maximumCellListSize      MaximumCellListSize                OPTIONAL,
    cellAssistanceInfo-EUTRA CellAssistanceInfo-EUTRA          OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { { CellAndCapacityAssistanceInfo-EUTRA-ExtIEs } } OPTIONAL,
    ...
}

CellAndCapacityAssistanceInfo-EUTRA-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CellAssistanceInfo-EUTRA ::= CHOICE {
    limitedEUTRA-List        SEQUENCE (SIZE(1..maxnoofCellsInNG-RANnode)) OF E-UTRA-CGI,
    full-List                ENUMERATED {all-served-cells-E-UTRA, ...},
    choice-extension         ProtocolIE-Single-Container { {CellAssistanceInfo-EUTRA-ExtIEs} }
}

CellAssistanceInfo-EUTRA-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

CellBasedMDT-NR ::= SEQUENCE {
    cellIdListforMDT-NR CellIdListforMDT-NR,
    iE-Extensions       ProtocolExtensionContainer { {CellBasedMDT-NR-ExtIEs} } OPTIONAL,
    ...
}

CellBasedMDT-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CellIdListforMDT-NR ::= SEQUENCE (SIZE(1..maxnoofCellIDforMDT)) OF NR-CGI

CellBasedMDT-EUTRA ::= SEQUENCE {
    cellIdListforMDT-EUTRA CellIdListforMDT-EUTRA,
    iE-Extensions         ProtocolExtensionContainer { {CellBasedMDT-EUTRA-ExtIEs} } OPTIONAL,
    ...
}

CellBasedMDT-EUTRA-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CellIdListforMDT-EUTRA ::= SEQUENCE (SIZE(1..maxnoofCellIDforMDT)) OF E-UTRA-CGI

```

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

CellGroupID ::= INTEGER (0..maxnoofSCellGroups)

CellMeasurementResult ::= SEQUENCE (SIZE(1..maxnoofCellsinNG-RANnode)) OF CellMeasurementResult-Item

```
CellMeasurementResult-Item ::= SEQUENCE {
  cell-ID                GlobalNG-RANCell-ID,
  radioResourceStatus    RadioResourceStatus          OPTIONAL,
  tNLCapacityIndicator   TNLCapacityIndicator          OPTIONAL,
  compositeAvailableCapacityGroup CompositeAvailableCapacityGroup OPTIONAL,
  sliceAvailableCapacity SliceAvailableCapacity        OPTIONAL,
  numberOfActiveUEs      NumberOfActiveUEs            OPTIONAL,
  rRCConnections         RRCConnections              OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { { CellMeasurementResult-Item-ExtIEs} } OPTIONAL,
  ...
}
```

```
CellMeasurementResult-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}
```

CellToReport ::= SEQUENCE (SIZE(1..maxnoofCellsinNG-RANnode)) OF CellToReport-Item

```
CellToReport-Item ::= SEQUENCE {
  cell-ID                GlobalNG-RANCell-ID,
  sSBToReport-List       SSBToReport-List          OPTIONAL,
  sliceToReport-List     SliceToReport-List        OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { { CellToReport-Item-ExtIEs} } OPTIONAL,
  ...
}
```

```
CellToReport-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}
```

```
Cell-Type-Choice ::= CHOICE {
  ng-ran-e-utra      E-UTRA-Cell-Identity,
  ng-ran-nr          NR-Cell-Identity,
  e-utran            E-UTRA-Cell-Identity,
  choice-extension   ProtocolIE-Single-Container { { Cell-Type-Choice-ExtIEs} }
}
```

```
Cell-Type-Choice-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}
```



```

CompositeAvailableCapacityGroup ::= SEQUENCE {
    compositeAvailableCapacityDownlink    CompositeAvailableCapacity,
    compositeAvailableCapacityUplink      CompositeAvailableCapacity,
    iE-Extensions                          ProtocolExtensionContainer { { CompositeAvailableCapacityGroup-ExtIEs} } OPTIONAL,
    ...
}

CompositeAvailableCapacityGroup-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CompositeAvailableCapacity ::= SEQUENCE {
    cellCapacityClassValue    CellCapacityClassValue                OPTIONAL,
    capacityValueInfo         CapacityValueInfo, -- this IE represents the IE "CapacityValue" in 9.2.2.a, it's used to distinguish the
"CapacityValue" in 9.2.2.c
    iE-Extensions             ProtocolExtensionContainer { { CompositeAvailableCapacity-ExtIEs} } OPTIONAL,
    ...
}

CompositeAvailableCapacity-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CHO-MRDC-EarlyDataForwarding ::= ENUMERATED {stop, ...}

CHO-MRDC-Indicator ::= ENUMERATED {true, ...}

CHOtrigger ::= ENUMERATED {
    cho-initiation,
    cho-replace,
    ...
}

CHOinformation-Req ::= SEQUENCE {
    cho-trigger                CHOtrigger,
    targetNG-RANnodeUEXnAPID  NG-RANnodeUEXnAPID                OPTIONAL
    -- This IE shall be present if the cho-trigger IE is present and set to "CHO-replace" --,
    CHO-EstimatedArrivalProbability CHO-Probability                OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { { CHOinformation-Req-ExtIEs} } OPTIONAL,
    ...
}

CHOinformation-Req-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CHOinformation-Ack ::= SEQUENCE {
    requestedTargetCellGlobalID  Target-CGI,
    maxCHOoperations              MaxCHOpreparations                OPTIONAL,
    iE-Extensions                 ProtocolExtensionContainer { { CHOinformation-Ack-ExtIEs} } OPTIONAL,
}

```

```
    ...
  }
CHOinformation-Ack-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

CHO-Probability ::= INTEGER (1..100)

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

Connectivity-Support ::= SEQUENCE {
  eNDC-Support      ENUMERATED {supported, not-supported, ...},
  iE-Extensions     ProtocolExtensionContainer { {Connectivity-Support-ExtIEs} } OPTIONAL,
  ...
}

Connectivity-Support-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

COUNT-PDCP-SN12 ::= SEQUENCE {
  pdcp-SN12          INTEGER (0..4095),
  hfn-PDCP-SN12     INTEGER (0..1048575),
  iE-Extensions     ProtocolExtensionContainer { {COUNT-PDCP-SN12-ExtIEs} } OPTIONAL,
  ...
}

COUNT-PDCP-SN12-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

COUNT-PDCP-SN18 ::= SEQUENCE {
  pdcp-SN18          INTEGER (0..262143),
  hfn-PDCP-SN18     INTEGER (0..16383),
  iE-Extensions     ProtocolExtensionContainer { {COUNT-PDCP-SN18-ExtIEs} } OPTIONAL,
  ...
}

COUNT-PDCP-SN18-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

CPTransportLayerInformation ::= CHOICE {
  endpointIPAddress      TransportLayerAddress,
```

```

    choice-extension          ProtocolIE-Single-Container { {CPTransportLayerInformation-ExtIEs} }
}

CPTransportLayerInformation-ExtIEs XNAP-PROTOCOL-IES ::= {
    { ID id-EndpointIPAddressAndPort          CRITICALITY reject TYPE EndpointIPAddressAndPort PRESENCE mandatory},
    ...
}

CriticalityDiagnostics ::= SEQUENCE {
    procedureCode              ProcedureCode              OPTIONAL,
    triggeringMessage          TriggeringMessage          OPTIONAL,
    procedureCriticality        Criticality                OPTIONAL,
    iEsCriticalityDiagnostics  CriticalityDiagnostics-IE-List OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { {CriticalityDiagnostics-ExtIEs} } OPTIONAL,
    ...
}

CriticalityDiagnostics-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1..maxNrOfErrors)) OF
SEQUENCE {
    iECriticality              Criticality,
    iE-ID                      ProtocolIE-ID,
    typeOfError                TypeOfError,
    iE-Extensions              ProtocolExtensionContainer { {CriticalityDiagnostics-IE-List-ExtIEs} } OPTIONAL,
    ...
}

CriticalityDiagnostics-IE-List-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

C-RNTI ::= BIT STRING (SIZE(16))

CyclicPrefix-E-UTRA-DL ::= ENUMERATED {
    normal,
    extended,
    ...
}

CyclicPrefix-E-UTRA-UL ::= ENUMERATED {
    normal,
    extended,
    ...
}

CSI-RSTransmissionIndication ::= ENUMERATED {
    activated,

```

```

    deactivated,
    ...
}

-- D

XnUAddressInfoperPDUSession-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF XnUAddressInfoperPDUSession-Item

XnUAddressInfoperPDUSession-Item ::= SEQUENCE {
    pduSession-ID          PDUSession-ID,
    dataForwardingInfoFromTargetNGRANnode      DataForwardingInfoFromTargetNGRANnode      OPTIONAL,
    pduSessionResourceSetupCompleteInfo-SNterm      PDUSessionResourceBearerSetupCompleteInfo-SNterminated      OPTIONAL,
    iE-Extension          ProtocolExtensionContainer { { XnUAddressInfoperPDUSession-Item-ExtIEs } }      OPTIONAL,
    ...
}

XnUAddressInfoperPDUSession-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
{ ID id-SecondarydataForwardingInfoFromTarget-List      CRITICALITY ignore      EXTENSION SecondarydataForwardingInfoFromTarget-List      PRESENCE optional } |
{ ID id-DRB-IDs-takenintouse          CRITICALITY reject      EXTENSION DRB-List          PRESENCE optional } |
{ ID id-dataForwardingInfoFromTargetE-UTRANnode      CRITICALITY ignore      EXTENSION DataForwardingInfoFromTargetE-UTRANnode      PRESENCE optional },
    ...
}

DataForwardingAccepted ::= ENUMERATED {data-forwarding-accepted, ...}

DataForwardingInfoFromTargetE-UTRANnode ::= SEQUENCE {
    dataForwardingInfoFromTargetE-UTRANnode-List      DataForwardingInfoFromTargetE-UTRANnode-List,
    iE-Extension          ProtocolExtensionContainer { { DataForwardingInfoFromTargetE-UTRANnode-ExtIEs } }      OPTIONAL,
    ...
}

DataForwardingInfoFromTargetE-UTRANnode-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DataForwardingInfoFromTargetE-UTRANnode-List ::= SEQUENCE (SIZE(1.. maxnoofDataForwardingTunneltoE-UTRAN)) OF DataForwardingInfoFromTargetE-UTRANnode-Item

DataForwardingInfoFromTargetE-UTRANnode-Item ::= SEQUENCE {
    dlForwardingUPTNLInformation      UPTransportLayerInformation,
    qosFlowsToBeForwarded-List      QoSFlowsToBeForwarded-List,
    iE-Extension          ProtocolExtensionContainer { { DataForwardingInfoFromTargetE-UTRANnode-Item-ExtIEs } }      OPTIONAL,
    ...
}

DataForwardingInfoFromTargetE-UTRANnode-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSFlowsToBeForwarded-List ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsToBeForwarded-Item
QoSFlowsToBeForwarded-Item ::= SEQUENCE {
    qosFlowIdentifier          QoSFlowIdentifier,

```

```

    iE-Extension      ProtocolExtensionContainer { { QoSFlowsToBeForwarded-Item-ExtIEs } } OPTIONAL,
    ...
}

QoSFlowsToBeForwarded-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DataForwardingInfoFromTargetNGRANnode ::= SEQUENCE {
    qosFlowsAcceptedForDataForwarding-List      QoSFlowsAcceptedToBeForwarded-List,
    pduSessionLevelDLDataForwardingInfo        UPTransportLayerInformation                OPTIONAL,
    pduSessionLevelULDataForwardingInfo        UPTransportLayerInformation                OPTIONAL,
    dataForwardingResponseDRBItemList          DataForwardingResponseDRBItemList          OPTIONAL,
    iE-Extension      ProtocolExtensionContainer { {DataForwardingInfoFromTargetNGRANnode-ExtIEs} } OPTIONAL,
    ...
}

DataForwardingInfoFromTargetNGRANnode-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSFlowsAcceptedToBeForwarded-List ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoSFlowsAcceptedToBeForwarded-Item

QoSFlowsAcceptedToBeForwarded-Item ::= SEQUENCE {
    qosFlowIdentifier      QoSFlowIdentifier,
    iE-Extension           ProtocolExtensionContainer { {QoSFlowsAcceptedToBeForwarded-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsAcceptedToBeForwarded-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DataforwardingandOffloadingInfofromSource ::= SEQUENCE {
    qosFlowsToBeForwarded      QoSFlowsToBeForwarded-List,
    sourceDRBtoQoSFlowMapping  DRBtoQoSFlowMapping-List                OPTIONAL,
    iE-Extension               ProtocolExtensionContainer { {DataforwardingandOffloadingInfofromSource-ExtIEs} } OPTIONAL,
    ...
}

DataforwardingandOffloadingInfofromSource-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSFlowsToBeForwarded-List ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoSFlowsToBeForwarded-Item

QoSFlowsToBeForwarded-Item ::= SEQUENCE {
    qosFlowIdentifier      QoSFlowIdentifier,
    dl-dataforwarding      DLForwarding,
    ul-dataforwarding      ULForwarding,
    iE-Extension           ProtocolExtensionContainer { {QoSFlowsToBeForwarded-Item-ExtIEs} } OPTIONAL,

```

```

}
...
}
QoSFlowsToBeForwarded-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
{ ID id-ULForwardingProposal          CRITICALITY ignore EXTENSION ULForwardingProposal  PRESENCE optional }|
{ ID id-SourceDLForwardingIPAddress   CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional }|
{ ID id-SourceNodeDLForwardingIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress  PRESENCE optional },
...
}

DataForwardingResponseDRBItemList ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DataForwardingResponseDRBItem

DataForwardingResponseDRBItem ::= SEQUENCE {
  drb-ID          DRB-ID,
  dlForwardingUPTNL  UPTransportLayerInformation          OPTIONAL,
  ulForwardingUPTNL  UPTransportLayerInformation          OPTIONAL,
  iE-Extension      ProtocolExtensionContainer { {DataForwardingResponseDRBItem-ExtIEs} } OPTIONAL,
  ...
}

DataForwardingResponseDRBItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

DataTrafficResources ::= BIT STRING (SIZE(6..17600))

DataTrafficResourceIndication ::= SEQUENCE {
  activationSFN          ActivationSFN,
  sharedResourceType     SharedResourceType,
  reservedSubframePattern ReservedSubframePattern          OPTIONAL,
  iE-Extension          ProtocolExtensionContainer { {DataTrafficResourceIndication-ExtIEs} } OPTIONAL,
  ...
}

DataTrafficResourceIndication-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

DAPSRequestInfo ::= SEQUENCE {
  dapsIndicator          ENUMERATED {daps-HO-required, ...},
  iE-Extensions          ProtocolExtensionContainer { {DAPSRequestInfo-ExtIEs} } OPTIONAL,
  ...
}

DAPSRequestInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

```

```
DAPSResponseInfo-List ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DAPSResponseInfo-Item

DAPSResponseInfo-Item ::= SEQUENCE {
    drbID                DRB-ID,
    dapsResponseIndicator  ENUMERATED {daps-HO-accepted, daps-HO-not-accepted, ...},
    iE-Extensions        ProtocolExtensionContainer { {DAPSResponseInfo-Item-ExtIEs} } OPTIONAL,
    ...
}

DAPSResponseInfo-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DeliveryStatus ::= INTEGER (0..4095, ...)

DesiredActNotificationLevel ::= ENUMERATED {none, qos-flow, pdu-session, ue-level, ...}

DefaultDRB-Allowed ::= ENUMERATED {true, false, ...}

DirectForwardingPathAvailability ::= ENUMERATED {direct-path-available, ...}

DLCountChoice ::= CHOICE {
    count12bits          COUNT-PDCP-SN12,
    count18bits          COUNT-PDCP-SN18,
    choice-extension     ProtocolIE-Single-Container { {DLCountChoice-ExtIEs} }
}

DLCountChoice-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

DLForwarding ::= ENUMERATED {dl-forwarding-proposed, ...}

DL-GBR-PRB-usage ::= INTEGER (0..100)

DL-non-GBR-PRB-usage ::= INTEGER (0..100)

DL-Total-PRB-usage ::= INTEGER (0..100)

DRB-ID ::= INTEGER (1..32, ...)

DRB-List ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DRB-ID

DRB-List-withCause ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DRB-List-withCause-Item
```

```

DRB-List-withCause-Item ::= SEQUENCE {
    drb-id      DRB-ID,
    cause      Cause,
    rLC-Mode   RLCMode OPTIONAL,
    iE-Extension ProtocolExtensionContainer { {DRB-List-withCause-Item-ExtIEs} } OPTIONAL,
    ...
}

DRB-List-withCause-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Number ::= INTEGER (1..32, ...)

DRBsSubjectToDLDiscarding-List ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DRBsSubjectToDLDiscarding-Item

DRBsSubjectToDLDiscarding-Item ::= SEQUENCE {
    drbID      DRB-ID,
    dlCount    DLCountChoice,
    iE-Extension ProtocolExtensionContainer { { DRBsSubjectToDLDiscarding-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsSubjectToDLDiscarding-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBsSubjectToEarlyStatusTransfer-List ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DRBsSubjectToEarlyStatusTransfer-Item

DRBsSubjectToEarlyStatusTransfer-Item ::= SEQUENCE {
    drbID      DRB-ID,
    dlCount    DLCountChoice,
    iE-Extension ProtocolExtensionContainer { { DRBsSubjectToEarlyStatusTransfer-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsSubjectToEarlyStatusTransfer-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBsSubjectToStatusTransfer-List ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DRBsSubjectToStatusTransfer-Item

DRBsSubjectToStatusTransfer-Item ::= SEQUENCE {
    drbID      DRB-ID,
    pdcpStatusTransfer-UL DRBBStatusTransferChoice,
    pdcpStatusTransfer-DL DRBBStatusTransferChoice,
    iE-Extension ProtocolExtensionContainer { {DRBsSubjectToStatusTransfer-Item-ExtIEs} } OPTIONAL,
    ...
}

```



```

DRBSubjectToStatusTransfer-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-OldQoSFlowMap-ULendmarkerexpected CRITICALITY reject EXTENSION QoSFlows-List PRESENCE optional },
  ...
}

DRBBStatusTransferChoice ::= CHOICE {
  pdcp-sn-12bits DRBBStatusTransfer12bitsSN,
  pdcp-sn-18bits DRBBStatusTransfer18bitsSN,
  choice-extension ProtocolIE-Single-Container { {DRBBStatusTransferChoice-ExtIEs} }
}

DRBBStatusTransferChoice-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

DRBBStatusTransfer12bitsSN ::= SEQUENCE {
  receiveStatusofPDCPSDU BIT STRING (SIZE(1..2048)) OPTIONAL,
  COUNTValue COUNT-PDCP-SN12,
  iE-Extension ProtocolExtensionContainer { {DRBBStatusTransfer12bitsSN-ExtIEs} } OPTIONAL,
  ...
}

DRBBStatusTransfer12bitsSN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

DRBBStatusTransfer18bitsSN ::= SEQUENCE {
  receiveStatusofPDCPSDU BIT STRING (SIZE(1..131072)) OPTIONAL,
  COUNTValue COUNT-PDCP-SN18,
  iE-Extension ProtocolExtensionContainer { {DRBBStatusTransfer18bitsSN-ExtIEs} } OPTIONAL,
  ...
}

DRBBStatusTransfer18bitsSN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

DRBToQoSFlowMapping-List ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DRBToQoSFlowMapping-Item

DRBToQoSFlowMapping-Item ::= SEQUENCE {
  drb-ID DRB-ID,
  qosFlows-List QoSFlows-List,
  rLC-Mode RLCMode OPTIONAL,
  iE-Extension ProtocolExtensionContainer { {DRBToQoSFlowMapping-Item-ExtIEs} } OPTIONAL,
  ...
}

DRBToQoSFlowMapping-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-DAPSRequestInfo CRITICALITY ignore EXTENSION DAPSRequestInfo PRESENCE optional },

```

```

}
...
}

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

Dynamic5QIDescriptor ::= SEQUENCE {
    priorityLevelQoS          PriorityLevelQoS,
    packetDelayBudget        PacketDelayBudget,
    packetErrorRate          PacketErrorRate,
    fiveQI                    FiveQI                                OPTIONAL,
    delayCritical             ENUMERATED {delay-critical, non-delay-critical, ...} OPTIONAL,
-- This IE shall be present if the GBR QoS Flow Information IE is present in the QoS Flow Level QoS Parameters IE.
    averagingWindow          AveragingWindow                        OPTIONAL,
-- This IE shall be present if the GBR QoS Flow Information IE is present in the QoS Flow Level QoS Parameters IE.
    maximumDataBurstVolume   MaximumDataBurstVolume                OPTIONAL,
    iE-Extension              ProtocolExtensionContainer { {Dynamic5QIDescriptor-ExtIEs } } OPTIONAL,
    ...
}

Dynamic5QIDescriptor-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-ExtendedPacketDelayBudget          CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional} |
    { ID id-CNPacketDelayBudgetDownlink        CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional} |
    { ID id-CNPacketDelayBudgetUplink          CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional},
    ...
}

-- E

E-RAB-ID ::= INTEGER (0..15, ...)

E-UTRAARFCN ::= INTEGER (0..maxEARFCN)

E-UTRA-Cell-Identity ::= BIT STRING (SIZE(28))

E-UTRA-CGI ::= SEQUENCE {
    plmn-id          PLMN-Identity,
    e-utra-CI        E-UTRA-Cell-Identity,
    iE-Extension      ProtocolExtensionContainer { {E-UTRA-CGI-ExtIEs} } OPTIONAL,
    ...
}

E-UTRA-CGI-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-UTRAFrequencyBandIndicator ::= INTEGER (1..256, ...)

```

```

E-UTRAMultibandInfoList ::= SEQUENCE (SIZE(1..maxnoofEUTRABands)) OF E-UTRAFrequencyBandIndicator

E-UTRAPCI ::= INTEGER (0..503, ...)

E-UTRAPRACHConfiguration ::= SEQUENCE {
    rootSequenceIndex          INTEGER (0..837),
    zeroCorrelationIndex       INTEGER (0..15),
    highSpeedFlag               ENUMERATED {true, false, ...},
    prach-FreqOffset           INTEGER (0..94),
    prach-ConfigIndex          INTEGER (0..63) OPTIONAL,
-- C-ifTDD: This IE shall be present if the EUTRA-Mode-Info IE in the Served Cell Information IE is set to the value "TDD" --
    iE-Extensions              ProtocolExtensionContainer { {E-UTRAPRACHConfiguration-ExtIEs} } OPTIONAL,
    ...
}

E-UTRAPRACHConfiguration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-UTRATransmissionBandwidth ::= ENUMERATED {bw6, bw15, bw25, bw50, bw75, bw100, ..., bw1}

EndpointIPAddressAndPort ::=SEQUENCE {
    endpointIPAddress          TransportLayerAddress,
    portNumber                 PortNumber,
    iE-Extensions              ProtocolExtensionContainer { { EndpointIPAddressAndPort-ExtIEs} } OPTIONAL
}

EndpointIPAddressAndPort-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

EventTriggered ::= SEQUENCE {
    loggedEventTriggeredConfig LoggedEventTriggeredConfig,
    iE-Extensions              ProtocolExtensionContainer { { EventTriggered-ExtIEs} } OPTIONAL,
    ...
}

EventTriggered-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

EventType ::= ENUMERATED {
    report-upon-change-of-serving-cell,
    report-UE-moving-presence-into-or-out-of-the-Area-of-Interest,
    ...,
    report-upon-change-of-serving-cell-and-Area-of-Interest
}

```

```

EventTypeTrigger ::= CHOICE {
    outOfCoverage          ENUMERATED {true, ...},
    eventL1      EventL1,
    choice-Extensions      ProtocolIE-Single-Container { {EventTypeTrigger-ExtIEs} }
}

EventTypeTrigger-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

EventL1 ::= SEQUENCE {
    l1Threshold          MeasurementThresholdL1LoggedMDT,
    hysteresis           Hysteresis,
    timeToTrigger       TimeToTrigger,
    iE-Extensions       ProtocolExtensionContainer { { EventL1-ExtIEs} } OPTIONAL,
    ...
}

EventL1-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

MeasurementThresholdL1LoggedMDT ::= CHOICE {
    threshold-RSRP      Threshold-RSRP,
    threshold-RSRQ     Threshold-RSRQ,
    ...,
    choice-extension    ProtocolIE-Single-Container { {MeasurementThresholdL1LoggedMDT-ExtIEs} }
}

MeasurementThresholdL1LoggedMDT-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

ExpectedActivityPeriod ::= INTEGER (1..30|40|50|60|80|100|120|150|180|181, ...)

ExpectedHOInterval ::= ENUMERATED {
    sec15, sec30, sec60, sec90, sec120, sec180, long-time,
    ...
}

ExpectedIdlePeriod ::= INTEGER (1..30|40|50|60|80|100|120|150|180|181, ...)

ExpectedUEActivityBehaviour ::= SEQUENCE {
    expectedActivityPeriod      ExpectedActivityPeriod          OPTIONAL,
    expectedIdlePeriod          ExpectedIdlePeriod              OPTIONAL,
    sourceOfUEActivityBehaviourInformation      SourceOfUEActivityBehaviourInformation      OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { {ExpectedUEActivityBehaviour-ExtIEs} } OPTIONAL,
    ...
}

ExpectedUEActivityBehaviour-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

ExpectedUEBehaviour ::= SEQUENCE {
    expectedUEActivityBehaviour    ExpectedUEActivityBehaviour    OPTIONAL,
    expectedHOInterval            ExpectedHOInterval            OPTIONAL,
    expectedUEMobility            ExpectedUEMobility            OPTIONAL,
    expectedUEMovingTrajectory    ExpectedUEMovingTrajectory    OPTIONAL,
    iE-Extensions                ProtocolExtensionContainer { {ExpectedUEBehaviour-ExtIEs} } OPTIONAL,
    ...
}

ExpectedUEBehaviour-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ExpectedUEMobility ::= ENUMERATED {
    stationary,
    mobile,
    ...
}

ExpectedUEMovingTrajectory ::= SEQUENCE (SIZE(1..maxnoofCellsUEMovingTrajectory)) OF ExpectedUEMovingTrajectoryItem

ExpectedUEMovingTrajectoryItem ::= SEQUENCE {
    nGRAN-CGI                    GlobalNG-RANCell-ID,
    timeStayedInCell            INTEGER (0..4095)                OPTIONAL,
    iE-Extensions                ProtocolExtensionContainer { {ExpectedUEMovingTrajectoryItem-ExtIEs} } OPTIONAL,
    ...
}

ExpectedUEMovingTrajectoryItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SourceOfUEActivityBehaviourInformation ::= ENUMERATED {
    subscription-information,
    statistics,
    ...
}

ExtendedRATRestrictionInformation ::= SEQUENCE {
    primaryRATRestriction        BIT STRING (SIZE(8, ...)),
    secondaryRATRestriction      BIT STRING (SIZE(8, ...)),
    iE-Extensions                ProtocolExtensionContainer { {ExtendedRATRestrictionInformation-ExtIEs} } OPTIONAL,
    ...
}

ExtendedRATRestrictionInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ExtendedPacketDelayBudget ::= INTEGER (0..65535, ...)

ExtendedSliceSupportList ::= SEQUENCE (SIZE(1..maxnoofExtSliceItems)) OF S-NSSAI

```

```

ExtendedUEIdentityIndexValue ::= BIT STRING (SIZE(16))

ExtTLAs ::= SEQUENCE (SIZE(1..maxnoofExtTLAs)) OF ExtTLA-Item

ExtTLA-Item ::= SEQUENCE {
    iPsecTLA                               TransportLayerAddress    OPTIONAL,
    gTPTransportLayerAddresses             GTPTLAs                  OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { {ExtTLA-Item-ExtIEs} } OPTIONAL,
    ...
}

ExtTLA-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

GTPTLAs ::= SEQUENCE (SIZE(1.. maxnoofGTPTLAs)) OF GTPTLA-Item

GTPTLA-Item ::= SEQUENCE {
    gTPTransportLayerAddresses             TransportLayerAddress,
    iE-Extensions                          ProtocolExtensionContainer { { GTPTLA-Item-ExtIEs } }    OPTIONAL,
    ...
}

GTPTLA-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- F

FiveGCMobilityRestrictionListContainer ::= OCTET STRING
-- This octets of the OCTET STRING contain the Mobility Restriction List IE as specified in TS 38.413 [5]. --

FiveQI ::= INTEGER (0..255, ...)

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

-- G

GBRQoSFlowInfo ::= SEQUENCE {
    maxFlowBitRateDL                       BitRate,
    maxFlowBitRateUL                       BitRate,
    guaranteedFlowBitRateDL               BitRate,
    guaranteedFlowBitRateUL               BitRate,
    notificationControl                   ENUMERATED {notification-requested, ...}    OPTIONAL,
    maxPacketLossRateDL                   PacketLossRate                            OPTIONAL,
    maxPacketLossRateUL                   PacketLossRate                            OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { {GBRQoSFlowInfo-ExtIEs} }    OPTIONAL,
    ...
}

```

```
GBRQoSFlowInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-AlternativeQoSParaSetList CRITICALITY ignore EXTENSION AlternativeQoSParaSetList PRESENCE optional },
  ...
}

GlobalgNB-ID ::= SEQUENCE {
  plmn-id PLMN-Identity,
  gnb-id GNB-ID-Choice,
  iE-Extensions ProtocolExtensionContainer { {GlobalgNB-ID-ExtIEs} } OPTIONAL,
  ...
}

GlobalgNB-ID-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

GNB-ID-Choice ::= CHOICE {
  gnb-ID BIT STRING (SIZE(22..32)),
  choice-extension ProtocolIE-Single-Container { {GNB-ID-Choice-ExtIEs} }
}

GNB-ID-Choice-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

GNB-RadioResourceStatus ::= SEQUENCE {
  ssbAreaRadioResourceStatus-List SSBAreaRadioResourceStatus-List,
  iE-Extensions ProtocolExtensionContainer { { GNB-RadioResourceStatus-ExtIEs} } OPTIONAL,
  ...
}

GNB-RadioResourceStatus-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

GlobalCell-ID ::= SEQUENCE {
  plmn-id PLMN-Identity,
  cell-type Cell-Type-Choice,
  iE-Extensions ProtocolExtensionContainer { { GlobalCell-ID-ExtIEs} } OPTIONAL,
  ...
}

GlobalCell-ID-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

GlobalgNB-ID ::= SEQUENCE {
  plmn-id PLMN-Identity,
  enb-id ENB-ID-Choice,
  iE-Extensions ProtocolExtensionContainer { {GlobalgNB-ID-ExtIEs} } OPTIONAL,
  ...
}
```

```

}

GlobaleNB-ID-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

ENB-ID-Choice ::= CHOICE {
  enb-ID-macro          BIT STRING (SIZE(20)),
  enb-ID-shortmacro    BIT STRING (SIZE(18)),
  enb-ID-longmacro     BIT STRING (SIZE(21)),
  choice-extension     ProtocolIE-Single-Container { {ENB-ID-Choice-ExtIEs} }
}

ENB-ID-Choice-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

GlobalNG-RANCell-ID ::= SEQUENCE {
  plmn-id              PLMN-Identity,
  ng-RAN-Cell-id      NG-RAN-Cell-Identity,
  iE-Extensions       ProtocolExtensionContainer { {GlobalNG-RANCell-ID-ExtIEs} } OPTIONAL,
  ...
}

GlobalNG-RANCell-ID-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

GlobalNG-RANNode-ID ::= CHOICE {
  gNB                  GlobalgNB-ID,
  ng-eNB               GlobalngeNB-ID,
  choice-extension     ProtocolIE-Single-Container { {GlobalNG-RANNode-ID-ExtIEs} }
}

GlobalNG-RANNode-ID-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

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

GTPtunnelTransportLayerInformation ::= SEQUENCE {
  tnl-address      TransportLayerAddress,
  gtp-teid        GTP-TEID,
  iE-Extensions   ProtocolExtensionContainer { {GTPtunnelTransportLayerInformation-ExtIEs} } OPTIONAL,
  ...
}

GTPtunnelTransportLayerInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  {ID id-QoS-Mapping-Information CRITICALITY reject EXTENSION QoS-Mapping-Information PRESENCE optional},

```



```

}
...
}

GUAMI ::= SEQUENCE {
    plmn-ID                PLMN-Identity,
    amf-region-id          BIT STRING (SIZE (8)),
    amf-set-id             BIT STRING (SIZE (10)),
    amf-pointer            BIT STRING (SIZE (6)),
    iE-Extensions          ProtocolExtensionContainer { {GUAMI-ExtIEs} } OPTIONAL,
    ...
}

GUAMI-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- H

HandoverReportType ::= ENUMERATED {
    hoTooEarly,
    hoToWrongCell,
    intersystempingpong,
    ...
}

Hysteresis ::=
    INTEGER (0..30)

HashedUEIdentityIndexValue ::= BIT STRING (SIZE(13, ...))

-- I

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

ImmediateMDT-NR ::= SEQUENCE {
    measurementsToActivate    MeasurementsToActivate,
    m1Configuration           M1Configuration            OPTIONAL,
    m4Configuration           M4Configuration            OPTIONAL,
    m5Configuration           M5Configuration            OPTIONAL,
    mDT-Location-Info         MDT-Location-Info          OPTIONAL,
    m6Configuration           M6Configuration            OPTIONAL,
    m7Configuration           M7Configuration            OPTIONAL,
    bluetoothMeasurementConfiguration    BluetoothMeasurementConfiguration    OPTIONAL,
    wlanMeasurementConfiguration    WLANMeasurementConfiguration    OPTIONAL,
    sensorMeasurementConfiguration    SensorMeasurementConfiguration    OPTIONAL,
    iE-Extensions             ProtocolExtensionContainer { { ImmediateMDT-NR-ExtIEs} } OPTIONAL,
    ...
}

ImmediateMDT-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```
}

InitiatingCondition-FailureIndication ::= CHOICE {
    rRCReestab          RRCReestab-initiated,
    rRCSetup            RRCSetup-initiated,
    choice-extension    ProtocolIE-Single-Container { {InitiatingCondition-FailureIndication-ExtIEs} }
}

InitiatingCondition-FailureIndication-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

IntendedTDD-DL-ULConfiguration-NR ::= SEQUENCE {
    nrscs                NRSCS,
    nrCyclicPrefix       NRCyclicPrefix,
    nrDL-ULTransmissionPeriodicity NRDL-ULTransmissionPeriodicity,
    slotConfiguration-List SlotConfiguration-List,
    iE-Extensions        ProtocolExtensionContainer { {IntendedTDD-DL-ULConfiguration-NR-ExtIEs} } OPTIONAL,
    ...
}

IntendedTDD-DL-ULConfiguration-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

InterfaceInstanceIndication ::= INTEGER (0..255, ...)

InterfacesToTrace ::= BIT STRING { ng-c (0), x-nc (1), uu (2), fl-c (3), e1 (4) } (SIZE(8))

I-RNTI ::= CHOICE {
    i-RNTI-full          BIT STRING (SIZE(40)),
    i-RNTI-short         BIT STRING (SIZE(24)),
    choice-extension     ProtocolIE-Single-Container { {I-RNTI-ExtIEs} }
}

I-RNTI-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

-- J

-- K

-- L

LastVisitedCell-Item ::= CHOICE {
    nG-RAN-Cell          LastVisitedNGRANCellInformation,
    e-UTRAN-Cell         LastVisitedEUTRANCellInformation,
    uTRAN-Cell           LastVisitedUTRANCellInformation,
}
```

```

    gERAN-Cell                LastVisitedGERANCellInformation,
    choice-extension          ProtocolIE-Single-Container { { LastVisitedCell-Item-ExtIEs } }
}

LastVisitedCell-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
}
...

LastVisitedEUTRANCellInformation ::= OCTET STRING

LastVisitedGERANCellInformation ::= OCTET STRING

LastVisitedNGRANCellInformation ::= OCTET STRING

LastVisitedUTRANCellInformation ::= OCTET STRING

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

Links-to-log ::= ENUMERATED {uplink, downlink, both-uplink-and-downlink, ...}

ListOfCells ::= SEQUENCE (SIZE(1..maxnoofCellsinAoI)) OF CellsinAoI-Item

CellsinAoI-Item ::= SEQUENCE {
    plmn-identity              PLMN-Identity,
    ng-ran-cell-id            NG-RAN-Cell-Identity,
    ie-extensions              ProtocolExtensionContainer { {CellsinAoI-Item-ExtIEs} } OPTIONAL,
    ...
}

CellsinAoI-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
}
...

ListOfRANNodesinAoI ::= SEQUENCE (SIZE(1.. maxnoofRANNodesinAoI)) OF GlobalNG-RANNodesinAoI-Item

GlobalNG-RANNodesinAoI-Item ::= SEQUENCE {
    global-NG-RAN-Node-ID      GlobalNG-RANNode-ID,
    ie-extensions              ProtocolExtensionContainer { {GlobalNG-RANNodesinAoI-Item-ExtIEs} } OPTIONAL,
    ...
}

GlobalNG-RANNodesinAoI-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
}
...

ListOfTAIsinAoI ::= SEQUENCE (SIZE(1..maxnoofTAIsinAoI)) OF TAIsinAoI-Item

TAIsinAoI-Item ::= SEQUENCE {
    plmn-identity              PLMN-Identity,
    tac                       TAC,

```

```

    iE-Extensions      ProtocolExtensionContainer { {TAIsinAoI-Item-ExtIEs} } OPTIONAL,
    ...
}

TAIsinAoI-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

LocationInformationSNReporting ::= ENUMERATED {
    pSCell,
    ...
}

LocationReportingInformation ::= SEQUENCE {
    eventType           EventType,
    reportArea          ReportArea,
    areaOfInterest      AreaOfInterestInformation          OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { {LocationReportingInformation-ExtIEs} } OPTIONAL,
    ...
}

LocationReportingInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-AdditionLocationInformation CRITICALITY ignore EXTENSION AdditionLocationInformation PRESENCE optional},
    ...
}

LoggedEventTriggeredConfig ::= SEQUENCE {
    eventTypeTrigger    EventTypeTrigger,
    iE-Extensions       ProtocolExtensionContainer { { LoggedEventTriggeredConfig-ExtIEs} } OPTIONAL,
    ...
}

LoggedEventTriggeredConfig-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

LoggedMDT-NR ::= SEQUENCE {
    loggingInterval     LoggingInterval,
    loggingDuration     LoggingDuration,
    reportType          ReportType,
    bluetoothMeasurementConfiguration BluetoothMeasurementConfiguration          OPTIONAL,
    wlanMeasurementConfiguration WLANMeasurementConfiguration          OPTIONAL,
    sensorMeasurementConfiguration SensorMeasurementConfiguration          OPTIONAL,
    areaScopeOfNeighCellsList AreaScopeOfNeighCellsList          OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { {LoggedMDT-NR-ExtIEs} } OPTIONAL,
    ...
}

LoggedMDT-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

LoggingInterval ::= ENUMERATED { ms320, ms640, ms1280, ms2560, ms5120, ms10240, ms20480, ms30720, ms40960, ms61440, infinity, ...}

```

```

LoggingDuration ::= ENUMERATED {m10, m20, m40, m60, m90, m120}

LowerLayerPresenceStatusChange ::= ENUMERATED {
    release-lower-layers,
    re-establish-lower-layers,
    ...,
    suspend-lower-layers,
    resume-lower-layers
}

LTEV2XServicesAuthorized ::= SEQUENCE {
    vehicleUE          VehicleUE          OPTIONAL,
    pedestrianUE       PedestrianUE        OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { {LTEV2XServicesAuthorized-ExtIEs} } OPTIONAL,
    ...
}

LTEV2XServicesAuthorized-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

LTEUESidelinkAggregateMaximumBitRate ::= SEQUENCE {
    uESidelinkAggregateMaximumBitRate      BitRate,
    iE-Extensions                          ProtocolExtensionContainer { {LTEUESidelinkAggregateMaximumBitRate-ExtIEs} } OPTIONAL,
    ...
}

LTEUESidelinkAggregateMaximumBitRate-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- M

M1Configuration ::= SEQUENCE {
    mlreportingTrigger      M1ReportingTrigger,
    mlthresholdeventA2      M1ThresholdEventA2          OPTIONAL,
    -- Included in case of event-triggered, or event-triggered periodic reporting for measurement M1
    mlperiodicReporting      M1PeriodicReporting        OPTIONAL,
    -- Included in case of periodic or event-triggered periodic reporting
    iE-Extensions            ProtocolExtensionContainer { { M1Configuration-ExtIEs} } OPTIONAL,
    ...
}

M1Configuration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

M1PeriodicReporting ::= SEQUENCE {
    reportInterval          ReportIntervalMDT,
    reportAmount            ReportAmountMDT,

```

```
    iE-Extensions          ProtocolExtensionContainer { { M1PeriodicReporting-ExtIEs } } OPTIONAL,
    ...
}

M1PeriodicReporting-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    {ID id-ExtendedReportIntervalMDT      CRITICALITY ignore     EXTENSION ExtendedReportIntervalMDT      PRESENCE optional},
    ...
}

M1ReportingTrigger ::= ENUMERATED{
    periodic,
    a2eventtriggered,
    a2eventtriggered-periodic,
    ...
}

M1ThresholdEventA2 ::= SEQUENCE {
    measurementThreshold      MeasurementThresholdA2,
    iE-Extensions            ProtocolExtensionContainer { { M1ThresholdEventA2-ExtIEs } } OPTIONAL,
    ...
}

M1ThresholdEventA2-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

M4Configuration ::= SEQUENCE {
    m4period                  M4period,
    m4-links-to-log          Links-to-log,
    iE-Extensions            ProtocolExtensionContainer { { M4Configuration-ExtIEs } } OPTIONAL,
    ...
}

M4Configuration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

M4period ::= ENUMERATED {ms1024, ms2048, ms5120, ms10240, min1, ... }

M5Configuration ::= SEQUENCE {
    m5period                  M5period,
    m5-links-to-log          Links-to-log,
    iE-Extensions            ProtocolExtensionContainer { { M5Configuration-ExtIEs } } OPTIONAL,
    ...
}

M5Configuration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

M5period ::= ENUMERATED {ms1024, ms2048, ms5120, ms10240, min1, ... }
```

```

M6Configuration ::= SEQUENCE {
    m6report-Interval    M6report-Interval,
    m6-links-to-log      Links-to-log,
    iE-Extensions        ProtocolExtensionContainer { { M6Configuration-ExtIEs } } OPTIONAL,
    ...
}

M6Configuration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

M6report-Interval ::= ENUMERATED { ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1, min6, min12, min30,... }

M7Configuration ::= SEQUENCE {
    m7period             M7period,
    m7-links-to-log      Links-to-log,
    iE-Extensions        ProtocolExtensionContainer { { M7Configuration-ExtIEs } } OPTIONAL,
    ...
}

M7Configuration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

M7period ::= INTEGER(1..60, ...)

MAC-I ::= BIT STRING (SIZE(16))

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

MaxCHOPreparations ::= INTEGER (1..8, ...)

MaximumDataBurstVolume ::= INTEGER (0..4095, ..., 4096.. 2000000)

MaximumIPDatarate ::= SEQUENCE {
    maxIPrate-UL         MaxIPrate,
    iE-Extensions        ProtocolExtensionContainer { {MaximumIPDatarate-ExtIEs} } OPTIONAL,
    ...
}

MaximumIPDatarate-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-MaxIPrate-DL    CRITICALITY ignore EXTENSION MaxIPrate PRESENCE optional},
    ...
}

MaxIPrate ::= ENUMERATED {
    bitrate64kbs,

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```

    max-UErate,
    ...
}

MBSFNControlRegionLength ::= INTEGER (0..3)

MBSFNSubframeAllocation-E-UTRA ::= CHOICE {
    oneframe          BIT STRING (SIZE(6)),
    fourframes       BIT STRING (SIZE(24)),
    choice-extension ProtocolIE-Single-Container { {MBSFNSubframeAllocation-E-UTRA-ExtIEs} }
}

MBSFNSubframeAllocation-E-UTRA-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

MBSFNSubframeInfo-E-UTRA ::= SEQUENCE (SIZE(1..maxnoofMBSFNEUTRA)) OF MBSFNSubframeInfo-E-UTRA-Item

MBSFNSubframeInfo-E-UTRA-Item ::= SEQUENCE {
    radioframeAllocationPeriod    ENUMERATED{n1,n2,n4,n8,n16,n32,...},
    radioframeAllocationOffset    INTEGER (0..7, ...),
    subframeAllocation            MBSFNSubframeAllocation-E-UTRA,
    iE-Extensions                ProtocolExtensionContainer { {MBSFNSubframeInfo-E-UTRA-Item-ExtIEs} } OPTIONAL,
    ...
}

MBSFNSubframeInfo-E-UTRA-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

MDT-Activation ::= ENUMERATED {
    immediate-MDT-only,
    immediate-MDT-and-Trace,
    logged-MDT-only,
    ...
}

MDT-Configuration ::= SEQUENCE {
    mDT-Configuration-NR          MDT-Configuration-NR          OPTIONAL,
    mDT-Configuration-EUTRA      MDT-Configuration-EUTRA      OPTIONAL,
    iE-Extensions                ProtocolExtensionContainer { { MDT-Configuration-ExtIEs} } OPTIONAL,
    ...
}

MDT-Configuration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

MDT-Configuration-NR ::= SEQUENCE {
    mdt-Activation                MDT-Activation,
    areaScopeOfMDT-NR            AreaScopeOfMDT-NR    OPTIONAL,

```



```

    mDTMode-NR                MDTMode-NR,
    signallingBasedMDTPLMNList MDTPLMNList OPTIONAL,
    iE-Extensions             ProtocolExtensionContainer { { MDT-Configuration-NR-ExtIEs } } OPTIONAL,
    ...
}
MDT-Configuration-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

MDT-Configuration-EUTRA ::= SEQUENCE {
    mdt-Activation                MDT-Activation,
    areaScopeOfMDT-EUTRA         AreaScopeOfMDT-EUTRA OPTIONAL,
    mDTMode-EUTRA                MDTMode-EUTRA,
    signallingBasedMDTPLMNList   MDTPLMNList,
    iE-Extensions                ProtocolExtensionContainer { { MDT-Configuration-EUTRA-ExtIEs } } OPTIONAL,
    ...
}
MDT-Configuration-EUTRA-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

MDT-Location-Info ::= BIT STRING (SIZE (8))

MDTPLMNList ::= SEQUENCE (SIZE(1..maxnoofMDTPLMNs)) OF PLMN-Identity

MDTMode-NR ::= CHOICE {
    immediateMDT                ImmediateMDT-NR,
    loggedMDT                    LoggedMDT-NR,
    ...,
    mDTMode-NR-Extension        MDTMode-NR-Extension
}

MDTMode-NR-Extension ::= ProtocolIE-Single-Container {{ MDTMode-NR-ExtensionIE }}

MDTMode-NR-ExtensionIE XNAP-PROTOCOL-IES ::= {
    ...
}

MDTMode-EUTRA ::= OCTET STRING

MeasurementsToActivate ::= BIT STRING (SIZE (8))

MeasurementThresholdA2 ::= CHOICE {
    threshold-RSRP                Threshold-RSRP,
    threshold-RSRQ                Threshold-RSRQ,
    threshold-SINR                Threshold-SINR,
    choice-extension              ProtocolIE-Single-Container { { MeasurementThresholdA2-ExtIEs } }
}

MeasurementThresholdA2-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

```

```

}

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

MobilityInformation ::= BIT STRING (SIZE(32))

MobilityParametersModificationRange ::= SEQUENCE {
    handoverTriggerChangeLowerLimit    INTEGER (-20..20),
    handoverTriggerChangeUpperLimit    INTEGER (-20..20),
    ...
}

MobilityParametersInformation ::= SEQUENCE {
    handoverTriggerChange                INTEGER (-20..20),
    ...
}

MobilityRestrictionList ::= SEQUENCE {
    serving-PLMN                        PLMN-Identity,
    equivalent-PLMNs                     SEQUENCE (SIZE(1..maxnoofEPLMNs)) OF PLMN-Identity    OPTIONAL,
    rat-Restrictions                      RAT-RestrictionsList                          OPTIONAL,
    forbiddenAreaInformation              ForbiddenAreaList                          OPTIONAL,
    serviceAreaInformation                ServiceAreaList                            OPTIONAL,
    iE-Extensions                        ProtocolExtensionContainer { {MobilityRestrictionList-ExtIEs} }  OPTIONAL,
    ...
}

MobilityRestrictionList-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
{ ID id-LastE-UTRANPLMNIdentity          CRITICALITY ignore EXTENSION PLMN-Identity          PRESENCE optional }|
{ ID id-CNTTypeRestrictionsForServing     CRITICALITY ignore EXTENSION CNTTypeRestrictionsForServing    PRESENCE optional }|
{ ID id-CNTTypeRestrictionsForEquivalent  CRITICALITY ignore EXTENSION CNTTypeRestrictionsForEquivalent  PRESENCE optional }|
{ ID id-NPNMobilityInformation            CRITICALITY reject  EXTENSION NPNMobilityInformation          PRESENCE optional }|
    ...
}

CNTTypeRestrictionsForEquivalent ::= SEQUENCE (SIZE(1..maxnoofEPLMNs)) OF CNTTypeRestrictionsForEquivalentItem

CNTTypeRestrictionsForEquivalentItem ::= SEQUENCE {
    plmn-Identity                        PLMN-Identity,
    cn-Type                               ENUMERATED {epc-forbidden, fiveGC-forbidden, ...},
    iE-Extensions                        ProtocolExtensionContainer { {CNTTypeRestrictionsForEquivalentItem-ExtIEs} }  OPTIONAL,
    ...
}

CNTTypeRestrictionsForEquivalentItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

CNTTypeRestrictionsForServing ::= ENUMERATED {
    epc-forbidden,
    ...
}

```

```

}

RAT-RestrictionsList ::= SEQUENCE (SIZE(1..maxnoofPLMNs)) OF RAT-RestrictionsItem

RAT-RestrictionsItem ::= SEQUENCE {
    plmn-Identity          PLMN-Identity,
    rat-RestrictionInformation  RAT-RestrictionInformation,
    iE-Extensions          ProtocolExtensionContainer { {RAT-RestrictionsItem-ExtIEs} } OPTIONAL,
    ...
}

RAT-RestrictionsItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-ExtendedRATRestrictionInformation  CRITICALITY ignore  EXTENSION ExtendedRATRestrictionInformation  PRESENCE optional},
    ...
}

RAT-RestrictionInformation ::= BIT STRING {e-UTRA (0),nR (1)} (SIZE(8, ...))

ForbiddenAreaList ::= SEQUENCE (SIZE(1..maxnoofPLMNs)) OF ForbiddenAreaItem

ForbiddenAreaItem ::= SEQUENCE {
    plmn-Identity          PLMN-Identity,
    forbidden-TACs        SEQUENCE (SIZE(1..maxnoofForbiddenTACs)) OF TAC,
    iE-Extensions          ProtocolExtensionContainer { {ForbiddenAreaItem-ExtIEs} } OPTIONAL,
    ...
}

ForbiddenAreaItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ServiceAreaList ::= SEQUENCE (SIZE(1..maxnoofPLMNs)) OF ServiceAreaItem

ServiceAreaItem ::= SEQUENCE {
    plmn-Identity          PLMN-Identity,
    allowed-TACs-ServiceArea  SEQUENCE (SIZE(1..maxnoofAllowedAreas)) OF TAC  OPTIONAL,
    not-allowed-TACs-ServiceArea  SEQUENCE (SIZE(1..maxnoofAllowedAreas)) OF TAC  OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {ServiceAreaItem-ExtIEs} }  OPTIONAL,
    ...
}

ServiceAreaItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

MR-DC-ResourceCoordinationInfo ::= SEQUENCE {
    ng-RAN-Node-ResourceCoordinationInfo  NG-RAN-Node-ResourceCoordinationInfo,
    iE-Extension          ProtocolExtensionContainer { {MR-DC-ResourceCoordinationInfo-ExtIEs} } OPTIONAL,
}

```

```

    }
    ...
}
MR-DC-ResourceCoordinationInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
NG-RAN-Node-ResourceCoordinationInfo ::= CHOICE {
    eutra-resource-coordination-info          E-UTRA-ResourceCoordinationInfo,
    nr-resource-coordination-info            NR-ResourceCoordinationInfo
}
E-UTRA-ResourceCoordinationInfo ::= SEQUENCE {
    e-utra-cell                               E-UTRA-CGI,
    ul-coordination-info                     BIT STRING (SIZE (6..4400)),
    dl-coordination-info                     BIT STRING (SIZE (6..4400)) OPTIONAL,
    nr-cell                                   NR-CGI OPTIONAL,
    e-utra-coordination-assistance-info      E-UTRA-CoordinationAssistanceInfo OPTIONAL,
    iE-Extension                             ProtocolExtensionContainer { {E-UTRA-ResourceCoordinationInfo-ExtIEs} } OPTIONAL,
    ...
}
E-UTRA-ResourceCoordinationInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
E-UTRA-CoordinationAssistanceInfo ::= ENUMERATED {coordination-not-required, ...}
NR-ResourceCoordinationInfo ::= SEQUENCE {
    nr-cell                                   NR-CGI,
    ul-coordination-info                     BIT STRING (SIZE (6..4400)),
    dl-coordination-info                     BIT STRING (SIZE (6..4400)) OPTIONAL,
    e-utra-cell                               E-UTRA-CGI OPTIONAL,
    nr-coordination-assistance-info          NR-CoordinationAssistanceInfo OPTIONAL,
    iE-Extension                             ProtocolExtensionContainer { {NR-ResourceCoordinationInfo-ExtIEs} } OPTIONAL,
    ...
}
NR-ResourceCoordinationInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
NR-CoordinationAssistanceInfo ::= ENUMERATED {coordination-not-required, ...}
MessageOversizeNotification ::= SEQUENCE {
    maximumCellListSize                     MaximumCellListSize,
    iE-Extension                             ProtocolExtensionContainer { {MessageOversizeNotification-ExtIEs} } OPTIONAL,
    ...
}
MessageOversizeNotification-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

MaximumCellListSize ::= INTEGER(1..16384, ...)

-- N

NBioT-UL-DL-AlignmentOffset ::= ENUMERATED {
    khz-7dot5,
    khz0,
    khz7dot5,
    ...
}
NE-DC-TDM-Pattern ::= SEQUENCE {
    subframeAssignment      ENUMERATED {sa0,sa1,sa2,sa3,sa4,sa5,sa6},
    harqOffset              INTEGER (0..9),
    iE-Extension            ProtocolExtensionContainer { {NE-DC-TDM-Pattern-ExtIEs}}    OPTIONAL,
    ...
}

NE-DC-TDM-Pattern-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NeighbourInformation-E-UTRA ::= SEQUENCE (SIZE(1..maxnoofNeighbours)) OF NeighbourInformation-E-UTRA-Item

NeighbourInformation-E-UTRA-Item ::= SEQUENCE {
    e-utra-PCI              E-UTRAPCI,
    e-utra-cgi              E-UTRA-CGI,
    earfcn                  E-UTRAARFCN,
    tac                     TAC,
    ranac                   RANAC                                OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {NeighbourInformation-E-UTRA-Item-ExtIEs} } OPTIONAL,
    ...
}

NeighbourInformation-E-UTRA-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NeighbourInformation-NR ::= SEQUENCE (SIZE(1..maxnoofNeighbours)) OF NeighbourInformation-NR-Item

NeighbourInformation-NR-Item ::= SEQUENCE {
    nr-PCI                  NRPCI,
    nr-cgi                  NR-CGI,
    tac                     TAC,
    ranac                   RANAC                                OPTIONAL,
    nr-mode-info            NeighbourInformation-NR-ModeInfo,
    connectivitySupport     Connectivity-Support,
    measurementTimingConfiguration OCTET STRING,
    iE-Extensions          ProtocolExtensionContainer { {NeighbourInformation-NR-Item-ExtIEs} } OPTIONAL,
    ...
}

NeighbourInformation-NR-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

```

```

}
...
}

NeighbourInformation-NR-ModeInfo ::= CHOICE {
    fdd-info          NeighbourInformation-NR-ModeFDDInfo,
    tdd-info          NeighbourInformation-NR-ModeTDDInfo,
    choice-extension ProtocolIE-Single-Container { {NeighbourInformation-NR-ModeInfo-ExtIEs} }
}

NeighbourInformation-NR-ModeInfo-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

NeighbourInformation-NR-ModeFDDInfo ::= SEQUENCE {
    ul-NR-FreqInfo    NRFrequencyInfo,
    dl-NR-FreqInfo    NRFrequencyInfo,
    ie-Extensions     ProtocolExtensionContainer { {NeighbourInformation-NR-ModeFDDInfo-ExtIEs} } OPTIONAL,
    ...
}

NeighbourInformation-NR-ModeFDDInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NeighbourInformation-NR-ModeTDDInfo ::= SEQUENCE {
    nr-FreqInfo       NRFrequencyInfo,
    ie-Extensions     ProtocolExtensionContainer { {NeighbourInformation-NR-ModeTDDInfo-ExtIEs} } OPTIONAL,
    ...
}

NeighbourInformation-NR-ModeTDDInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NID ::= BIT STRING (SIZE(44))

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

```

NRCellPRACHConfig ::= OCTET STRING

```

NG-RAN-Cell-Identity ::= CHOICE {
  nr                NR-Cell-Identity,
  e-utra            E-UTRA-Cell-Identity,
  choice-extension  ProtocolIE-Single-Container { {NG-RAN-Cell-Identity-ExtIEs} }
}

```

```

NG-RAN-Cell-Identity-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

```

```

NG-RAN-CellPCI ::= CHOICE {
  nr                NRPCI,
  e-utra            E-UTRAPCI,
  choice-extension  ProtocolIE-Single-Container { {NG-RAN-CellPCI-ExtIEs} }
}

```

```

NG-RAN-CellPCI-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

```

NG-RANnodeUEXnAPID ::= INTEGER (0.. 4294967295)

NumberOfActiveUEs ::= INTEGER(0..16777215, ...)

NoofRRCConnections ::= INTEGER (1..65536,...)

```

NonDynamic5QIDescriptor ::= SEQUENCE {
  fiveQI                FiveQI,
  priorityLevelQoS      PriorityLevelQoS                                OPTIONAL,
  averagingWindow       AveragingWindow                             OPTIONAL,
  maximumDataBurstVolume MaximumDataBurstVolume         OPTIONAL,
  iE-Extension          ProtocolExtensionContainer { {NonDynamic5QIDescriptor-ExtIEs} } OPTIONAL,
  ...
}

```

```

NonDynamic5QIDescriptor-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-CNPacketDelayBudgetDownlink    CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional}|
  { ID id-CNPacketDelayBudgetUplink      CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional},
  ...
}

```

NRARFCN ::= INTEGER (0.. maxNRARFCN)

```

NG-eNB-RadioResourceStatus ::= SEQUENCE {
    dL-GBR-PRB-usage          DL-GBR-PRB-usage,
    uL-GBR-PRB-usage          UL-GBR-PRB-usage,
    dL-non-GBR-PRB-usage      DL-non-GBR-PRB-usage,
    uL-non-GBR-PRB-usage      UL-non-GBR-PRB-usage,
    dL-Total-PRB-usage        DL-Total-PRB-usage,
    uL-Total-PRB-usage        UL-Total-PRB-usage,
    iE-Extensions             ProtocolExtensionContainer { { NG-eNB-RadioResourceStatus-ExtIEs } } OPTIONAL,
    ...
}

NG-eNB-RadioResourceStatus-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-DL-scheduling-PDCCH-CCE-usage          CRITICALITY ignore EXTENSION DL-scheduling-PDCCH-CCE-usage PRESENCE optional}|
    { ID id-UL-scheduling-PDCCH-CCE-usage          CRITICALITY ignore EXTENSION UL-scheduling-PDCCH-CCE-usage PRESENCE optional},
    ...
}

DL-scheduling-PDCCH-CCE-usage ::= INTEGER (0.. 100)
UL-scheduling-PDCCH-CCE-usage ::= INTEGER (0.. 100)

TNLCapacityIndicator ::= SEQUENCE {
    dLTNLOfferedCapacity      OfferedCapacity,
    dLTNLAvailableCapacity    AvailableCapacity,
    uLTNLOfferedCapacity      OfferedCapacity,
    uLTNLAvailableCapacity    AvailableCapacity,
    iE-Extensions             ProtocolExtensionContainer { { TNLCapacityIndicator-ExtIEs } } OPTIONAL,
    ...
}

TNLCapacityIndicator-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NPN-Broadcast-Information ::= CHOICE {
    snpn-Information          NPN-Broadcast-Information-SNPN,
    pni-npn-Information        NPN-Broadcast-Information-PNI-NPN,
    choice-extension          ProtocolIE-Single-Container { {NPN-Broadcast-Information-ExtIEs} }
}

NPN-Broadcast-Information-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

NPN-Broadcast-Information-SNPN ::= SEQUENCE {
    broadcastSNPNID-List      BroadcastSNPNID-List,
    iE-Extension              ProtocolExtensionContainer { {NPN-Broadcast-Information-SNPN-ExtIEs} } OPTIONAL,
    ...
}

NPN-Broadcast-Information-SNPN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```



```

NPN-Broadcast-Information-PNI-NPN ::= SEQUENCE {
    broadcastPNI-NPN-ID-Information    BroadcastPNI-NPN-ID-Information,
    iE-Extension                       ProtocolExtensionContainer { {NPN-Broadcast-Information-PNI-NPN-ExtIEs} } OPTIONAL,
    ...
}

NPN-Broadcast-Information-PNI-NPN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NPNMobilityInformation ::= CHOICE {
    snpn-mobility-information          NPNMobilityInformation-SNPN,
    pni-npn-mobility-information      NPNMobilityInformation-PNI-NPN,
    choice-extension                  ProtocolIE-Single-Container { {NPNMobilityInformation-ExtIEs} }
}

NPNMobilityInformation-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

NPNMobilityInformation-SNPN ::= SEQUENCE {
    serving-NID                       NID,
    iE-Extension                       ProtocolExtensionContainer { {NPNMobilityInformation-SNPN-ExtIEs} } OPTIONAL,
    ...
}

NPNMobilityInformation-SNPN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NPNMobilityInformation-PNI-NPN ::= SEQUENCE {
    allowedPNI-NPN-ID-List            AllowedPNI-NPN-ID-List,
    iE-Extension                       ProtocolExtensionContainer { {NPNMobilityInformation-PNI-NPN-ExtIEs} } OPTIONAL,
    ...
}

NPNMobilityInformation-PNI-NPN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NPNPagingAssistanceInformation ::= CHOICE {
    pni-npn-Information               NPNPagingAssistanceInformation-PNI-NPN,
    choice-extension                  ProtocolIE-Single-Container { {NPNPagingAssistanceInformation-ExtIEs} }
}

NPNPagingAssistanceInformation-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

NPNPagingAssistanceInformation-PNI-NPN ::= SEQUENCE {
    allowedPNI-NPN-ID-List            AllowedPNI-NPN-ID-List,
    iE-Extension                       ProtocolExtensionContainer { {NPNPagingAssistanceInformation-PNI-NPN-ExtIEs} } OPTIONAL,
    ...
}

```

```

}
NPNPagingAssistanceInformation-PNI-NPN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

NPN-Support ::= CHOICE {
  sNPN                NPN-Support-SNPN,
  choice-Extensions  ProtocolIE-Single-Container { {NPN-Support-ExtIEs} }
}

NPN-Support-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

NPN-Support-SNPN ::= SEQUENCE {
  nid                NID,
  ie-Extension       ProtocolExtensionContainer { {NPN-Support-SNPN-ExtIEs} }    OPTIONAL,
  ...
}

NPN-Support-SNPN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

NPRACHConfiguration ::= SEQUENCE {
  fdd-or-tdd         CHOICE {
    fdd              NPRACHConfiguration-FDD,
    tdd              NPRACHConfiguration-TDD,
    choice-extension ProtocolIE-Single-Container { { FDD-or-TDD-in-NPRACHConfiguration-Choice-ExtIEs } }
  },
  iE-Extensions      ProtocolExtensionContainer { { NPRACHConfiguration-ExtIEs } } OPTIONAL,
  ...
}

NPRACHConfiguration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

FDD-or-TDD-in-NPRACHConfiguration-Choice-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

NPRACHConfiguration-FDD ::= SEQUENCE {
  nprach-CP-length      NPRACH-CP-Length,
  anchorCarrier-NPRACHConfig  OCTET STRING,
  anchorCarrier-EDT-NPRACHConfig  OCTET STRING                OPTIONAL,
  anchorCarrier-Format2-NPRACHConfig  OCTET STRING                OPTIONAL,
  anchorCarrier-Format2-EDT-NPRACHConfig  OCTET STRING                OPTIONAL,
  non-anchorCarrier-NPRACHConfig  OCTET STRING                OPTIONAL,
  non-anchorCarrier-Format2-NPRACHConfig  OCTET STRING                OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { { NPRACHConfiguration-FDD-ExtIEs } } OPTIONAL,
  ...
}

```

```

}

NPRACHConfiguration-FDD-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

NPRACHConfiguration-TDD ::= SEQUENCE {
  nprach-preambleFormat          NPRACH-preambleFormat,
  anchorCarrier-NPRACHConfigTDD  OCTET STRING,
  non-anchorCarrierFrequencyConfiglist  Non-AnchorCarrierFrequencylist  OPTIONAL,
  non-anchorCarrier-NPRACHConfigTDD  OCTET STRING  OPTIONAL,
  iE-Extensions  ProtocolExtensionContainer { { NPRACHConfiguration-TDD-ExtIEs } }  OPTIONAL,
  ...
}

NPRACHConfiguration-TDD-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

NPRACH-CP-Length ::= ENUMERATED {
  us66dot7,
  us266dot7,
  ...
}

NPRACH-preambleFormat ::= ENUMERATED {fmt0,fmt1,fmt2,fmt0a,fmt1a,...}

Non-AnchorCarrierFrequencylist ::= SEQUENCE (SIZE(1..maxnoofNonAnchorCarrierFreqConfig)) OF
  SEQUENCE {
    non-anchorCarrierFrquency  OCTET STRING,
    iE-Extensions  ProtocolExtensionContainer { { Non-AnchorCarrierFrequencylist-ExtIEs } }  OPTIONAL,
    ...
  }

Non-AnchorCarrierFrequencylist-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

NR-Cell-Identity ::= BIT STRING (SIZE (36))

NG-RAN-Cell-Identity-ListinRANPagingArea ::= SEQUENCE (SIZE (1..maxnoofCellsinRNA)) OF NG-RAN-Cell-Identity

NR-CGI ::= SEQUENCE {
  plmn-id  PLMN-Identity,
  nr-CI  NR-Cell-Identity,
  iE-Extension  ProtocolExtensionContainer { {NR-CGI-ExtIEs} }  OPTIONAL,
  ...
}

NR-CGI-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

```

```

}
...
}
NRCyclicPrefix ::= ENUMERATED {normal, extended, ...}

NRDL-ULTransmissionPeriodicity ::= ENUMERATED {ms0p5, ms0p625, ms1, ms1p25, ms2, ms2p5, ms3, ms4, ms5, ms10, ms20, ms40, ms60, ms80, ms100, ms120,
ms140, ms160, ...}

NRFrequencyBand ::= INTEGER (1..1024, ...)

NRFrequencyBand-List ::= SEQUENCE (SIZE(1..maxnoofNRCellBands)) OF NRFrequencyBandItem

NRFrequencyBandItem ::= SEQUENCE {
    nr-frequency-band          NRFrequencyBand,
    supported-SUL-Band-List    SupportedSULBandList                               OPTIONAL,
    iE-Extension                ProtocolExtensionContainer { {NRFrequencyBandItem-ExtIEs} }  OPTIONAL,
    ...
}

NRFrequencyBandItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NRFrequencyInfo ::= SEQUENCE {
    nrARFCN                    NRARFCN,
    sul-information            SUL-Information                               OPTIONAL,
    frequencyBand-List        NRFrequencyBand-List,
    iE-Extension                ProtocolExtensionContainer { {NRFrequencyInfo-ExtIEs} }  OPTIONAL,
    ...
}

NRFrequencyInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-FrequencyShift7p5khz    CRITICALITY ignore EXTENSION FrequencyShift7p5khz PRESENCE optional },...
}

NRMobilityHistoryReport ::= OCTET STRING

NRModeInfo ::= CHOICE {
    fdd                        NRModeInfoFDD,
    tdd                        NRModeInfoTDD,
    choice-extension            ProtocolIE-Single-Container { {NRModeInfo-ExtIEs} }
}

NRModeInfo-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

NRModeInfoFDD ::= SEQUENCE {
    ulNRFrequencyInfo          NRFrequencyInfo,
    dlNRFrequencyInfo          NRFrequencyInfo,

```

```

    ulNRTransmissionBandwidth    NRTransmissionBandwidth,
    dlNRTransmissionBandwidth    NRTransmissionBandwidth,
    iE-Extension                  ProtocolExtensionContainer { {NRModeInfoFDD-ExtIEs} } OPTIONAL,
    ...
}

NRModeInfoFDD-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-ULCarrierList          CRITICALITY ignore EXTENSION NRCarrierList          PRESENCE optional }|
  { ID id-DLCarrierList          CRITICALITY ignore EXTENSION NRCarrierList          PRESENCE optional },
  ...
}

NRModeInfoTDD ::= SEQUENCE {
  nrFrequencyInfo                NRFrequencyInfo,
  nrTransmissionBandwidth        NRTransmissionBandwidth,
  iE-Extension                    ProtocolExtensionContainer { {NRModeInfoTDD-ExtIEs} } OPTIONAL,
  ...
}

NRModeInfoTDD-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  {ID id-IntendedTDD-DL-ULConfiguration-NR          CRITICALITY ignore EXTENSION IntendedTDD-DL-ULConfiguration-NR          PRESENCE optional }|
  {ID id-TDDULDLConfigurationCommonNR              CRITICALITY ignore EXTENSION TDDULDLConfigurationCommonNR          PRESENCE optional }|
  { ID id-CarrierList                               CRITICALITY ignore EXTENSION NRCarrierList          PRESENCE optional },
  ...
}

NRNRB ::= ENUMERATED { nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121,
nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...}

NRPCI ::= INTEGER (0..1007, ...)

NRSCS ::= ENUMERATED { scs15, scs30, scs60, scs120, ...}

NRTransmissionBandwidth ::= SEQUENCE {
  nRSCS    NRSCS,
  nRNRB    NRNRB,
  iE-Extensions          ProtocolExtensionContainer { {NRTransmissionBandwidth-ExtIEs} } OPTIONAL,
  ...
}

NRTransmissionBandwidth-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

NumberOfAntennaPorts-E-UTRA ::= ENUMERATED {an1, an2, an4, ...}

NG-RANTraceID                ::=OCTET STRING (SIZE (8))

NonGBRResources-Offered ::= ENUMERATED {true, ...}

```

```
NRV2XServicesAuthorized ::= SEQUENCE {
    vehicleUE          VehicleUE              OPTIONAL,
    pedestrianUE       PedestrianUE           OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { {NRV2XServicesAuthorized-ExtIEs} } OPTIONAL,
    ...
}

NRV2XServicesAuthorized-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

NRUESidelinkAggregateMaximumBitRate ::= SEQUENCE {
    uESidelinkAggregateMaximumBitRate BitRate,
    iE-Extensions                      ProtocolExtensionContainer { {NRUESidelinkAggregateMaximumBitRate-ExtIEs} } OPTIONAL,
    ...
}

NRUESidelinkAggregateMaximumBitRate-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- 0

OfferedCapacity ::= INTEGER (1.. 16777216,...)

OffsetOfNbiotChannelNumberToEARFCN ::= ENUMERATED {
    minusTen,
    minusNine,
    minusEightDotFive,
    minusEight,
    minusSeven,
    minusSix,
    minusFive,
    minusFourDotFive,
    minusFour,
    minusThree,
    minusTwo,
    minusOne,
    minusZeroDotFive,
    zero,
    one,
    two,
    three,
    threeDotFive,
    four,
    five,
    six,
    seven,
    sevenDotFive,
    eight,
    nine,
}
```

```
    ...
}
-- P

PacketDelayBudget ::= INTEGER (0..1023, ...)

PacketErrorRate ::= SEQUENCE {
    pER-Scalar          PER-Scalar,
    pER-Exponent        PER-Exponent,
    iE-Extensions       ProtocolExtensionContainer { {PacketErrorRate-ExtIEs} } OPTIONAL,
    ...
}

PacketErrorRate-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PedestrianUE ::= ENUMERATED {
    authorized,
    not-authorized,
    ...
}

PER-Scalar ::= INTEGER (0..9, ...)

PER-Exponent ::= INTEGER (0..9, ...)

PacketLossRate ::= INTEGER (0..1000, ...)

PagingDRX ::= ENUMERATED {
    v32,
    v64,
    v128,
    v256,
    ... ,
    v512,
    v1024
}

PagingDRXInformation ::= SEQUENCE {
    paging-eDRX-Cycle      Paging-eDRX-Cycle,
    paging-Time-Window     Paging-Time-Window OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {PagingDRXInformation-ExtIEs} } OPTIONAL,
    ...
}

PagingDRXInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```

}

Paging-eDRX-Cycle ::= ENUMERATED {
    hfhalf, hf1, hf2, hf4, hf6,
    hf8, hf10, hf12, hf14, hf16,
    hf32, hf64, hf128, hf256,
    ...
}

Paging-Time-Window ::= ENUMERATED {
    s1, s2, s3, s4, s5,
    s6, s7, s8, s9, s10,
    s11, s12, s13, s14, s15, s16,
    ...
}

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

PartialListIndicator ::= ENUMERATED {partial, ...}

PC5QoSParameters ::= SEQUENCE {
    pc5QoSFlowList          PC5QoSFlowList,
    pc5LinkAggregateBitRates BitRate          OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { PC5QoSParameters-ExtIEs } } OPTIONAL,
    ...
}

PC5QoSParameters-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PC5QoSFlowList ::= SEQUENCE (SIZE(1..maxnoofPC5QoSFlows)) OF PC5QoSFlowItem
-- The size of the PC5 QoS Flow List shall not exceed 2048 items.

PC5QoSFlowItem ::= SEQUENCE {
    pQI          FiveQI,
    pc5FlowBitRates PC5FlowBitRates          OPTIONAL,
    range        Range          OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { PC5QoSFlowItem-ExtIEs } } OPTIONAL,
    ...
}

```



```

PC5QoSFlowItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PC5FlowBitRates ::= SEQUENCE {
    guaranteedFlowBitRate      BitRate,
    maximumFlowBitRate         BitRate,
    iE-Extensions              ProtocolExtensionContainer { { PC5FlowBitRates-ExtIEs} }    OPTIONAL,
    ...
}

PC5FlowBitRates-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDCPChangeIndication ::= CHOICE {
    from-S-NG-RAN-node          ENUMERATED {s-ng-ran-node-key-update-required, pdcp-data-recovery-required, ...},
    from-M-NG-RAN-node          ENUMERATED {pdcp-data-recovery-required, ...},
    choice-extension            ProtocolIE-Single-Container { {PDCPChangeIndication-ExtIEs} }
}

PDCPChangeIndication-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

PDCPDuplicationConfiguration ::= ENUMERATED {
    configured,
    de-configured,
    ...
}

PDCPSNLength ::= SEQUENCE {
    ulPDCPSNLength              ENUMERATED {v12bits, v18bits, ...},
    dlPDCPSNLength              ENUMERATED {v12bits, v18bits, ...},
    iE-Extension                ProtocolExtensionContainer { {PDCPSNLength-ExtIEs} }    OPTIONAL,
    ...
}

PDCPSNLength-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionAggregateMaximumBitRate ::= SEQUENCE {
    downlink-session-AMBR       BitRate,
    uplink-session-AMBR         BitRate,
    iE-Extensions               ProtocolExtensionContainer { {PDUSessionAggregateMaximumBitRate-ExtIEs} }    OPTIONAL,
    ...
}

```

```

PDUSessionAggregateMaximumBitRate-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDUSession-List ::= SEQUENCE (SIZE (1.. maxnoofPDUSessions)) OF PDUSession-ID

PDUSession-List-withCause ::= SEQUENCE (SIZE (1.. maxnoofPDUSessions)) OF PDUSession-List-withCause-Item

PDUSession-List-withCause-Item ::= SEQUENCE {
  pduSessionId          PDUSession-ID,
  cause                 Cause          OPTIONAL,
  iE-Extension          ProtocolExtensionContainer { {PDUSession-List-withCause-Item-ExtIEs} } OPTIONAL,
  ...
}

PDUSession-List-withCause-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDUSession-List-withDataForwardingFromTarget ::= SEQUENCE (SIZE (1.. maxnoofPDUSessions)) OF
  PDUSession-List-withDataForwardingFromTarget-Item

PDUSession-List-withDataForwardingFromTarget-Item ::= SEQUENCE {
  pduSessionId          PDUSession-ID,
  dataforwardinginfoTarget DataForwardingInfoFromTargetNGRANnode,
  iE-Extension          ProtocolExtensionContainer { {PDUSession-List-withDataForwardingFromTarget-Item-ExtIEs} } OPTIONAL,
  ...
}

PDUSession-List-withDataForwardingFromTarget-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-DRB-IDs-takenintouse          CRITICALITY reject EXTENSION DRB-List PRESENCE optional},
  ...
}

PDUSession-List-withDataForwardingRequest ::= SEQUENCE (SIZE (1.. maxnoofPDUSessions)) OF
  PDUSession-List-withDataForwardingRequest-Item

PDUSession-List-withDataForwardingRequest-Item ::= SEQUENCE {
  pduSessionId          PDUSession-ID,
  dataforwardingInfofromSource DataforwardingandOffloadingInfofromSource          OPTIONAL,
  drBtoBeReleasedList   DRBtoQoSFlowMapping-List          OPTIONAL,
  iE-Extension          ProtocolExtensionContainer { {PDUSession-List-withDataForwardingRequest-Item-ExtIEs} } OPTIONAL,
  ...
}

PDUSession-List-withDataForwardingRequest-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  {ID id-Cause          CRITICALITY ignore EXTENSION Cause          PRESENCE optional},
  ...
}

```

```

-- *****
--
-- PDU Session related message level IEs BEGIN
--
-- *****

-- *****
--
-- PDU Session Resources Admitted List
--
-- *****

PDUSessionResourcesAdmitted-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionResourcesAdmitted-Item

PDUSessionResourcesAdmitted-Item ::= SEQUENCE {
    pduSessionId          PDUSession-ID,
    pduSessionResourceAdmittedInfo  PDUSessionResourceAdmittedInfo,
    iE-Extensions         ProtocolExtensionContainer { {PDUSessionResourcesAdmitted-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourcesAdmitted-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionResourceAdmittedInfo ::= SEQUENCE {
    dL-NG-U-TNL-Information-Unchanged  ENUMERATED {true, ...} OPTIONAL,
    qosFlowsAdmitted-List              QoSFlowsAdmitted-List,
    qosFlowsNotAdmitted-List           QoSFlows-List-withCause OPTIONAL,
    dataForwardingInfoFromTarget       DataForwardingInfoFromTargetNGRANnode OPTIONAL,
    iE-Extensions                      ProtocolExtensionContainer { {PDUSessionResourceAdmittedInfo-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceAdmittedInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
{ ID id-SecondarydataForwardingInfoFromTarget-List CRITICALITY ignore EXTENSION SecondarydataForwardingInfoFromTarget-List PRESENCE optional},
    ...
}

-- *****
--
-- PDU Session Resources Not Admitted List
--
-- *****

PDUSessionResourcesNotAdmitted-List ::= SEQUENCE (SIZE (1..maxnoofPDUSessions)) OF PDUSessionResourcesNotAdmitted-Item

```

```

PDU SessionResourcesNotAdmitted-Item ::= SEQUENCE {
    pduSessionId          PDU Session-ID,
    cause                  Cause             OPTIONAL,
    iE-Extension          ProtocolExtensionContainer { {PDU SessionResourcesNotAdmitted-Item-Item-ExtIEs} } OPTIONAL,
    ...
}

PDU SessionResourcesNotAdmitted-Item-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- PDU Session Resources To Be Setup List
--
-- *****

PDU SessionResourcesToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofPDU Sessions)) OF PDU SessionResourcesToBeSetup-Item

PDU SessionResourcesToBeSetup-Item ::= SEQUENCE {
    pduSessionId          PDU Session-ID,
    s-NSSAI                S-NSSAI,
    pduSessionAMBR        PDU SessionAggregateMaximumBitRate             OPTIONAL,
    uL-NG-U-TNLatUPF      UPTransportLayerInformation,
    source-DL-NG-U-TNL-Information UPTransportLayerInformation         OPTIONAL,
    securityIndication     SecurityIndication                          OPTIONAL,
    pduSessionType        PDU SessionType,
    pduSessionNetworkInstance PDU SessionNetworkInstance             OPTIONAL,
    qosFlowsToBeSetup-List QoSFlowsToBeSetup-List,
    dataforwardinginfofromSource DataforwardingandOffloadingInfofromSource     OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {PDU SessionResourcesToBeSetup-Item-ExtIEs} } OPTIONAL,
    ...
}

PDU SessionResourcesToBeSetup-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-Additional-UL-NG-U-TNLatUPF-List          CRITICALITY ignore EXTENSION Additional-UL-NG-U-TNLatUPF-List          PRESENCE optional } |
    { ID id-PDU SessionCommonNetworkInstance          CRITICALITY ignore EXTENSION PDU SessionCommonNetworkInstance          PRESENCE optional } |
    { ID id-Redundant-UL-NG-U-TNLatUPF                CRITICALITY ignore EXTENSION UPTransportLayerInformation          PRESENCE optional } |
    { ID id-Additional-Redundant-UL-NG-U-TNLatUPF-List CRITICALITY ignore EXTENSION Additional-UL-NG-U-TNLatUPF-List          PRESENCE optional } |
    { ID id-RedundantCommonNetworkInstance            CRITICALITY ignore EXTENSION PDU SessionCommonNetworkInstance          PRESENCE optional } |
    { ID id-RedundantPDU SessionInformation            CRITICALITY ignore EXTENSION RedundantPDU SessionInformation          PRESENCE optional } |
    ...
}

-- *****
--
-- PDU Session Resource Setup Info - SN terminated
--
-- *****

```

```

PDUSessionResourceSetupInfo-SNterminated ::= SEQUENCE {
    uL-NG-U-TNLatUPF          UPTransportLayerInformation,
    pduSessionType            PDUSessionType,
    pduSessionNetworkInstance PDUSessionNetworkInstance           OPTIONAL,
    qosFlowsToBeSetup-List    QoSFlowsToBeSetup-List-Setup-SNterminated,
    dataforwardinginfofromSource DataforwardingandOffloadingInfofromSource   OPTIONAL,
    securityIndication        SecurityIndication                OPTIONAL,
    iE-Extensions             ProtocolExtensionContainer { {PDUSessionResourceSetupInfo-SNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceSetupInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-SecurityResult          CRITICALITY reject  EXTENSION SecurityResult          PRESENCE optional} |
    { ID id-PDUSessionCommonNetworkInstance CRITICALITY ignore EXTENSION PDUSessionCommonNetworkInstance PRESENCE optional} |
    { ID id-DefaultDRB-Allowed      CRITICALITY ignore EXTENSION DefaultDRB-Allowed      PRESENCE optional} |
    { ID id-SplitSessionIndicator   CRITICALITY reject  EXTENSION SplitSessionIndicator   PRESENCE optional} |
    { ID id-NonGBRResources-Offered CRITICALITY ignore EXTENSION NonGBRResources-Offered PRESENCE optional} |
    { ID id-Redundant-UL-NG-U-TNLatUPF CRITICALITY ignore EXTENSION UPTransportLayerInformation PRESENCE optional} |
    { ID id-RedundantCommonNetworkInstance CRITICALITY ignore EXTENSION PDUSessionCommonNetworkInstance PRESENCE optional} |
    { ID id-RedundantPDUSessionInformation CRITICALITY ignore EXTENSION RedundantPDUSessionInformation PRESENCE optional},
    ...
}

QoSFlowsToBeSetup-List-Setup-SNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsToBeSetup-List-Setup-SNterminated-Item

QoSFlowsToBeSetup-List-Setup-SNterminated-Item ::= SEQUENCE {
    qfi          QoSFlowIdentifier,
    qosFlowLevelQoSParameters QoSFlowLevelQoSParameters,
    offeredGBRQoSFlowInfo    GBRQoSFlowInfo           OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {QoSFlowsToBeSetup-List-Setup-SNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsToBeSetup-List-Setup-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-TSCTrafficCharacteristics CRITICALITY ignore EXTENSION TSCTrafficCharacteristics PRESENCE optional} |
    { ID id-RedundantQoSFlowIndicator CRITICALITY ignore EXTENSION RedundantQoSFlowIndicator PRESENCE optional},
    ...
}

-- *****
--
-- PDU Session Resource Setup Response Info - SN terminated
--
-- *****

PDUSessionResourceSetupResponseInfo-SNterminated ::= SEQUENCE {
    dL-NG-U-TNLatNG-RAN          UPTransportLayerInformation,
    dRBsToBeSetup                DRBsToBeSetupList-SetupResponse-SNterminated   OPTIONAL,
    dataforwardinginfoTarget     DataForwardingInfoFromTargetNGRANnode   OPTIONAL,
    qosFlowsNotAdmittedList      QoSFlows-List-withCause                OPTIONAL,
    securityResult               SecurityResult                    OPTIONAL,
    iE-Extensions                ProtocolExtensionContainer { {PDUSessionResourceSetupResponseInfo-SNterminated-ExtIEs} } OPTIONAL,
}

```

```

}
...
}
PDUSessionResourceSetupResponseInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-DRB-IDs-takenintouse          CRITICALITY reject  EXTENSION DRB-List  PRESENCE optional} |
  { ID id-Redundant-DL-NG-U-TNLatNG-RAN CRITICALITY ignore  EXTENSION UPTransportLayerInformation  PRESENCE optional} |
  { ID id-UsedRSNInformation            CRITICALITY ignore  EXTENSION RedundantPDUSessionInformation  PRESENCE optional},
  ...
}

DRBsToBeSetupList-SetupResponse-SNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsToBeSetupList-SetupResponse-SNterminated-Item

DRBsToBeSetupList-SetupResponse-SNterminated-Item ::= SEQUENCE {
  drb-ID                DRB-ID,
  sN-UL-PDCP-UP-TNLInfo UPTransportParameters,
  dRB-QoS                QoSFlowLevelQoSParameters,
  pDCP-SNLength         PDCPSNLength                OPTIONAL,
  rLC-Mode              RLCMode,
  uL-Configuration     ULConfiguration                OPTIONAL,
  secondary-SN-UL-PDCP-UP-TNLInfo UPTransportParameters                OPTIONAL,
  duplicationActivation DuplicationActivation        OPTIONAL,
  qoSFlowsMappedtoDRB-SetupResponse-SNterminated QoSFlowsMappedtoDRB-SetupResponse-SNterminated,
  iE-Extensions        ProtocolExtensionContainer { {DRBsToBeSetupList-SetupResponse-SNterminated-Item-ExtIEs} } OPTIONAL,
  ...
}

DRBsToBeSetupList-SetupResponse-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore  EXTENSION Additional-PDCP-Duplication-TNL-List  PRESENCE optional} |
  { ID id-RLCDuplicationInformation                    CRITICALITY ignore  EXTENSION RLCDuplicationInformation  PRESENCE optional},
  ...
}

QoSFlowsMappedtoDRB-SetupResponse-SNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF
  QoSFlowsMappedtoDRB-SetupResponse-SNterminated-Item

QoSFlowsMappedtoDRB-SetupResponse-SNterminated-Item ::= SEQUENCE {
  qoSFlowIdentifier      QoSFlowIdentifier,
  mCGRequestedGBRQoSFlowInfo GBRQoSFlowInfo                OPTIONAL,
  qosFlowMappingIndication QoSFlowMappingIndication        OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { {QoSFlowsMappedtoDRB-SetupResponse-SNterminated-Item-ExtIEs} } OPTIONAL,
  ...
}

QoSFlowsMappedtoDRB-SetupResponse-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-CurrentQoSParaSetIndex          CRITICALITY ignore  EXTENSION QoSParaSetIndex          PRESENCE optional } |
  { ID id-SourceDLForwardingIPAddress     CRITICALITY ignore  EXTENSION TransportLayerAddress     PRESENCE optional},
  ...
}

-- *****
--
-- PDU Session Resource Setup Info - MN terminated
--

```

```

-- *****

PDUSessionResourceSetupInfo-MNterminated ::= SEQUENCE {
    pduSessionType          PDUSessionType,
    drBsToBeSetup           DRBsToBeSetupList-Setup-MNterminated,
    iE-Extensions           ProtocolExtensionContainer { {PDUSessionResourceSetupInfo-MNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceSetupInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBsToBeSetupList-Setup-MNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsToBeSetupList-Setup-MNterminated-Item

DRBsToBeSetupList-Setup-MNterminated-Item ::= SEQUENCE {
    drb-ID                  DRB-ID,
    mN-UL-PDCP-UP-TNLInfo  UPTransportParameters,
    rLC-Mode                RLCMode,
    uL-Configuration       ULConfiguration OPTIONAL,
    drB-QoS                 QoSFlowLevelQoSParameters,
    pDCP-SNLength          PDCPSNLength OPTIONAL,
    secondary-MN-UL-PDCP-UP-TNLInfo UPTransportParameters OPTIONAL,
    duplicationActivation   DuplicationActivation OPTIONAL,
    qoSFlowsMappedtoDRB-Setup-MNterminated QoSFlowsMappedtoDRB-Setup-MNterminated,
    iE-Extensions          ProtocolExtensionContainer { {DRBsToBeSetupList-Setup-MNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsToBeSetupList-Setup-MNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore EXTENSION Additional-PDCP-Duplication-TNL-List PRESENCE optional}|
    { ID id-RLCDuplicationInformation                  CRITICALITY ignore EXTENSION RLCDuplicationInformation PRESENCE optional},
    ...
}

QoSFlowsMappedtoDRB-Setup-MNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsMappedtoDRB-Setup-MNterminated-Item

QoSFlowsMappedtoDRB-Setup-MNterminated-Item ::= SEQUENCE {
    qoSFlowIdentifier       QoSFlowIdentifier,
    qoSFlowLevelQoSParameters QoSFlowLevelQoSParameters,
    qosFlowMappingIndication QoSFlowMappingIndication OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {QoSFlowsMappedtoDRB-Setup-MNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsMappedtoDRB-Setup-MNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-TSCTrafficCharacteristics          CRITICALITY ignore EXTENSION TSCTrafficCharacteristics PRESENCE optional},
    ...
}

-- *****
--

```

```

-- PDU Session Resource Setup Response Info - MN terminated
--
-- *****

PDUSessionResourceSetupResponseInfo-MNterminated ::= SEQUENCE {
    drBsAdmittedList          DRBsAdmittedList-SetupResponse-MNterminated,
    iE-Extensions            ProtocolExtensionContainer { {PDUSessionResourceSetupResponseInfo-MNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceSetupResponseInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    {ID id-DRBsNotAdmittedSetupModifyList CRITICALITY ignore EXTENSION DRB-List-withCause PRESENCE optional},
    ...
}

DRBsAdmittedList-SetupResponse-MNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsAdmittedList-SetupResponse-MNterminated-Item

DRBsAdmittedList-SetupResponse-MNterminated-Item ::= SEQUENCE {
    drb-ID                    DRB-ID,
    sN-DL-SCG-UP-TNLInfo     UPTransportParameters,
    secondary-SN-DL-SCG-UP-TNLInfo UPTransportParameters OPTIONAL,
    lCID                      LCID OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { {DRBsAdmittedList-SetupResponse-MNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsAdmittedList-SetupResponse-MNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-Additional-PDCP-Duplication-TNL-List CRITICALITY ignore EXTENSION Additional-PDCP-Duplication-TNL-List PRESENCE optional}|
    { ID id-QoSFlowsMappedtoDRB-SetupResponse-MNterminated CRITICALITY ignore EXTENSION QoSFlowsMappedtoDRB-SetupResponse-MNterminated PRESENCE optional},
    ...
}

QoSFlowsMappedtoDRB-SetupResponse-MNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsMappedtoDRB-SetupResponse-MNterminated-Item

QoSFlowsMappedtoDRB-SetupResponse-MNterminated-Item ::= SEQUENCE {
    qoSFlowIdentifier         QoSFlowIdentifier,
    currentQoSParaSetIndex    QoSParaSetIndex,
    iE-Extensions            ProtocolExtensionContainer { {QoSFlowsMappedtoDRB-SetupResponse-MNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsMappedtoDRB-SetupResponse-MNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- PDU Session Resource Modification Info - SN terminated
--
-- *****

```



```

PDUSessionResourceModificationInfo-SNterminated ::= SEQUENCE {
    uL-NG-U-TNLatUPF                UPTransportLayerInformation          OPTIONAL,
    pduSessionNetworkInstance        PDUSessionNetworkInstance            OPTIONAL,
    qosFlowsToBeSetup-List           QoSFlowsToBeSetup-List-Setup-SNterminated  OPTIONAL,
    dataforwardingInfofromSource     DataforwardingandOffloadingInfofromSource  OPTIONAL,
    qosFlowsToBeModified-List        QoSFlowsToBeSetup-List-Modified-SNterminated  OPTIONAL,
    qosFlowsToBeReleased-List        QoSFlows-List-withCause                  OPTIONAL,
    drbsToBeModifiedList             DRBsToBeModified-List-Modified-SNterminated  OPTIONAL,
    drBsToBeReleased                 DRB-List-withCause                       OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { {PDUSessionResourceModificationInfo-SNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceModificationInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-PDUSessionCommonNetworkInstance    CRITICALITY ignore  EXTENSION PDUSessionCommonNetworkInstance    PRESENCE optional} |
    { ID id-DefaultDRB-Allowed                 CRITICALITY ignore  EXTENSION DefaultDRB-Allowed                 PRESENCE optional} |
    { ID id-NonGBRRResources-Offered           CRITICALITY ignore  EXTENSION NonGBRRResources-Offered           PRESENCE optional} |
    { ID id-Redundant-UL-NG-U-TNLatUPF        CRITICALITY ignore  EXTENSION UPTransportLayerInformation        PRESENCE optional} |
    { ID id-RedundantCommonNetworkInstance     CRITICALITY ignore  EXTENSION PDUSessionCommonNetworkInstance     PRESENCE optional} |
    { ID id-SecurityIndication                 CRITICALITY ignore  EXTENSION SecurityIndication                 PRESENCE optional},
    ...
}

QoSFlowsToBeSetup-List-Modified-SNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsToBeSetup-List-Modified-SNterminated-Item

QoSFlowsToBeSetup-List-Modified-SNterminated-Item ::= SEQUENCE {
    qfi                                QoSFlowIdentifier,
    qosFlowLevelQoSParameters          QoSFlowLevelQoSParameters                OPTIONAL,
    offeredGBRQoSFlowInfo              GBRQoSFlowInfo                          OPTIONAL,
    qosFlowMappingIndication            QoSFlowMappingIndication                 OPTIONAL,
    iE-Extensions                      ProtocolExtensionContainer { {QoSFlowsToBeSetup-List-Modified-SNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsToBeSetup-List-Modified-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-TSCTrafficCharacteristics          CRITICALITY ignore  EXTENSION TSCTrafficCharacteristics          PRESENCE optional} |
    { ID id-RedundantQoSFlowIndicator          CRITICALITY ignore  EXTENSION RedundantQoSFlowIndicator          PRESENCE optional},
    ...
}

DRBsToBeModified-List-Modified-SNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsToBeModified-List-Modified-SNterminated-Item

DRBsToBeModified-List-Modified-SNterminated-Item ::= SEQUENCE {
    drb-ID                             DRB-ID,
    mN-DL-SCG-UP-TNLInfo               UPTransportParameters                    OPTIONAL,
    secondary-MN-DL-SCG-UP-TNLInfo      UPTransportParameters                    OPTIONAL,
    lCID                                LCID                                     OPTIONAL,
    rlc-status                          RLC-Status                              OPTIONAL,
    iE-Extensions                      ProtocolExtensionContainer { {DRBsToBeModified-List-Modified-SNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsToBeModified-List-Modified-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

```

```

    { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore  EXTENSION Additional-PDCP-Duplication-TNL-List  PRESENCE optional},
    ...
  }
}

-- *****
--
-- PDU Session Resource Modification Response Info - SN terminated
--
-- *****

PDUSessionResourceModificationResponseInfo-SNterminated ::= SEQUENCE {
  dL-NG-U-TNLatNG-RAN          UPTransportLayerInformation          OPTIONAL,
  dRBsToBeSetup                DRBsToBeSetupList-SetupResponse-SNterminated  OPTIONAL,
  dataforwardinginfoTarget     DataForwardingInfoFromTargetNGRANnode  OPTIONAL,
  dRBsToBeModified            DRBsToBeModifiedList-ModificationResponse-SNterminated  OPTIONAL,
  dRBsToBeReleased            DRB-List-withCause                    OPTIONAL,
  dataforwardinginfofromSource DataforwardingandOffloadingInfofromSource  OPTIONAL,
  qosFlowsNotAdmittedTBAdded  QoSFlows-List-withCause                OPTIONAL,
  qosFlowsReleased            QoSFlows-List-withCause                OPTIONAL,
  iE-Extensions                ProtocolExtensionContainer { {PDUSessionResourceModificationResponseInfo-SNterminated-ExtIEs} }  OPTIONAL,
  ...
}

PDUSessionResourceModificationResponseInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-DRB-IDs-takenintouse      CRITICALITY reject  EXTENSION DRB-List          PRESENCE optional}|
  { ID id-Redundant-DL-NG-U-TNLatNG-RAN  CRITICALITY ignore  EXTENSION UPTransportLayerInformation  PRESENCE optional}|
  { ID id-SecurityResult             CRITICALITY ignore  EXTENSION SecurityResult          PRESENCE optional},
  ...
}

DRBsToBeModifiedList-ModificationResponse-SNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF
  DRBsToBeModifiedList-ModificationResponse-SNterminated-Item

DRBsToBeModifiedList-ModificationResponse-SNterminated-Item ::= SEQUENCE {
  drb-ID                DRB-ID,
  sN-UL-PDCP-UP-TNLInfo  UPTransportParameters          OPTIONAL,
  dRB-QoS                QoSFlowLevelQoSParameters          OPTIONAL,
  qosFlowsMappedtoDRB-SetupResponse-SNterminated  QoSFlowsMappedtoDRB-SetupResponse-SNterminated  OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { {DRBsToBeModifiedList-ModificationResponse-SNterminated-Item-ExtIEs} }  OPTIONAL,
  ...
}

DRBsToBeModifiedList-ModificationResponse-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore  EXTENSION Additional-PDCP-Duplication-TNL-List  PRESENCE optional}|
  { ID id-RLCDuplicationInformation                    CRITICALITY ignore  EXTENSION RLCDuplicationInformation              PRESENCE optional}|
  { ID id-secondary-SN-UL-PDCP-UP-TNLInfo              CRITICALITY ignore  EXTENSION UPTransportParameters                  PRESENCE optional}|
  { ID id-pdcpDuplicationConfiguration                 CRITICALITY ignore  EXTENSION PDCPDuplicationConfiguration          PRESENCE optional}|
  { ID id-duplicationActivation                         CRITICALITY ignore  EXTENSION DuplicationActivation                  PRESENCE optional},
  ...
}

-- *****

```

```

--
-- PDU Session Resource Modification Info - MN terminated
--
-- *****

PDUSessionResourceModificationInfo-MNterminated ::= SEQUENCE {
    pduSessionType          PDUSessionType,
    drBsToBeSetup           DRBsToBeSetupList-Setup-MNterminated          OPTIONAL,
    drBsToBeModified        DRBsToBeModifiedList-Modification-MNterminated  OPTIONAL,
    drBsToBeReleased        DRB-List-withCause                          OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {PDUSessionResourceModificationInfo-MNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceModificationInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBsToBeModifiedList-Modification-MNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF
    DRBsToBeModifiedList-Modification-MNterminated-Item

DRBsToBeModifiedList-Modification-MNterminated-Item ::= SEQUENCE {
    drb-ID                  DRB-ID,
    mN-UL-PDCP-UP-TNLInfo  UPTransportParameters          OPTIONAL,
    drB-QoS                 QoSFlowLevelQoSParameters          OPTIONAL,
    secondary-MN-UL-PDCP-UP-TNLInfo UPTransportParameters          OPTIONAL,
    uL-Configuration        ULConfiguration                    OPTIONAL,
    pdcpDuplicationConfiguration PDCPDuplicationConfiguration          OPTIONAL,
    duplicationActivation    DuplicationActivation              OPTIONAL,
    qosFlowsMappedtoDRB-Setup-MNterminated QoSFlowsMappedtoDRB-Setup-MNterminated  OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {DRBsToBeModifiedList-Modification-MNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsToBeModifiedList-Modification-MNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore EXTENSION Additional-PDCP-Duplication-TNL-List PRESENCE optional}|
    { ID id-RLCDuplicationInformation                    CRITICALITY ignore EXTENSION RLCDuplicationInformation PRESENCE optional},
    ...
}

-- *****
--
-- PDU Session Resource Modification Response Info - MN terminated
--
-- *****

PDUSessionResourceModificationResponseInfo-MNterminated ::= SEQUENCE {
    drBsAdmittedList        DRBsAdmittedList-ModificationResponse-MNterminated,
    drBsReleasedList        DRB-List                                OPTIONAL,
    drBsNotAdmittedSetupModifyList DRB-List-withCause          OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {PDUSessionResourceModificationResponseInfo-MNterminated-ExtIEs} } OPTIONAL,
}

```

```

}
...
}
PDUSessionResourceModificationResponseInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
...
}
DRBsAdmittedList-ModificationResponse-MNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsAdmittedList-ModificationResponse-MNterminated-Item
DRBsAdmittedList-ModificationResponse-MNterminated-Item ::= SEQUENCE {
drb-ID DRB-ID,
sN-DL-SCG-UP-TNLInfo UPTransportParameters OPTIONAL,
secondary-SN-DL-SCG-UP-TNLInfo UPTransportParameters OPTIONAL,
lCID LCID OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {DRBsAdmittedList-ModificationResponse-MNterminated-Item-ExtIEs} } OPTIONAL,
...
}
DRBsAdmittedList-ModificationResponse-MNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
{ ID id-Additional-PDCP-Duplication-TNL-List CRITICALITY ignore EXTENSION Additional-PDCP-Duplication-TNL-List PRESENCE optional}|
{ ID id-QoSFlowsMappedtoDRB-SetupResponse-MNterminated CRITICALITY ignore EXTENSION QoSFlowsMappedtoDRB-SetupResponse-MNterminated PRESENCE
optional},
...
}

-- *****
--
-- PDU Session Resource Change Required Info - SN terminated
--
-- *****

PDUSessionResourceChangeRequiredInfo-SNterminated ::= SEQUENCE {
dataforwardinginfofromSource DataforwardingandOffloadingInfofromSource OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {PDUSessionResourceChangeRequiredInfo-SNterminated-ExtIEs} } OPTIONAL,
...
}
PDUSessionResourceChangeRequiredInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
...
}

-- *****
--
-- PDU Session Resource Change Confirm Info - SN terminated
--
-- *****

PDUSessionResourceChangeConfirmInfo-SNterminated ::= SEQUENCE {
dataforwardinginfoTarget DataForwardingInfoFromTargetNgranNode OPTIONAL,
iE-Extensions ProtocolExtensionContainer { {PDUSessionResourceChangeConfirmInfo-SNterminated-ExtIEs} } OPTIONAL,

```

```

}
...
}
PDU Session Resource Change Confirm Info - SN terminated - Ext IEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-DRB-IDs-takenintouse    CRITICALITY reject  EXTENSION DRB-List  PRESENCE optional},
  ...
}

-- *****
--
-- PDU Session Resource Change Required Info - MN terminated
--
-- *****

PDU Session Resource Change Required Info - MN terminated ::= SEQUENCE {
  iE-Extensions                    ProtocolExtensionContainer { {PDU Session Resource Change Required Info - MN terminated - Ext IEs} }  OPTIONAL,
  ...
}

PDU Session Resource Change Required Info - MN terminated - Ext IEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *****
--
-- PDU Session Resource Change Confirm Info - MN terminated
--
-- *****

PDU Session Resource Change Confirm Info - MN terminated ::= SEQUENCE {
  iE-Extensions                    ProtocolExtensionContainer { {PDU Session Resource Change Confirm Info - MN terminated - Ext IEs} }  OPTIONAL,
  ...
}

PDU Session Resource Change Confirm Info - MN terminated - Ext IEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

-- *****
--
-- PDU Session Resource Modification Required Info - SN terminated
--
-- *****

PDU Session Resource Mod Rqd Info - SN terminated ::= SEQUENCE {
  dL-NG-U-TNLatNG-RAN              UPTransportLayerInformation          OPTIONAL,
  qosFlowsToBeReleased-List         QoSFlows-List-withCause          OPTIONAL,
  dataforwardinginfofromSource      DataforwardingandOffloadingInfofromSource  OPTIONAL,

```

```

drbsToBeSetupList          DRBsToBeSetup-List-ModRqd-SNterminated          OPTIONAL,
drbsToBeModifiedList      DRBsToBeModified-List-ModRqd-SNterminated      OPTIONAL,
dRBsToBeReleased          DRB-List-withCause                          OPTIONAL,
iE-Extensions              ProtocolExtensionContainer { {PDUSessionResourceModRqdInfo-SNterminated-ExtIEs} } OPTIONAL,
...
}

PDUSessionResourceModRqdInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
...
}

DRBsToBeSetup-List-ModRqd-SNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsToBeSetup-List-ModRqd-SNterminated-Item

DRBsToBeSetup-List-ModRqd-SNterminated-Item ::= SEQUENCE {
drb-ID                      DRB-ID,
pDCP-SNLength              PDCPSNLength                                OPTIONAL,
sn-UL-PDCP-UPTNLInfo      UPTransportParameters,
dRB-QoS                    QoSFlowLevelQoSParameters,
secondary-SN-UL-PDCP-UP-TNLInfo UPTransportParameters                OPTIONAL,
duplicationActivation      DuplicationActivation                OPTIONAL,
uL-Configuration          ULConfiguration                    OPTIONAL,
qoSFlowsMappedtoDRB-ModRqd-SNterminated QoSFlowsSetupMappedtoDRB-ModRqd-SNterminated,
rLC-Mode                  RLCMode,
iE-Extensions              ProtocolExtensionContainer { {DRBsToBeSetup-List-ModRqd-SNterminated-Item-ExtIEs} } OPTIONAL,
...
}

DRBsToBeSetup-List-ModRqd-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
{ ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore EXTENSION Additional-PDCP-Duplication-TNL-List PRESENCE optional},
{ ID id-RLCDuplicationInformation                    CRITICALITY ignore EXTENSION RLCDuplicationInformation PRESENCE optional},
...
}

QoSFlowsSetupMappedtoDRB-ModRqd-SNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF
QoSFlowsSetupMappedtoDRB-ModRqd-SNterminated-Item

QoSFlowsSetupMappedtoDRB-ModRqd-SNterminated-Item ::= SEQUENCE {
qoSFlowIdentifier          QoSFlowIdentifier,
mCGRequestedGBRQoSFlowInfo GBRQoSFlowInfo                                OPTIONAL,
iE-Extensions              ProtocolExtensionContainer { {QoSFlowsSetupMappedtoDRB-ModRqd-SNterminated-Item-ExtIEs} } OPTIONAL,
...
}

QoSFlowsSetupMappedtoDRB-ModRqd-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
{ID id-QoSFlowMappingIndication CRITICALITY ignore EXTENSION QoSFlowMappingIndication PRESENCE optional},
...
}

DRBsToBeModified-List-ModRqd-SNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsToBeModified-List-ModRqd-SNterminated-Item

DRBsToBeModified-List-ModRqd-SNterminated-Item ::= SEQUENCE {
drb-ID                      DRB-ID,
sN-UL-PDCP-UP-TNLInfo      UPTransportParameters                OPTIONAL,
dRB-QoS                    QoSFlowLevelQoSParameters                OPTIONAL,

```

```

secondary-SN-UL-PDCP-UP-TNLInfo          UPTransportParameters          OPTIONAL,
uL-Configuration                          ULConfiguration                  OPTIONAL,
pdcpDuplicationConfiguration              PDCPDuplicationConfiguration    OPTIONAL,
duplicationActivation                      DuplicationActivation            OPTIONAL,
qoSFlowsMappedtoDRB-ModRqd-SNterminated  QoSFlowsModifiedMappedtoDRB-ModRqd-SNterminated  OPTIONAL,
IE-Extensions                             ProtocolExtensionContainer { {DRBsToBeModified-List-ModRqd-SNterminated-Item-ExtIEs} } OPTIONAL,
...
}

DRBsToBeModified-List-ModRqd-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore  EXTENSION Additional-PDCP-Duplication-TNL-List  PRESENCE optional}|
  { ID id-RLCDuplicationInformation                    CRITICALITY ignore  EXTENSION RLCDuplicationInformation  PRESENCE optional},
  ...
}

QoSFlowsModifiedMappedtoDRB-ModRqd-SNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF
  QoSFlowsModifiedMappedtoDRB-ModRqd-SNterminated-Item

QoSFlowsModifiedMappedtoDRB-ModRqd-SNterminated-Item ::= SEQUENCE {
  qoSFlowIdentifier          QoSFlowIdentifier,
  mCGRequestedGBRQoSFlowInfo  GBRQoSFlowInfo          OPTIONAL,
  IE-Extensions              ProtocolExtensionContainer { {QoSFlowsModifiedMappedtoDRB-ModRqd-SNterminated-Item-ExtIEs} } OPTIONAL,
  ...
}

QoSFlowsModifiedMappedtoDRB-ModRqd-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  {ID id-QoSFlowMappingIndication CRITICALITY ignore  EXTENSION QoSFlowMappingIndication  PRESENCE optional},
  ...
}

-- *****
--
-- PDU Session Resource Modification Confirm Info - SN terminated
--
-- *****

PDU Session Resource Modification Confirm Info - SN terminated ::= SEQUENCE {
  uL-NG-U-TNLatUPF          UPTransportLayerInformation          OPTIONAL,
  dRBsAdmittedList           DRBsAdmittedList-ModConfirm-SNterminated,
  dRBsNotAdmittedSetupModifyList  DRB-List-withCause          OPTIONAL,
  dataforwardinginInfoTarget     DataForwardingInfoFromTargetNGRANnode  OPTIONAL,
  IE-Extensions              ProtocolExtensionContainer { {PDU Session Resource Modification Confirm Info - SN terminated-ExtIEs} } OPTIONAL,
  ...
}

PDU Session Resource Modification Confirm Info - SN terminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-DRB-IDs-takenintouse          CRITICALITY reject  EXTENSION DRB-List  PRESENCE optional},
  ...
}

DRBsAdmittedList-ModConfirm-SNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF
  DRBsAdmittedList-ModConfirm-SNterminated-Item

```

```

DRBsAdmittedList-ModConfirm-SNterminated-Item ::= SEQUENCE {
    drb-ID                DRB-ID,
    mN-DL-CG-UP-TNLInfo   UPTransportParameters                OPTIONAL,
    secondary-MN-DL-CG-UP-TNLInfo   UPTransportParameters                OPTIONAL,
    lCID                  LCID                                OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { {DRBsAdmittedList-ModConfirm-SNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsAdmittedList-ModConfirm-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore  EXTENSION Additional-PDCP-Duplication-TNL-List  PRESENCE optional},
    ...
}

-- *****
--
-- PDU Session Resource Modification Required Info - MN terminated
--
-- *****

PDUSessionResourceModRqdInfo-MNterminated ::= SEQUENCE {
    drBsToBeModified      DRBsToBeModified-List-ModRqd-MNterminated                OPTIONAL,
    drBsToBeReleased      DRB-List-withCause                                    OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { {PDUSessionResourceModRqdInfo-MNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceModRqdInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBsToBeModified-List-ModRqd-MNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsToBeModified-List-ModRqd-MNterminated-Item

DRBsToBeModified-List-ModRqd-MNterminated-Item ::= SEQUENCE {
    drb-ID                DRB-ID,
    sN-DL-SCG-UP-TNLInfo   UPTransportLayerInformation,
    secondary-SN-DL-SCG-UP-TNLInfo   UPTransportLayerInformation    OPTIONAL,
    lCID                  LCID                                OPTIONAL,
    rlc-status            RLC-Status                          OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { {DRBsToBeModified-List-ModRqd-MNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsToBeModified-List-ModRqd-MNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-Additional-PDCP-Duplication-TNL-List          CRITICALITY ignore  EXTENSION Additional-PDCP-Duplication-TNL-List  PRESENCE optional},
    ...
}

-- *****

```



```

--
-- PDU Session Resource Modification Confirm Info - MN terminated
--
-- *****

PDUSessionResourceModConfirmInfo-MNterminated ::= SEQUENCE {
    iE-Extensions          ProtocolExtensionContainer { {PDUSessionResourceModConfirmInfo-MNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceModConfirmInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- *****
--
-- PDU Session Resource Setup Complete Info - SN terminated
--
-- *****

PDUSessionResourceBearerSetupCompleteInfo-SNterminated ::= SEQUENCE {
    dRBsToBeSetupList      SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBsToBeSetupList-BearerSetupComplete-SNterminated-Item,
    iE-Extensions          ProtocolExtensionContainer { {PDUSessionResourceBearerSetupCompleteInfo-SNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceBearerSetupCompleteInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBsToBeSetupList-BearerSetupComplete-SNterminated-Item ::= SEQUENCE {
    dRB-ID                 DRB-ID,
    mN-Xn-U-TNLInfoatM     UPTransportLayerInformation,
    iE-Extensions          ProtocolExtensionContainer { {DRBsToBeSetupList-BearerSetupComplete-SNterminated-Item-ExtIEs} } OPTIONAL,
    ...
}

DRBsToBeSetupList-BearerSetupComplete-SNterminated-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    {ID id-Secondary-MN-Xn-U-TNLInfoatM CRITICALITY ignore EXTENSION UPTransportLayerInformation PRESENCE optional},
    ...
}

-- *****
--
-- PDU Session related message level IEs END
--
-- *****

PDUSessionResourceSecondaryRATUsageList ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionResourceSecondaryRATUsageItem

PDUSessionResourceSecondaryRATUsageItem ::= SEQUENCE {
    pDUSessionID           PDUSession-ID,

```

```

    secondaryRATUsageInformation          SecondaryRATUsageInformation,
    iE-Extensions          ProtocolExtensionContainer { {PDUSessionResourceSecondaryRATUsageItem-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceSecondaryRATUsageItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionUsageReport ::= SEQUENCE {
    rATType          ENUMERATED {nr, eutra, ..., nr-unlicensed, e-utra-unlicensed},
    pDUSessionTimedReportList          VolumeTimedReportList,
    iE-Extensions          ProtocolExtensionContainer { {PDUSessionUsageReport-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionUsageReport-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionType ::= ENUMERATED {ipv4, ipv6, ipv4v6, ethernet, unstructured, ...}

PDUSession-ID ::= INTEGER (0..255)

PDUSessionNetworkInstance ::= INTEGER (1..256, ...)

PDUSessionCommonNetworkInstance ::= OCTET STRING

Periodical ::= SEQUENCE {
    iE-Extensions          ProtocolExtensionContainer { { Periodical-ExtIEs} } OPTIONAL,
    ...
}

Periodical-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

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

PCIListForMDT ::= SEQUENCE (SIZE(1.. maxnoofNeighPCIforMDT)) OF NRPCI

PNI-NPN-Restricted-Information ::= ENUMERATED { restricted, not-restricted, ...}

PortNumber ::= BIT STRING (SIZE (16))

PriorityLevelQoS ::= INTEGER (1..127, ...)

ProtectedE-UTRAResourceIndication ::= SEQUENCE {
    activationSFN          ActivationSFN,
    protectedResourceList          ProtectedE-UTRAResourceList,
    mbsfnControlRegionLength          MBSFNControlRegionLength          OPTIONAL,
}

```

```

    pDCCHRegionLength          INTEGER (1..3),
    iE-Extensions              ProtocolExtensionContainer { {ProtectedE-UTRAResourceIndication-ExtIEs} } OPTIONAL,
    ...
}

ProtectedE-UTRAResourceIndication-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ProtectedE-UTRAResourceList ::= SEQUENCE (SIZE (1.. maxnoofProtectedResourcePatterns)) OF ProtectedE-UTRAResource-Item

ProtectedE-UTRAResource-Item ::= SEQUENCE {
    resourceType                ENUMERATED {downlinknonCRS, cRS, uplink, ...},
    intra-PRBProtectedResourceFootprint BIT STRING (SIZE(84, ...)),
    protectedFootprintFrequencyPattern BIT STRING (SIZE(6..110, ...)),
    protectedFootprintTimePattern    ProtectedE-UTRAFootprintTimePattern,
    iE-Extensions                ProtocolExtensionContainer { {ProtectedE-UTRAResource-Item-ExtIEs} } OPTIONAL,
    ...
}

ProtectedE-UTRAResource-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ProtectedE-UTRAFootprintTimePattern ::= SEQUENCE {
    protectedFootprintTimeperiodicity INTEGER (1..320, ...),
    protectedFootprintStartTime        INTEGER (1..20, ...),
    iE-Extensions                    ProtocolExtensionContainer { {ProtectedE-UTRAFootprintTimePattern-ExtIEs} } OPTIONAL,
    ...
}

ProtectedE-UTRAFootprintTimePattern-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- Q

QoSCharacteristics ::= CHOICE {
    non-dynamic          NonDynamic5QIDescriptor,
    dynamic              Dynamic5QIDescriptor,
    choice-extension     ProtocolIE-Single-Container { {QoSCharacteristics-ExtIEs} }
}

QoSCharacteristics-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

QoSFlowIdentifier ::= INTEGER (0..63, ...)

```

```

QoSFlowLevelQoSParameters ::= SEQUENCE {
    qos-characteristics          QoSCharacteristics,
    allocationAndRetentionPrio  AllocationandRetentionPriority,
    gBRQoSFlowInfo              GBRQoSFlowInfo                OPTIONAL,
    relectiveQoS                ReflectiveQoSAttribute        OPTIONAL,
    additionalQoSflowInfo       ENUMERATED {more-likely, ...}  OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { {QoSFlowLevelQoSParameters-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowLevelQoSParameters-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    {ID id-QoSMonitoringRequest          CRITICALITY ignore EXTENSION QoSMonitoringRequest          PRESENCE optional}|
    {ID id-QoSMonitoringReportingFrequency CRITICALITY ignore EXTENSION QoSMonitoringReportingFrequency PRESENCE optional}|
    {ID id-QoSMonitoringDisabled        CRITICALITY ignore EXTENSION QoSMonitoringDisabled        PRESENCE optional},
    ...
}

QoSFlowMappingIndication ::= ENUMERATED {
    ul,
    dl,
    ...
}

QoSFlowNotificationControlIndicationInfo ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowNotify-Item

QoSFlowNotify-Item ::= SEQUENCE {
    qosFlowIdentifier          QoSFlowIdentifier,
    notificationInformation    ENUMERATED {fulfilled, not-fulfilled, ...},
    iE-Extensions              ProtocolExtensionContainer { {QoSFlowNotificationControlIndicationInfo-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowNotificationControlIndicationInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-CurrentQoSParaSetIndex      CRITICALITY ignore EXTENSION QoSParaSetNotifyIndex      PRESENCE optional },
    ...
}

QoSFlows-List ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlow-Item

QoSFlow-Item ::= SEQUENCE {
    qfi                        QoSFlowIdentifier,
    qosFlowMappingIndication   QoSFlowMappingIndication        OPTIONAL,
    iE-Extension                ProtocolExtensionContainer { {QoSFlow-Item-ExtIEs} }  OPTIONAL,
    ...
}

QoSFlow-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

QoSFlows-List-withCause ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowwithCause-Item

QoSFlowwithCause-Item ::= SEQUENCE {
    qfi                QoSFlowIdentifier,
    cause              Cause                OPTIONAL,
    iE-Extension       ProtocolExtensionContainer { {QoSFlowwithCause-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowwithCause-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoS-Mapping-Information ::= SEQUENCE {
    dscp                BIT STRING (SIZE(6))                OPTIONAL,
    flow-label          BIT STRING (SIZE(20))                OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { {QoS-Mapping-Information-ExtIEs} } OPTIONAL,
    ...
}

QoS-Mapping-Information-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSParaSetIndex ::= INTEGER (1..8,...)
QoSParaSetNotifyIndex ::= INTEGER (0..8,...)

QoSFlowsAdmitted-List ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowsAdmitted-Item

QoSFlowsAdmitted-Item ::= SEQUENCE {
    qfi                QoSFlowIdentifier,
    iE-Extension       ProtocolExtensionContainer { {QoSFlowsAdmitted-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsAdmitted-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-CurrentQoSParaSetIndex CRITICALITY ignore EXTENSION QoSParaSetIndex PRESENCE optional },
    ...
}

QoSFlowsToBeSetup-List ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowsToBeSetup-Item

QoSFlowsToBeSetup-Item ::= SEQUENCE {
    qfi                QoSFlowIdentifier,
    qosFlowLevelQoSParameters QoSFlowLevelQoSParameters,
    e-RAB-ID           E-RAB-ID                OPTIONAL,
    iE-Extension       ProtocolExtensionContainer { {QoSFlowsToBeSetup-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsToBeSetup-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-TSCTrafficCharacteristics CRITICALITY ignore EXTENSION TSCTrafficCharacteristics PRESENCE optional}|

```

```

    { ID id-RedundantQoSFlowIndicator      CRITICALITY ignore  EXTENSION RedundantQoSFlowIndicator  PRESENCE optional},
    ...
}

QoSFlowsUsageReportList ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsUsageReport-Item

QoSFlowsUsageReport-Item ::= SEQUENCE {
    qosFlowIdentifier      QoSFlowIdentifier,
    rATType                ENUMERATED {nr, eutra, ..., nr-unlicensed, e-utra-unlicensed},
    qosFlowsTimedReportList VolumeTimedReportList,
    iE-Extensions          ProtocolExtensionContainer { {QoSFlowsUsageReport-Item-ExtIEs} } OPTIONAL,
    ...
}

QoSFlowsUsageReport-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSMonitoringRequest ::= ENUMERATED {ul, dl, both}
QoSMonitoringDisabled ::= ENUMERATED {true, ...}
QoSMonitoringReportingFrequency ::= INTEGER (1..1800, ...)

-- R

RACHReportInformation ::= SEQUENCE (SIZE(1.. maxnoofRACHReports)) OF RACHReportList-Item
RACHReportList-Item ::= SEQUENCE {
    rACHReport      RACHReportContainer,
    iE-Extensions   ProtocolExtensionContainer { { RACHReportList-Item-ExtIEs} } OPTIONAL,
    ...
}

RACHReportList-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RACHReportContainer ::= OCTET STRING

RadioResourceStatus ::= CHOICE {
    ng-eNB-RadioResourceStatus NG-eNB-RadioResourceStatus,
    gNB-RadioResourceStatus     GNB-RadioResourceStatus,
    choice-extension            ProtocolIE-Single-Container { { RadioResourceStatus-ExtIEs} }
}

RadioResourceStatus-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

RANAC ::= INTEGER (0..255)

RANAreaID ::= SEQUENCE {

```

```

    tAC                TAC,
    rANAC              RANAC
    iE-Extensions     ProtocolExtensionContainer { {RANAreaID-ExtIEs} } OPTIONAL,
    ...
}

RANAreaID-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RANAreaID-List ::= SEQUENCE (SIZE(1..maxnoofRANAreasinRNA)) OF RANAreaID

Range ::= ENUMERATED {m50, m80, m180, m200, m350, m400, m500, m700, m1000, ...}

RANPagingArea ::= SEQUENCE {
    pLMN-Identity      PLMN-Identity,
    rANPagingAreaChoice RANPagingAreaChoice,
    iE-Extensions     ProtocolExtensionContainer { {RANPagingArea-ExtIEs} } OPTIONAL,
    ...
}

RANPagingArea-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RANPagingAreaChoice ::= CHOICE {
    cell-List          NG-RAN-Cell-Identity-ListinRANPagingArea,
    rANAreaID-List     RANAreaID-List,
    choice-extension   ProtocolIE-Single-Container { {RANPagingAreaChoice-ExtIEs} }
}

RANPagingAreaChoice-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

RANPagingAttemptInfo ::= SEQUENCE {
    pagingAttemptCount    INTEGER (1..16, ...),
    intendedNumberOfPagingAttempts    INTEGER (1..16, ...),
    nextPagingAreaScope   ENUMERATED {same, changed, ...} OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { {RANPagingAttemptInfo-ExtIEs} } OPTIONAL,
    ...
}

RANPagingAttemptInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

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

```

```
RedundantQoSFlowIndicator ::= ENUMERATED {true, false}

RedundantPDUSessionInformation ::= SEQUENCE {
    rSN                RSN,
    iE-Extensions     ProtocolExtensionContainer { {RedundantPDUSessionInformation-ExtIEs} } OPTIONAL,
    ...
}

RedundantPDUSessionInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RSN ::= ENUMERATED {v1, v2, ...}

ReferenceID ::= INTEGER (1..64, ...) -- This IE may need to be refined.

ReflectiveQoSAttribute ::= ENUMERATED {subject-to-reflective-QoS, ...}

ReportAmountMDT ::= ENUMERATED{r1, r2, r4, r8, r16, r32, r64, infinity, ...}

ReportArea ::= ENUMERATED {
    cell,
    ...
}

ReportIntervalMDT ::= ENUMERATED {ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, min1, min6, min12, min30, min60, ...}

ReportType ::= CHOICE {
    periodical                Periodical,
    eventTriggered            EventTriggered,
    ...,
    choice-extension          ProtocolIE-Single-Container { {ReportType-ExtIEs} }
}

ReportType-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

ExtendedReportIntervalMDT ::= ENUMERATED {
    ms20480,
    ms40960,
    ...
}

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

ReportingPeriodicity ::= ENUMERATED {
    half-thousand-ms,
    one-thousand-ms,
```



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    two-thousand-ms,
    five-thousand-ms,
    ten-thousand-ms,
    ...
}

RegistrationRequest ::= ENUMERATED {start, stop, add, ... }

RequestReferenceID ::= INTEGER (1..64, ...)

ReservedSubframePattern ::= SEQUENCE {
    subframeType          ENUMERATED {mbsfn, non-mbsfn, ...},
    reservedSubframePattern BIT STRING (SIZE(10..160)),
    mbsfnControlRegionLength MBSFNControlRegionLength OPTIONAL,
    iE-Extension          ProtocolExtensionContainer { {ReservedSubframePattern-ExtIEs} } OPTIONAL,
    ...
}

ReservedSubframePattern-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResetRequestTypeInfo ::= CHOICE {
    fullReset          ResetRequestTypeInfo-Full,
    partialReset       ResetRequestTypeInfo-Partial,
    choice-extension   ProtocolIE-Single-Container { {ResetRequestTypeInfo-ExtIEs} }
}

ResetRequestTypeInfo-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

ResetRequestTypeInfo-Full ::= SEQUENCE {
    iE-Extension          ProtocolExtensionContainer { {ResetRequestTypeInfo-Full-ExtIEs} } OPTIONAL,
    ...
}

ResetRequestTypeInfo-Full-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResetRequestTypeInfo-Partial ::= SEQUENCE {
    ue-contexts-ToBeReleasedList ResetRequestPartialReleaseList,
    iE-Extension          ProtocolExtensionContainer { {ResetRequestTypeInfo-Partial-ExtIEs} } OPTIONAL,
    ...
}

ResetRequestTypeInfo-Partial-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

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```

ResetRequestPartialReleaseList ::= SEQUENCE (SIZE(1..maxnoofUEContexts)) OF ResetRequestPartialReleaseItem

ResetRequestPartialReleaseItem ::= SEQUENCE {
    ng-ran-node1UEXnAPID          NG-RANnodeUEXnAPID          OPTIONAL,
    ng-ran-node2UEXnAPID          NG-RANnodeUEXnAPID          OPTIONAL,
    iE-Extensions                  ProtocolExtensionContainer { {ResetRequestPartialReleaseItem-ExtIEs} } OPTIONAL,
    ...
}

ResetRequestPartialReleaseItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResetResponseTypeInfo ::= CHOICE {
    fullReset          ResetResponseTypeInfo-Full,
    partialReset       ResetResponseTypeInfo-Partial,
    choice-extension   ProtocolIE-Single-Container { {ResetResponseTypeInfo-ExtIEs} }
}

ResetResponseTypeInfo-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

ResetResponseTypeInfo-Full ::= SEQUENCE {
    iE-Extension       ProtocolExtensionContainer { {ResetResponseTypeInfo-Full-ExtIEs} } OPTIONAL,
    ...
}

ResetResponseTypeInfo-Full-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResetResponseTypeInfo-Partial ::= SEQUENCE {
    ue-contexts-AdmittedToBeReleasedList  ResetResponsePartialReleaseList,
    iE-Extension                           ProtocolExtensionContainer { {ResetResponseTypeInfo-Partial-ExtIEs} } OPTIONAL,
    ...
}

ResetResponseTypeInfo-Partial-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ResetResponsePartialReleaseList ::= SEQUENCE (SIZE(1..maxnoofUEContexts)) OF ResetResponsePartialReleaseItem

ResetResponsePartialReleaseItem ::= SEQUENCE {
    ng-ran-node1UEXnAPID          NG-RANnodeUEXnAPID          OPTIONAL,
    ng-ran-node2UEXnAPID          NG-RANnodeUEXnAPID          OPTIONAL,
    iE-Extensions                  ProtocolExtensionContainer { {ResetResponsePartialReleaseItem-ExtIEs} } OPTIONAL,
    ...
}

ResetResponsePartialReleaseItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

```

```

}
...
}

RLCMode ::= ENUMERATED {
    rlc-am,
    rlc-um-bidirectional,
    rlc-um-unidirectional-ul,
    rlc-um-unidirectional-dl,
    ...
}

RLC-Status ::= SEQUENCE {
    reestablishment-Indication Reestablishment-Indication,
    iE-Extensions ProtocolExtensionContainer { {RLC-Status-ExtIEs} } OPTIONAL,
    ...
}

RLC-Status-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RLCDuplicationInformation ::= SEQUENCE {
    rLCDuplicationStateList RLCDuplicationStateList,
    rLC-PrimaryIndicator ENUMERATED {true, false} OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { {RLCDuplicationInformation-ItemExtIEs} } OPTIONAL
}

RLCDuplicationInformation-ItemExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RLCDuplicationStateList ::= SEQUENCE (SIZE(1..maxnoofRLCDuplicationstate)) OF RLCDuplicationState-Item

RLCDuplicationState-Item ::= SEQUENCE {
    duplicationState ENUMERATED {active,inactive, ...},
    iE-Extensions ProtocolExtensionContainer { {RLCDuplicationState-ItemExtIEs} } OPTIONAL,
    ...
}

RLCDuplicationState-ItemExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

Reestablishment-Indication ::= ENUMERATED {
    reestablished,
    ...
}

RFSP-Index ::= INTEGER (1..256)

```

```

RRCConfigIndication ::= ENUMERATED {
    full-config,
    delta-config,
    ...
}

RRCConnections ::= SEQUENCE {
    noofRRCConnections          NoofRRCConnections,
    availableRRCConnectionCapacityValue AvailableRRCConnectionCapacityValue,
    iE-Extensions              ProtocolExtensionContainer { { RRCConnections-ExtIEs } } OPTIONAL,
    ...
}

RRCConnections-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RRCConnReestab-Indicator ::= ENUMERATED { reconfigurationFailure, handoverFailure, otherFailure, ...}

RRCReestab-initiated ::= SEQUENCE {
    rRRCReestab-initiated-reporting RRCReestab-Initiated-Reporting,
    iE-Extensions                  ProtocolExtensionContainer { { RRCReestab-initiated-ExtIEs } } OPTIONAL,
    ...
}

RRCReestab-initiated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RRCReestab-Initiated-Reporting ::= CHOICE {
    rRRCReestab-reporting-wo-UERLFRReport          RRCReestab-Initiated-Reporting-wo-UERLFRReport,
    rRRCReestab-reporting-with-UERLFRReport       RRCReestab-Initiated-Reporting-with-UERLFRReport,
    choice-extension                               ProtocolIE-Single-Container { {RRCReestab-Initiated-Reporting-ExtIEs} }
}

RRCReestab-Initiated-Reporting-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

RRCReestab-Initiated-Reporting-wo-UERLFRReport ::= SEQUENCE {
    failureCellPCI          NG-RAN-CellPCI,
    reestabCellCGI         GlobalNG-RANCell-ID,
    c-RNTI                  C-RNTI,
    shortMAC-I              MAC-I,
    iE-Extensions          ProtocolExtensionContainer { { RRCReestab-Initiated-Reporting-wo-UERLFRReport-ExtIEs } } OPTIONAL,
    ...
}

RRCReestab-Initiated-Reporting-wo-UERLFRReport-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-RRCCConnReestab-Indicator    CRITICALITY ignore  EXTENSION RRCConnReestab-Indicator    PRESENCE optional },
    ...
}

```

```

RRCReestab-Initiated-Reporting-with-UERLFReport ::= SEQUENCE {
    uERLFReportContainer    UERLFReportContainer,
    iE-Extensions          ProtocolExtensionContainer { {RRCReestab-Initiated-Reporting-with-UERLFReport-ExtIEs} } OPTIONAL,
    ...
}

RRCReestab-Initiated-Reporting-with-UERLFReport-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RRCSetup-initiated ::= SEQUENCE {
    rRRCSetup-Initiated-Reporting    RRCSetup-Initiated-Reporting,
    uERLFReportContainer              UERLFReportContainer OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { { RRCSetup-initiated-ExtIEs} } OPTIONAL,
    ...
}

RRCSetup-initiated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RRCSetup-Initiated-Reporting ::= CHOICE {
    rRCSsetup-reporting-with-UERLFReport          RRCSetup-Initiated-Reporting-with-UERLFReport,
    choice-extension                             ProtocolIE-Single-Container { {RRCSetup-Initiated-Reporting-ExtIEs} }
}

RRCSetup-Initiated-Reporting-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

RRCSetup-Initiated-Reporting-with-UERLFReport ::= SEQUENCE {
    uERLFReportContainer    UERLFReportContainer,
    iE-Extensions          ProtocolExtensionContainer { {RRCSetup-Initiated-Reporting-with-UERLFReport-ExtIEs} } OPTIONAL,
    ...
}

RRCSetup-Initiated-Reporting-with-UERLFReport-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

RRCResumeCause ::= ENUMERATED {
    rna-Update,
    ...
}

-- S

SecondarydataForwardingInfoFromTarget-Item ::= SEQUENCE {
    secondarydataForwardingInfoFromTarget          DataForwardingInfoFromTargetNGRANnode,
    iE-Extensions                                ProtocolExtensionContainer { { SecondarydataForwardingInfoFromTarget-Item-ExtIEs} } OPTIONAL,
    ...
}

```

```

SecondarydataForwardingInfoFromTarget-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

SecondarydataForwardingInfoFromTarget-List ::= SEQUENCE (SIZE(1..maxnoofMultiConnectivityMinusOne)) OF SecondarydataForwardingInfoFromTarget-Item

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

SCGIndicator ::= ENUMERATED{released, ...}

SecondaryRATUsageInformation ::= SEQUENCE {
  pduSessionUsageReport          PDUUsageReport          OPTIONAL,
  qosFlowsUsageReportList        QoSFlowsUsageReportList  OPTIONAL,
  iE-Extension                    ProtocolExtensionContainer { {SecondaryRATUsageInformation-ExtIEs} } OPTIONAL,
  ...
}

SecondaryRATUsageInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

SecurityIndication ::= SEQUENCE {
  integrityProtectionIndication      ENUMERATED {required, preferred, not-needed, ...},
  confidentialityProtectionIndication  ENUMERATED {required, preferred, not-needed, ...},
  maximumIPdataRate                  MaximumIPdataRate          OPTIONAL,
  -- This IE shall be present if the Integrity Protection IE within the Security Indication IE is present and set to "required" or "preferred". --
  iE-Extensions                       ProtocolExtensionContainer { {SecurityIndication-ExtIEs} } OPTIONAL,
  ...
}

SecurityIndication-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

SecurityResult ::= SEQUENCE {
  integrityProtectionResult          ENUMERATED {performed, not-performed, ...},
  confidentialityProtectionResult    ENUMERATED {performed, not-performed, ...},
  iE-Extensions                      ProtocolExtensionContainer { {SecurityResult-ExtIEs} } OPTIONAL,
  ...
}

SecurityResult-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

SensorMeasurementConfiguration ::= SEQUENCE {
  sensorMeasConfig                  SensorMeasConfig,
  sensorMeasConfigNameList          SensorMeasConfigNameList          OPTIONAL,
  iE-Extensions                      ProtocolExtensionContainer { { SensorMeasurementConfiguration-ExtIEs } } OPTIONAL,
  ...
}

```

```

SensorMeasurementConfiguration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

SensorMeasConfigNameList ::= SEQUENCE (SIZE(1..maxnoofSensorName)) OF SensorName

SensorMeasConfig ::= ENUMERATED {setup, ...}

SensorName ::= SEQUENCE {
  uncompensatedBarometricConfig  ENUMERATED {true, ...}          OPTIONAL,
  ueSpeedConfig                   ENUMERATED {true, ...}          OPTIONAL,
  ueOrientationConfig              ENUMERATED {true, ...}          OPTIONAL,
  iE-Extensions                   ProtocolExtensionContainer { {SensorNameConfig-ExtIEs} } OPTIONAL,
  ...
}

SensorNameConfig-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

-- Served Cells E-UTRA IEs

ServedCellInformation-E-UTRA ::= SEQUENCE {
  e-utra-pci                       E-UTRAPCI,
  e-utra-cgi                       E-UTRA-CGI,
  tac                              TAC,
  ranac                            RANAC                                OPTIONAL,
  broadcastPLMNs                   SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF ServedCellInformation-E-UTRA-perBPLMN,
  e-utra-mode-info                 ServedCellInformation-E-UTRA-ModeInfo,
  numberOfAntennaPorts             NumberOfAntennaPorts-E-UTRA          OPTIONAL,
  prach-configuration              E-UTRAPRACHConfiguration            OPTIONAL,
  mBSFNsubframeInfo               MBSFNsubframeInfo-E-UTRA            OPTIONAL,
  multibandInfo                   E-UTRAMultibandInfoList             OPTIONAL,
  freqBandIndicatorPriority         ENUMERATED {not-broadcast, ...}      OPTIONAL,
  bandwidthReducedSI               ENUMERATED {scheduled, ...}      OPTIONAL,
  protectedE-UTRAResourceIndication ProtectedE-UTRAResourceIndication    OPTIONAL,
  iE-Extensions                   ProtocolExtensionContainer { {ServedCellInformation-E-UTRA-ExtIEs} } OPTIONAL,
  ...
}

ServedCellInformation-E-UTRA-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-BPLMN-ID-Info-EUTRA      CRITICALITY ignore EXTENSION BPLMN-ID-Info-EUTRA      PRESENCE optional }|
  { ID id-NPRACHConfiguration      CRITICALITY ignore EXTENSION NPRACHConfiguration      PRESENCE optional },
  ...
}

ServedCellInformation-E-UTRA-perBPLMN ::= SEQUENCE {
  plmn-id                          PLMN-Identity,
  iE-Extensions                   ProtocolExtensionContainer { {ServedCellInformation-E-UTRA-perBPLMN-ExtIEs} } OPTIONAL,
  ...
}

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```

ServedCellInformation-E-UTRA-perBPLMN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

ServedCellInformation-E-UTRA-ModeInfo ::= CHOICE {
  fdd          ServedCellInformation-E-UTRA-FDDInfo,
  tdd          ServedCellInformation-E-UTRA-TDDInfo,
  choice-extension  ProtocolIE-Single-Container { {ServedCellInformation-E-UTRA-ModeInfo-ExtIEs} }
}

ServedCellInformation-E-UTRA-ModeInfo-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

ServedCellInformation-E-UTRA-FDDInfo ::= SEQUENCE {
  ul-earfcn      E-UTRAARFCN,
  dl-earfcn      E-UTRAARFCN,
  ul-e-utraTxBW  E-UTRATransmissionBandwidth,
  dl-e-utraTxBW  E-UTRATransmissionBandwidth,
  iE-Extensions  ProtocolExtensionContainer { {ServedCellInformation-E-UTRA-FDDInfo-ExtIEs} } OPTIONAL,
  ...
}

ServedCellInformation-E-UTRA-FDDInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-OffsetOfNbiotChannelNumberToDL-EARFCN  CRITICALITY reject  EXTENSION OffsetOfNbiotChannelNumberToEARFCN  PRESENCE optional} |
  { ID id-OffsetOfNbiotChannelNumberToUL-EARFCN   CRITICALITY reject  EXTENSION OffsetOfNbiotChannelNumberToEARFCN  PRESENCE optional},
  ...
}

ServedCellInformation-E-UTRA-TDDInfo ::= SEQUENCE {
  earfcn          E-UTRAARFCN,
  e-utraTxBW      E-UTRATransmissionBandwidth,
  subframeAssignmnet  ENUMERATED {sa0,sa1,sa2,sa3,sa4,sa5,sa6,...},
  specialSubframeInfo  SpecialSubframeInfo-E-UTRA,
  iE-Extensions     ProtocolExtensionContainer { {ServedCellInformation-E-UTRA-TDDInfo-ExtIEs} } OPTIONAL,
  ...
}

ServedCellInformation-E-UTRA-TDDInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-OffsetOfNbiotChannelNumberToDL-EARFCN  CRITICALITY reject  EXTENSION OffsetOfNbiotChannelNumberToEARFCN  PRESENCE optional} |
  { ID id-NBIoT-UL-DL-AlignmentOffset           CRITICALITY reject  EXTENSION NBIoT-UL-DL-AlignmentOffset  PRESENCE optional},
  ...
}

ServedCells-E-UTRA ::= SEQUENCE (SIZE (1..maxnoofCellsinNG-RANnode)) OF ServedCells-E-UTRA-Item

ServedCells-E-UTRA-Item ::= SEQUENCE {
  served-cell-info-E-UTRA  ServedCellInformation-E-UTRA,
  neighbour-info-NR        NeighbourInformation-NR                OPTIONAL,
}

```



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    neighbour-info-E-UTRA      NeighbourInformation-E-UTRA      OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { {ServedCells-E-UTRA-Item-ExtIEs} } OPTIONAL,
    ...
}

ServedCells-E-UTRA-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-SFN-Offset      CRITICALITY ignore EXTENSION SFN-Offset      PRESENCE optional },
    ...
}

ServedCellsToUpdate-E-UTRA ::= SEQUENCE {
    served-Cells-ToAdd-E-UTRA      ServedCells-E-UTRA      OPTIONAL,
    served-Cells-ToModify-E-UTRA      ServedCells-ToModify-E-UTRA      OPTIONAL,
    served-Cells-ToDelete-E-UTRA      SEQUENCE (SIZE (1..maxnoofCellsinNG-RANode)) OF E-UTRA-CGI      OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { {ServedCellsToUpdate-E-UTRA-ExtIEs} } OPTIONAL,
    ...
}

ServedCellsToUpdate-E-UTRA-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

ServedCells-ToModify-E-UTRA ::= SEQUENCE (SIZE (1..maxnoofCellsinNG-RANode)) OF ServedCells-ToModify-E-UTRA-Item

ServedCells-ToModify-E-UTRA-Item ::= SEQUENCE {
    old-ECGI      E-UTRA-CGI,
    served-cell-info-E-UTRA      ServedCellInformation-E-UTRA,
    neighbour-info-NR      NeighbourInformation-NR      OPTIONAL,
    neighbour-info-E-UTRA      NeighbourInformation-E-UTRA      OPTIONAL,
    deactivation-indication      ENUMERATED {deactivated, ...}      OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { {Served-cells-ToModify-E-UTRA-Item-ExtIEs} } OPTIONAL,
    ...
}

Served-cells-ToModify-E-UTRA-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-SFN-Offset      CRITICALITY ignore EXTENSION SFN-Offset      PRESENCE optional },
    ...
}

-- Served Cells NR IEs

ServedCellInformation-NR ::= SEQUENCE {
    nrPCI      NRPCI,
    cellID      NR-CGI,
    tac      TAC,
    ranac      RANAC      OPTIONAL,
    broadcastPLMN      BroadcastPLMNs,
    nrModeInfo      NRModeInfo,
    measurementTimingConfiguration      OCTET STRING,
    connectivitySupport      Connectivity-Support,

```

```

    iE-Extensions          ProtocolExtensionContainer { {ServedCellInformation-NR-ExtIEs} } OPTIONAL,
    ...
}

ServedCellInformation-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  { ID id-BPLMN-ID-Info-NR          CRITICALITY ignore EXTENSION BPLMN-ID-Info-NR          PRESENCE optional } |
  { ID id-ConfiguredTACIndication   CRITICALITY ignore EXTENSION ConfiguredTACIndication PRESENCE optional } |
  { ID id-SSB-PositionsInBurst       CRITICALITY ignore EXTENSION SSB-PositionsInBurst     PRESENCE optional } |
  { ID id-NRCellPRACHConfig          CRITICALITY ignore EXTENSION NRCellPRACHConfig       PRESENCE optional } |
  { ID id-NPN-Broadcast-Information  CRITICALITY reject EXTENSION NPN-Broadcast-Information PRESENCE optional } |
  { ID id-CSI-RSTransmissionIndication CRITICALITY ignore EXTENSION CSI-RSTransmissionIndication PRESENCE optional } |
  { ID id-SFN-Offset                 CRITICALITY ignore EXTENSION SFN-Offset                 PRESENCE optional } ,
  ...
}

SFN-Offset ::= SEQUENCE {
  sFN-Time-Offset          BIT STRING (SIZE(24)),

  iE-Extensions          ProtocolExtensionContainer { {SFN-Offset-ExtIEs} } OPTIONAL,
  ...
}

SFN-Offset-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

ServedCells-NR ::= SEQUENCE (SIZE (1..maxnoofCellsinNG-RANnode)) OF ServedCells-NR-Item

ServedCells-NR-Item ::= SEQUENCE {
  served-cell-info-NR      ServedCellInformation-NR,
  neighbour-info-NR       NeighbourInformation-NR          OPTIONAL,
  neighbour-info-E-UTRA   NeighbourInformation-E-UTRA     OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { {ServedCells-NR-Item-ExtIEs} } OPTIONAL,
  ...
}

ServedCells-NR-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

ServedCells-ToModify-NR ::= SEQUENCE (SIZE (1..maxnoofCellsinNG-RANnode)) OF ServedCells-ToModify-NR-Item

ServedCells-ToModify-NR-Item ::= SEQUENCE {
  old-NR-CGI              NR-CGI,
  served-cell-info-NR      ServedCellInformation-NR,
  neighbour-info-NR       NeighbourInformation-NR          OPTIONAL,
  neighbour-info-E-UTRA   NeighbourInformation-E-UTRA     OPTIONAL,
  deactivation-indication ENUMERATED {deactivated, ...}   OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { {Served-cells-ToModify-NR-Item-ExtIEs} } OPTIONAL,
  ...
}

Served-cells-ToModify-NR-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

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}
...
}

ServedCellsToUpdate-NR ::= SEQUENCE {
    served-Cells-ToAdd-NR          ServedCells-NR                OPTIONAL,
    served-Cells-ToModify-NR      ServedCells-ToModify-NR        OPTIONAL,
    served-Cells-ToDelete-NR      SEQUENCE (SIZE (1..maxnoofCellsinNG-RANnode)) OF NR-CGI  OPTIONAL,
    iE-Extensions                 ProtocolExtensionContainer { {ServedCellsToUpdate-NR-ExtIEs} } OPTIONAL,
    ...
}

ServedCellsToUpdate-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SharedResourceType ::= CHOICE {
    ul-onlySharing                SharedResourceType-UL-OnlySharing,
    ul-and-dl-Sharing             SharedResourceType-ULDL-Sharing,
    choice-extension              ProtocolIE-Single-Container { {SharedResourceType-ExtIEs} }
}

SharedResourceType-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

SharedResourceType-UL-OnlySharing ::= SEQUENCE {
    ul-resourceBitmap             DataTrafficResources,
    iE-Extensions                ProtocolExtensionContainer { {SharedResourceType-UL-OnlySharing-ExtIEs} } OPTIONAL,
    ...
}

SharedResourceType-UL-OnlySharing-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SharedResourceType-ULDL-Sharing ::= CHOICE {
    ul-resources                 SharedResourceType-ULDL-Sharing-UL-Resources,
    dl-resources                 SharedResourceType-ULDL-Sharing-DL-Resources,
    choice-extension             ProtocolIE-Single-Container { {SharedResourceType-ULDL-Sharing-ExtIEs} }
}

SharedResourceType-ULDL-Sharing-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

SharedResourceType-ULDL-Sharing-UL-Resources ::= CHOICE {
    unchanged                    NULL,
    changed                      SharedResourceType-ULDL-Sharing-UL-ResourcesChanged,
    choice-extension             ProtocolIE-Single-Container { {SharedResourceType-ULDL-Sharing-UL-Resources-ExtIEs} }
}

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SharedResourceType-ULDL-Sharing-UL-Resources-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

SharedResourceType-ULDL-Sharing-UL-ResourcesChanged ::= SEQUENCE {
  ul-resourceBitmap          DataTrafficResources,
  iE-Extensions              ProtocolExtensionContainer { {SharedResourceType-ULDL-Sharing-UL-ResourcesChanged-ExtIEs} } OPTIONAL,
  ...
}

SharedResourceType-ULDL-Sharing-UL-ResourcesChanged-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

SharedResourceType-ULDL-Sharing-DL-Resources ::= CHOICE {
  unchanged                  NULL,
  changed                    SharedResourceType-ULDL-Sharing-DL-ResourcesChanged,
  choice-extension           ProtocolIE-Single-Container { {SharedResourceType-ULDL-Sharing-DL-Resources-ExtIEs} }
}

SharedResourceType-ULDL-Sharing-DL-Resources-ExtIEs XNAP-PROTOCOL-IES ::= {
  ...
}

SharedResourceType-ULDL-Sharing-DL-ResourcesChanged ::= SEQUENCE {
  dl-resourceBitmap          DataTrafficResources,
  iE-Extensions              ProtocolExtensionContainer { {SharedResourceType-ULDL-Sharing-DL-ResourcesChanged-ExtIEs} } OPTIONAL,
  ...
}

SharedResourceType-ULDL-Sharing-DL-ResourcesChanged-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

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

SliceAvailableCapacity-Item ::= SEQUENCE {
  pLMNIdentity                PLMN-Identity,
  sNSSAIAvailableCapacity-List SNSSAIAvailableCapacity-List,
  iE-Extensions              ProtocolExtensionContainer { { SliceAvailableCapacity-Item-ExtIEs} } OPTIONAL,
  ...
}

SliceAvailableCapacity-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}

SNSSAIAvailableCapacity-List ::= SEQUENCE (SIZE(1.. maxnoofSliceItems)) OF SNSSAIAvailableCapacity-Item

SNSSAIAvailableCapacity-Item ::= SEQUENCE {
  sNSSAI          S-NSSAI,
  sliceAvailableCapacityValueDownlink INTEGER (0..100),

```

```

    sliceAvailableCapacityValueUplink    INTEGER (0..100),
    iE-Extensions                        ProtocolExtensionContainer { { SNSSAIAvailableCapacity-Item-ExtIEs } } OPTIONAL
}

SNSSAIAvailableCapacity-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SliceSupport-List ::= SEQUENCE (SIZE(1..maxnoofSliceItems)) OF S-NSSAI

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

SliceToReport-List-Item ::= SEQUENCE {
    pLMNIdentity          PLMN-Identity,
    sNSSAIlist            SNSSAI-list,
    iE-Extensions        ProtocolExtensionContainer { { SliceToReport-List-Item-ExtIEs } } OPTIONAL,
    ...
}

SliceToReport-List-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SNSSAI-list ::= SEQUENCE (SIZE(1.. maxnoofSliceItems)) OF SNSSAI-Item

SNSSAI-Item ::= SEQUENCE {
    sNSSAI        S-NSSAI,
    iE-Extensions ProtocolExtensionContainer { { SNSSAI-Item-ExtIEs } } OPTIONAL
}

SNSSAI-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SlotConfiguration-List ::= SEQUENCE (SIZE (1..maxnoofslots)) OF SlotConfiguration-List-Item

SlotConfiguration-List-Item ::= SEQUENCE {
    slotIndex          INTEGER (0..5119),
    symbolAllocation-in-Slot SymbolAllocation-in-Slot,
    iE-Extensions     ProtocolExtensionContainer { {SlotConfiguration-List-Item-ExtIEs} } OPTIONAL,
    ...
}

SlotConfiguration-List-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

S-NG-RANnode-SecurityKey ::= BIT STRING (SIZE(256))

S-NG-RANnode-Addition-Trigger-Ind ::= ENUMERATED {
    sn-change,
    inter-MN-HO,
    intra-MN-HO,
}

```

```

    ...
}

S-NSSAI ::= SEQUENCE {
    sst          OCTET STRING (SIZE(1)),
    sd          OCTET STRING (SIZE(3)) OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { {S-NSSAI-ExtIEs} } OPTIONAL,
    ...
}

S-NSSAI-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

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

SpecialSubframeInfo-E-UTRA ::= SEQUENCE {
    specialSubframePattern SpecialSubframePatterns-E-UTRA,
    cyclicPrefixDL          CyclicPrefix-E-UTRA-DL,
    cyclicPrefixUL          CyclicPrefix-E-UTRA-UL,
    iE-Extensions          ProtocolExtensionContainer { {SpecialSubframeInfo-E-UTRA-ExtIEs} } OPTIONAL,
    ...
}

SpecialSubframeInfo-E-UTRA-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SpecialSubframePatterns-E-UTRA ::= ENUMERATED {
    ssp0,
    ssp1,
    ssp2,
    ssp3,
    ssp4,
    ssp5,
    ssp6,
    ssp7,
    ssp8,
    ssp9,
    ssp10,
    ...
}

SpectrumSharingGroupID ::= INTEGER (1..maxnoofCellsinNG-RANnode)

SplitSessionIndicator ::= ENUMERATED {
    split,
    ...
}

```

SplitSRBstypes ::= ENUMERATED {srb1, srb2, srb1and2, ...}

SSBAreaCapacityValue-List ::= SEQUENCE (SIZE(1..maxnoofSSBAreas)) OF SSBAreaCapacityValue-List-Item

```
SSBAreaCapacityValue-List-Item ::= SEQUENCE {
    sSBIndex          INTEGER(0..63),
    ssbAreaCapacityValue  INTEGER (0..100),
    iE-Extensions     ProtocolExtensionContainer { { SSBAreaCapacityValue-List-Item-ExtIEs} } OPTIONAL,
    ...
}
```

```
SSBAreaCapacityValue-List-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

SSBAreaRadioResourceStatus-List ::= SEQUENCE (SIZE(1..maxnoofSSBAreas)) OF SSBAreaRadioResourceStatus-List-Item

```
SSBAreaRadioResourceStatus-List-Item ::= SEQUENCE {
    sSBIndex          INTEGER(0..63),
    ssb-Area-DL-GBR-PRB-usage      DL-GBR-PRB-usage,
    ssb-Area-UL-GBR-PRB-usage      UL-GBR-PRB-usage,
    ssb-Area-dL-non-GBR-PRB-usage  DL-non-GBR-PRB-usage,
    ssb-Area-uL-non-GBR-PRB-usage  UL-non-GBR-PRB-usage,
    ssb-Area-dL-Total-PRB-usage    DL-Total-PRB-usage,
    ssb-Area-uL-Total-PRB-usage    UL-Total-PRB-usage,
    iE-Extensions     ProtocolExtensionContainer { { SSBAreaRadioResourceStatus-List-Item-ExtIEs} } OPTIONAL,
    ...
}
```

```
SSBAreaRadioResourceStatus-List-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-DL-scheduling-PDCCH-CCE-usage      CRITICALITY ignore EXTENSION DL-scheduling-PDCCH-CCE-usage PRESENCE optional}|
    { ID id-UL-scheduling-PDCCH-CCE-usage      CRITICALITY ignore EXTENSION UL-scheduling-PDCCH-CCE-usage PRESENCE optional},
    ...
}
```

```
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 XNAP-PROTOCOL-IES ::= {
    ...
}
```

SSBToReport-List ::= SEQUENCE (SIZE(1..maxnoofSSBAreas)) OF SSBToReport-List-Item

```

SSBToReport-List-Item ::= SEQUENCE {
    sSBIndex          INTEGER(0..63),
    iE-Extensions     ProtocolExtensionContainer { { SSBToReport-List-Item-ExtIEs } } OPTIONAL,
    ...
}

```

```

SSBToReport-List-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

SUL-FrequencyBand ::= INTEGER (1..1024)

```

```

SUL-Information ::= SEQUENCE {
    sulFrequencyInfo      NRARFCN,
    sulTransmissionBandwidth NRTransmissionBandwidth,
    iE-Extensions         ProtocolExtensionContainer { {SUL-Information-ExtIEs} } OPTIONAL,
    ...
}

```

```

SUL-Information-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-CarrierList          CRITICALITY ignore EXTENSION NRCarrierList          PRESENCE optional } |
    { ID id-FrequencyShift7p5khz CRITICALITY ignore EXTENSION FrequencyShift7p5khz PRESENCE optional },
    ...
}

```

```

SupportedSULBandList ::= SEQUENCE (SIZE(1..maxnoofNRCellBands)) OF SupportedSULBandItem

```

```

SupportedSULBandItem ::= SEQUENCE {
    sulBandItem          SUL-FrequencyBand,
    iE-Extensions         ProtocolExtensionContainer { {SupportedSULBandItem-ExtIEs} } OPTIONAL,
    ...
}

```

```

SupportedSULBandItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

SymbolAllocation-in-Slot ::= CHOICE {
    allDL          SymbolAllocation-in-Slot-AllDL,
    allUL          SymbolAllocation-in-Slot-AllUL,
    bothDLandUL   SymbolAllocation-in-Slot-BothDLandUL,
    choice-extension ProtocolIE-Single-Container { {SymbolAllocation-in-Slot-ExtIEs} }
}

```

```

SymbolAllocation-in-Slot-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

```



```

SymbolAllocation-in-Slot-AllDL ::= SEQUENCE {
    iE-Extension      ProtocolExtensionContainer { {SymbolAllocation-in-Slot-AllDL-ExtIEs} } OPTIONAL,
    ...
}

SymbolAllocation-in-Slot-AllDL-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SymbolAllocation-in-Slot-AllUL ::= SEQUENCE {
    iE-Extension      ProtocolExtensionContainer { {SymbolAllocation-in-Slot-AllUL-ExtIEs} } OPTIONAL,
    ...
}

SymbolAllocation-in-Slot-AllUL-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

SymbolAllocation-in-Slot-BothDLandUL ::= SEQUENCE {
    numberOfDLSymbols  INTEGER (0..13),
    numberOfULSymbols  INTEGER (0..13),
    iE-Extension      ProtocolExtensionContainer { {SymbolAllocation-in-Slot-BothDLandUL-ExtIEs} } OPTIONAL,
    ...
}

SymbolAllocation-in-Slot-BothDLandUL-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- T

TABasedMDT ::= SEQUENCE {
    tAListforMDT      TAListforMDT,
    iE-Extensions     ProtocolExtensionContainer { {TABasedMDT-ExtIEs} } OPTIONAL,
    ...
}

TABasedMDT-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TAIBasedMDT ::= SEQUENCE {
    tAIListforMDT     TAIListforMDT,
    iE-Extensions     ProtocolExtensionContainer { {TAIBasedMDT-ExtIEs} } OPTIONAL,
    ...
}

TAIBasedMDT-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

```

```

}
...
}
TAIListforMDT ::= SEQUENCE (SIZE(1..maxnoofTAforMDT)) OF TAIforMDT-Item
TAIforMDT-Item ::= SEQUENCE {
    plmn-ID          PLMN-Identity,
    tac              TAC,
    iE-Extensions   ProtocolExtensionContainer { {TAIforMDT-Item-ExtIEs} } OPTIONAL,
    ...
}
TAIforMDT-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
TAC ::= OCTET STRING (SIZE (3))

TAISupport-List ::= SEQUENCE (SIZE(1..maxnoofsupportedTACs)) OF TAISupport-Item
TAISupport-Item ::= SEQUENCE {
    tac              TAC,
    broadcastPLMNs  SEQUENCE (SIZE(1..maxnoofsupportedPLMNs)) OF BroadcastPLMNinTAISupport-Item,
    iE-Extensions   ProtocolExtensionContainer { {TAISupport-Item-ExtIEs} } OPTIONAL,
    ...
}
TAISupport-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
TAListforMDT ::= SEQUENCE (SIZE(1..maxnoofTAforMDT)) OF TAC

TargetCellinEUTRAN ::= OCTET STRING -- This IE is to be encoded according to Global Cell ID in the Last Visited E-UTRAN Cell Information IE, as
defined in in TS 36.413 [31]

Target-CGI ::= CHOICE {
    nr              NR-CGI,
    e-utra          E-UTRA-CGI,
    choice-extension ProtocolIE-Single-Container { {TargetCGI-ExtIEs} }
}
TargetCGI-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

TDDULDLConfigurationCommonNR ::= OCTET STRING

```

```

TargetCellList ::= SEQUENCE (SIZE(1..maxnoofCHOcells)) OF TargetCellList-Item

TargetCellList-Item ::= SEQUENCE {
    target-cell                Target-CGI,
    iE-Extensions              ProtocolExtensionContainer { { TargetCellList-Item-ExtIEs } } OPTIONAL
}

TargetCellList-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

Threshold-RSRQ ::= INTEGER(0..127)
Threshold-RSRP ::= INTEGER(0..127)
Threshold-SINR ::= INTEGER(0..127)
TimeToTrigger ::= ENUMERATED {ms0, ms40, ms64, ms80, ms100, ms128, ms160, ms256, ms320, ms480, ms512, ms640, ms1024, ms1280, ms2560, ms5120}

TimeToWait ::= ENUMERATED {
    v1s,
    v2s,
    v5s,
    v10s,
    v20s,
    v60s,
    ...
}

TNLConfigurationInfo ::= SEQUENCE {
    extendedUPTransportLayerAddressesToAdd      ExtTLAs                OPTIONAL,
    extendedUPTransportLayerAddressesToRemove  ExtTLAs                OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {TNLConfigurationInfo-ExtIEs} }  OPTIONAL,
    ...
}

TNLConfigurationInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TNLA-To-Add-List ::= SEQUENCE (SIZE(1..maxnoofTNLAAssociations)) OF TNLA-To-Add-Item

TNLA-To-Add-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress      CPTransportLayerInformation,
    tNLAssociationUsage                     TNLAAssociationUsage,
    iE-Extensions                          ProtocolExtensionContainer { { TNLA-To-Add-Item-ExtIEs } } OPTIONAL
}

TNLA-To-Add-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TNLA-To-Update-List ::= SEQUENCE (SIZE(1..maxnoofTNLAAssociations)) OF TNLA-To-Update-Item

TNLA-To-Update-Item ::= SEQUENCE {

```

```

    tNLAssociationTransportLayerAddress    CPTransportLayerInformation,
    tNLAssociationUsage                    TNLAssociationUsage    OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { { TNLA-To-Update-Item-ExtIEs } } OPTIONAL
}

TNLA-To-Update-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TNLA-To-Remove-List ::= SEQUENCE (SIZE(1..maxnoofTNLAAssociations)) OF TNLA-To-Remove-Item

TNLA-To-Remove-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress    CPTransportLayerInformation,
    iE-Extensions                          ProtocolExtensionContainer { { TNLA-To-Remove-Item-ExtIEs } } OPTIONAL
}

TNLA-To-Remove-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TNLA-Setup-List ::= SEQUENCE (SIZE(1..maxnoofTNLAAssociations)) OF TNLA-Setup-Item

TNLA-Setup-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress    CPTransportLayerInformation,
    iE-Extensions                          ProtocolExtensionContainer { { TNLA-Setup-Item-ExtIEs } } OPTIONAL,
    ...
}

TNLA-Setup-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TNLA-Failed-To-Setup-List ::= SEQUENCE (SIZE(1..maxnoofTNLAAssociations)) OF TNLA-Failed-To-Setup-Item

TNLA-Failed-To-Setup-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress    CPTransportLayerInformation,
    cause                                  Cause,
    iE-Extensions                          ProtocolExtensionContainer { { TNLA-Failed-To-Setup-Item-ExtIEs } } OPTIONAL
}

TNLA-Failed-To-Setup-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TNLAssociationUsage ::= ENUMERATED {
    ue,
    non-ue,
    both,
    ...
}

```

```
TransportLayerAddress ::= BIT STRING (SIZE(1..160, ...))
```

```
TraceActivation ::= SEQUENCE {
  ng-ran-TraceID          NG-RANTraceID,
  interfaces-to-trace     BIT STRING { ng-c (0), x-nc (1), uu (2), fl-c (3), e1 (4) } (SIZE(8)),
  trace-depth            Trace-Depth,
  trace-coll-address     TransportLayerAddress,
  ie-Extension           ProtocolExtensionContainer { {TraceActivation-ExtIEs} } OPTIONAL,
  ...
}
```

```
TraceActivation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
-- Extension to support MDT -
  { ID id-TraceCollectionEntityURI   CRITICALITY ignore  EXTENSION URIaddress           PRESENCE optional} |
  { ID id-MDT-Configuration           CRITICALITY ignore  EXTENSION MDT-Configuration         PRESENCE optional},
  ...
}
```

```
Trace-Depth ::= ENUMERATED {
  minimum,
  medium,
  maximum,
  minimumWithoutVendorSpecificExtension,
  mediumWithoutVendorSpecificExtension,
  maximumWithoutVendorSpecificExtension,
  ...
}
```

```
TSCTrafficCharacteristics ::= SEQUENCE {
  tSCAssistanceInformationDownlink  TSCAssistanceInformation OPTIONAL,
  tSCAssistanceInformationUplink    TSCAssistanceInformation OPTIONAL,
  ie-Extension                      ProtocolExtensionContainer { {TSCTrafficCharacteristics-ExtIEs} } OPTIONAL,
  ...
}
```

```
TSCTrafficCharacteristics-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}
```

```
TSCAssistanceInformation ::= SEQUENCE {
  periodicity          INTEGER (0.. 640000, ...),
  burstArrivalTime    OCTET STRING              OPTIONAL,
  ie-Extension        ProtocolExtensionContainer { { TSCAssistanceInformation-ExtIEs} } OPTIONAL,
  ...
}
```

```
TSCAssistanceInformation-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
  ...
}
```

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

-- U

UEAggregateMaximumBitRate ::= SEQUENCE {
    dl-UE-AMBR          BitRate,
    ul-UE-AMBR          BitRate,
    iE-Extension        ProtocolExtensionContainer { {UEAggregateMaximumBitRate-ExtIEs} } OPTIONAL,
    ...
}

UEAggregateMaximumBitRate-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

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

UEContextID ::= CHOICE {
    rRCResume          UEContextIDforRRCResume,
    rRRCReestablishment UEContextIDforRRCReestablishment,
    choice-extension    ProtocolIE-Single-Container { {UEContextID-ExtIEs} }
}

UEContextID-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

UEContextIDforRRCResume ::= SEQUENCE {
    i-rnti          I-RNTI,
    allocated-c-rnti C-RNTI,
    accessPCI       NG-RAN-CellPCI,
    iE-Extension    ProtocolExtensionContainer { {UEContextIDforRRCResume-ExtIEs} } OPTIONAL,
    ...
}

UEContextIDforRRCResume-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

UEContextIDforRRCReestablishment ::= SEQUENCE {
    c-rnti          C-RNTI,
    failureCellPCI NG-RAN-CellPCI,
    iE-Extension    ProtocolExtensionContainer { {UEContextIDforRRCReestablishment-ExtIEs} } OPTIONAL,
    ...
}
```

```

}
...
UEContextIDforRRCReestablishment-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
}
...

UEContextInfoRetrUECtxtResp ::= SEQUENCE {
    ng-c-UE-signalling-ref          AMF-UE-NGAP-ID,
    signalling-TNL-at-source        CPTransportLayerInformation,
    ueSecurityCapabilities          UESecurityCapabilities,
    securityInformation             AS-SecurityInformation,
    ue-AMBR                         UEAggregateMaximumBitRate,
    pduSessionResourcesToBeSetup-List PDUSessionResourcesToBeSetup-List,
    rrc-Context                     OCTET STRING,
    mobilityRestrictionList         MobilityRestrictionList                OPTIONAL,
    indexToRatFrequencySelectionPriority RFSP-Index                      OPTIONAL,
    iE-Extension                    ProtocolExtensionContainer { {UEContextInfoRetrUECtxtResp-ExtIEs} } OPTIONAL,
    ...
}

UEContextInfoRetrUECtxtResp-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-FiveGCMobilityRestrictionListContainer CRITICALITY ignore EXTENSION FiveGCMobilityRestrictionListContainer PRESENCE optional } |
    { ID id-NRUESidelinkAggregateMaximumBitRate CRITICALITY ignore EXTENSION NRUESidelinkAggregateMaximumBitRate PRESENCE optional } |
    { ID id-LTEUESidelinkAggregateMaximumBitRate CRITICALITY ignore EXTENSION LTEUESidelinkAggregateMaximumBitRate PRESENCE optional } |
    { ID id-UERadioCapabilityID CRITICALITY reject EXTENSION UERadioCapabilityID PRESENCE optional },
    ...
}

UEHistoryInformation ::= SEQUENCE (SIZE(1..maxnoofCellsinUEHistoryInfo)) OF LastVisitedCell-Item

UEHistoryInformationFromTheUE ::= CHOICE {
    nR NRMobilityHistoryReport,
    choice-extension ProtocolIE-Single-Container { {UEHistoryInformationFromTheUE-ExtIEs} }
}

UEHistoryInformationFromTheUE-ExtIEs XNAP-PROTOCOL-IES ::= {
}
...

UEIdentityIndexValue ::= CHOICE {
    indexLength10 BIT STRING (SIZE(10)),
    choice-extension ProtocolIE-Single-Container { {UEIdentityIndexValue-ExtIEs} }
}

UEIdentityIndexValue-ExtIEs XNAP-PROTOCOL-IES ::= {
}
...

UERadioCapabilityForPaging ::= SEQUENCE {

```

```

    uERadioCapabilityForPagingOfNR          UERadioCapabilityForPagingOfNR          OPTIONAL,
    uERadioCapabilityForPagingOfEUTRA      UERadioCapabilityForPagingOfEUTRA      OPTIONAL,
    IE-Extensions          ProtocolExtensionContainer { {UERadioCapabilityForPaging-ExtIEs} } OPTIONAL,
    ...
}

UERadioCapabilityForPaging-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

UERadioCapabilityForPagingOfNR ::= OCTET STRING

UERadioCapabilityForPagingOfEUTRA ::= OCTET STRING

UERadioCapabilityID ::= OCTET STRING

UERANPagingIdentity ::= CHOICE {
    i-RNTI-full          BIT STRING ( SIZE (40)),
    choice-extension    ProtocolIE-Single-Container { {UERANPagingIdentity-ExtIEs} }
}

UERANPagingIdentity-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

UERLFRReportContainer ::= CHOICE {
    nR-UERLFRReportContainer          UERLFRReportContainerNR,
    lTE-UERLFRReportContainer          UERLFRReportContainerLTE,
    choice-Extension          ProtocolIE-Single-Container { {UERLFRReportContainer-ExtIEs} }
}

UERLFRReportContainer-ExtIEs XNAP-PROTOCOL-IES ::= {
    { ID id-UERLFRReportContainerLTEExtension CRITICALITY ignore TYPE UERLFRReportContainerLTEExtension PRESENCE mandatory},
    ...
}

UERLFRReportContainerLTEExtension ::= SEQUENCE {
    ueRFRReportContainerLTE          UERLFRReportContainerLTE,
    ueRFRReportContainerLTEExtendBand UERLFRReportContainerLTEExtendBand,
    IE-Extensions          ProtocolExtensionContainer { {UERLFRReportContainerLTEExtension-ExtIEs} } OPTIONAL,
    ...
}

UERLFRReportContainerLTEExtension-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

UERLFRReportContainerLTE ::= OCTET STRING
-- This IE is a transparent container and shall be encoded as the RLF-Report-r9 IE contained in the UEInformationResponse message (TS 36.331 [14])

UERLFRReportContainerLTEExtendBand ::= OCTET STRING
-- This IE is a transparent container and include the RLF-Report-v9e0 contained in the UEInformationResponse message (TS 36.331 [14])

UERLFRReportContainerNR ::= OCTET STRING

```


-- This IE is a transparent container and shall be encoded as the *nr-RLF-Report-r16* IE contained in the *UEInformationResponse* message (TS 38.331 [10])

```

UESecurityCapabilities ::= SEQUENCE {
    nr-EncryptionAlgorithms      BIT STRING {neal-128(1),
                                             nea2-128(2),
                                             nea3-128(3)} (SIZE(16, ...)),
    nr-IntegrityProtectionAlgorithms BIT STRING {nia1-128(1),
                                             nia2-128(2),
                                             nia3-128(3)} (SIZE(16, ...)),
    e-utra-EncryptionAlgorithms BIT STRING {eeal-128(1),
                                             eea2-128(2),
                                             eea3-128(3)} (SIZE(16, ...)),
    e-utra-IntegrityProtectionAlgorithms BIT STRING {eia1-128(1),
                                             eia2-128(2),
                                             eia3-128(3)} (SIZE(16, ...)),
    iE-Extension                ProtocolExtensionContainer { {UESecurityCapabilities-ExtIEs} } OPTIONAL,
    ...
}

UESecurityCapabilities-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

UESpecificDRX ::= ENUMERATED {
    v32,
    v64,
    v128,
    v256,
    ...
}

ULConfiguration ::= SEQUENCE {
    uL-PDCP                UL-UE-Configuration,
    iE-Extensions          ProtocolExtensionContainer { {ULConfiguration-ExtIEs} } OPTIONAL,
    ...
}

ULConfiguration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

UL-UE-Configuration ::= ENUMERATED {no-data, shared, only, ...}

ULForwarding ::= ENUMERATED {ul-forwarding-proposed, ...}

ULForwardingProposal ::= ENUMERATED {ul-forwarding-proposed, ...}

UL-GBR-PRB-usage ::= INTEGER (0..100)

UL-non-GBR-PRB-usage ::= INTEGER (0..100)

```

```
UL-Total-PRB-usage ::= INTEGER (0..100)

UPTransportLayerInformation ::= CHOICE {
    gtpTunnel          GTPtunnelTransportLayerInformation,
    choice-extension  ProtocolIE-Single-Container { {UPTransportLayerInformation-ExtIEs} }
}

UPTransportLayerInformation-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

UPTransportParameters ::= SEQUENCE (SIZE(1..maxnoofSCellGroupsplus1)) OF UPTransportParametersItem

UPTransportParametersItem ::= SEQUENCE {
    upTNLInfo          UPTransportLayerInformation,
    cellGroupID       CellGroupID,
    iE-Extension       ProtocolExtensionContainer { {UPTransportParametersItem-ExtIEs} } OPTIONAL,
    ...
}

UPTransportParametersItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

UserPlaneTrafficActivityReport ::= ENUMERATED {inactive, re-activated, ...}

URIaddress ::= VisibleString

-- V

VehicleUE ::= ENUMERATED {
    authorized,
    not-authorized,
    ...
}

VolumeTimedReportList ::= SEQUENCE (SIZE(1..maxnooftimeperiods)) OF VolumeTimedReport-Item

VolumeTimedReport-Item ::= SEQUENCE {
    startTimeStamp    OCTET STRING (SIZE(4)),
    endTimeStamp      OCTET STRING (SIZE(4)),
    usageCountUL      INTEGER (0..18446744073709551615),
    usageCountDL      INTEGER (0..18446744073709551615),
    iE-Extensions     ProtocolExtensionContainer { {VolumeTimedReport-Item-ExtIEs} } OPTIONAL,
    ...
}

VolumeTimedReport-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```

}
-- W
WLANMeasurementConfiguration ::= SEQUENCE {
    wlanMeasConfig          WLANMeasConfig,
    wlanMeasConfigNameList  WLANMeasConfigNameList          OPTIONAL,
    wlan-rssi               ENUMERATED {true, ...}           OPTIONAL,
    wlan-rtt                ENUMERATED {true, ...}           OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { WLANMeasurementConfiguration-ExtIEs } } OPTIONAL,
    ...
}

WLANMeasurementConfiguration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

WLANMeasConfigNameList ::= SEQUENCE (SIZE(1..maxnoofWLANName)) OF WLANName

WLANMeasConfig ::= ENUMERATED {setup, ...}

WLANName ::= OCTET STRING (SIZE (1..32))

-- X
XnBenefitValue ::= INTEGER (1..8, ...)

-- Y

-- Z

END
-- ASN1STOP

```

9.3.6 Common definitions

```

-- ASN1START
-- *****
--
-- Common definitions
--
-- *****

XnAP-CommonDataTypes {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) xnap (2) version1 (1) xnap-CommonDataTypes (3) }

DEFINITIONS AUTOMATIC TAGS ::=

```

```

BEGIN
-- *****
--
-- Extension constants
--
-- *****

maxPrivateIEs                INTEGER ::= 65535
maxProtocolExtensions        INTEGER ::= 65535
maxProtocolIEs               INTEGER ::= 65535

-- *****
--
-- Common Data Types
--
-- *****

Criticality      ::= ENUMERATED { reject, ignore, notify }

Presence         ::= ENUMERATED { optional, conditional, mandatory }

PrivateIE-ID     ::= CHOICE {
    local          INTEGER (0.. maxPrivateIEs),
    global         OBJECT IDENTIFIER
}

ProcedureCode    ::= INTEGER (0..255)

ProtocolIE-ID    ::= INTEGER (0..maxProtocolIEs)

TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome}

END
-- ASN1STOP

```

9.3.7 Constant definitions

```

-- ASN1START
-- *****
--
-- Constant definitions
--
-- *****

XnAP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-Access (22) modules (3) xnap (2) version1 (1) xnap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

```

```
BEGIN

IMPORTS
    ProcedureCode,
    ProtocolIE-ID
FROM XnAP-CommonDataTypes;

-- *****
--
-- Elementary Procedures
--
-- *****

id-handoverPreparation           ProcedureCode ::= 0
id-sNStatusTransfer             ProcedureCode ::= 1
id-handoverCancel               ProcedureCode ::= 2
id-retrieveUEContext            ProcedureCode ::= 3
id-rANPaging                    ProcedureCode ::= 4
id-xnUAddressIndication         ProcedureCode ::= 5
id-uEContextRelease            ProcedureCode ::= 6
id-sNGRANnodeAdditionPreparation ProcedureCode ::= 7
id-sNGRANnodeReconfigurationCompletion ProcedureCode ::= 8
id-mNGRANnodeinitiatedSNGRANnodeModificationPreparation ProcedureCode ::= 9
id-sNGRANnodeinitiatedSNGRANnodeModificationPreparation ProcedureCode ::= 10
id-mNGRANnodeinitiatedSNGRANnodeRelease ProcedureCode ::= 11
id-sNGRANnodeinitiatedSNGRANnodeRelease ProcedureCode ::= 12
id-sNGRANnodeCounterCheck      ProcedureCode ::= 13
id-sNGRANnodeChange            ProcedureCode ::= 14
id-rRCTransfer                  ProcedureCode ::= 15
id-xnRemoval                    ProcedureCode ::= 16
id-xnSetup                      ProcedureCode ::= 17
id-nGRANnodeConfigurationUpdate ProcedureCode ::= 18
id-cellActivation               ProcedureCode ::= 19
id-reset                        ProcedureCode ::= 20
id-errorIndication              ProcedureCode ::= 21
id-privateMessage               ProcedureCode ::= 22
id-notificationControl          ProcedureCode ::= 23
id-activityNotification         ProcedureCode ::= 24
id-e-UTRA-NR-CellResourceCoordination ProcedureCode ::= 25
id-secondaryRATDataUsageReport ProcedureCode ::= 26
id-deactivateTrace              ProcedureCode ::= 27
id-traceStart                   ProcedureCode ::= 28
id-handoverSuccess              ProcedureCode ::= 29
id-conditionalHandoverCancel    ProcedureCode ::= 30
id-earlyStatusTransfer         ProcedureCode ::= 31
id-failureIndication            ProcedureCode ::= 32
id-handoverReport               ProcedureCode ::= 33
id-resourceStatusReportingInitiation ProcedureCode ::= 34
id-resourceStatusReporting      ProcedureCode ::= 35
id-mobilitySettingsChange       ProcedureCode ::= 36
id-accessAndMobilityIndication ProcedureCode ::= 37
```

```

-- *****
--
-- Lists
--
-- *****

maxEARFCN                INTEGER ::= 262143
maxnoofAllowedAreas      INTEGER ::= 16
maxnoofAMFRegions        INTEGER ::= 16
maxnoofAoIs              INTEGER ::= 64
maxnoofBluetoothName     INTEGER ::= 4
maxnoofBPLMNs            INTEGER ::= 12
maxnoofCAGs              INTEGER ::= 12
maxnoofCAGsperPLMN       INTEGER ::= 256
maxnoofCellIDforMDT      INTEGER ::= 32
maxnoofCellsinAoI        INTEGER ::= 256
maxnoofCellsinUEHistoryInfo  INTEGER ::= 16
maxnoofCellsinNG-RANnode  INTEGER ::= 16384
maxnoofCellsinRNA        INTEGER ::= 32
maxnoofCellsUEMovingTrajectory  INTEGER ::= 16
maxnoofDRBs              INTEGER ::= 32
maxnoofEUTRABands        INTEGER ::= 16
maxnoofEUTRABPLMNs       INTEGER ::= 6
maxnoofEPLMNs            INTEGER ::= 15
maxnoofExtSliceItems     INTEGER ::= 65535
maxnoofEPLMNspusl        INTEGER ::= 16
maxnoofForbiddenTACs     INTEGER ::= 4096
maxnoofFreqforMDT        INTEGER ::= 8
maxnoofMBSFNUETRA        INTEGER ::= 8
maxnoofMDTPLMNs          INTEGER ::= 16
maxnoofMultiConnectivityMinusOne  INTEGER ::= 3
maxnoofNeighbours        INTEGER ::= 1024
maxnoofNeighPCIforMDT    INTEGER ::= 32
maxnoofNIDs              INTEGER ::= 12
maxnoofNRCellBands       INTEGER ::= 32
maxnoofPLMNs             INTEGER ::= 16
maxnoofPDUSessions        INTEGER ::= 256
maxnoofProtectedResourcePatterns  INTEGER ::= 16
maxnoofQoSFlows          INTEGER ::= 64
maxnoofQoSParaSets       INTEGER ::= 8
maxnoofRANAreaCodes      INTEGER ::= 32
maxnoofRANAreasinRNA     INTEGER ::= 16
maxnoofRANNodesinAoI     INTEGER ::= 64
maxnoofSCellGroups       INTEGER ::= 3
maxnoofSCellGroupsplus1  INTEGER ::= 4
maxnoofSensorName        INTEGER ::= 3
maxnoofSliceItems        INTEGER ::= 1024
maxnoofSNPNIDs           INTEGER ::= 12
maxnoofsupportedPLMNs    INTEGER ::= 12
maxnoofsupportedTACs     INTEGER ::= 256
maxnoofTAforMDT          INTEGER ::= 8
maxnoofTAI               INTEGER ::= 16
maxnoofTAIsinAoI         INTEGER ::= 16
maxnooftimeperiods       INTEGER ::= 2

```

```

maxnoofTNLAssociations      INTEGER ::= 32
maxnoofUEContexts          INTEGER ::= 8192
maxNRARFCN                  INTEGER ::= 3279165
maxNrOfErrors                INTEGER ::= 256
maxnoofslots                INTEGER ::= 5120
maxnoofExtTLAs              INTEGER ::= 16
maxnoofGTPTLAs              INTEGER ::= 16
maxnoofCHOCells             INTEGER ::= 8
maxnoofPC5QoSFlows          INTEGER ::= 2064
maxnoofSSBAreas             INTEGER ::= 64
maxnoofRACHReports          INTEGER ::= 64
maxnoofNRSCSs               INTEGER ::= 5
maxnoofPhysicalResourceBlocks INTEGER ::= 275
maxnoofAdditionalPDCPDuplicationTNL INTEGER ::= 2
maxnoofRLCDuplicationstate  INTEGER ::= 3
maxnoofWLANName              INTEGER ::= 4
maxnoofNonAnchorCarrierFreqConfig INTEGER ::= 15
maxnoofDataForwardingTunneltoE-UTRAN INTEGER ::= 256

```

```

-- *****
--
-- IEs
--
-- *****

```

```

id-ActivatedServedCells      ProtocolIE-ID ::= 0
id-ActivationIDforCellActivation ProtocolIE-ID ::= 1
id-admittedSplitSRB          ProtocolIE-ID ::= 2
id-admittedSplitSRBrelease   ProtocolIE-ID ::= 3
id-AMF-Region-Information    ProtocolIE-ID ::= 4
id-AssistanceDataForRANPaging ProtocolIE-ID ::= 5
id-BearersSubjectToCounterCheck ProtocolIE-ID ::= 6
id-Cause                      ProtocolIE-ID ::= 7
id-cellAssistanceInfo-NR     ProtocolIE-ID ::= 8
id-ConfigurationUpdateInitiatingNodeChoice ProtocolIE-ID ::= 9
id-CriticalityDiagnostics    ProtocolIE-ID ::= 10
id-XnUAddressInfoPerPDUSession-List ProtocolIE-ID ::= 11
id-DRBsSubjectToStatusTransfer-List ProtocolIE-ID ::= 12
id-ExpectedUEBehaviour      ProtocolIE-ID ::= 13
id-GlobalNG-RAN-node-ID     ProtocolIE-ID ::= 14
id-GUAMI                      ProtocolIE-ID ::= 15
id-indexToRatFreqSelectionPriority ProtocolIE-ID ::= 16
id-initiatingNodeType-ResourceCoordRequest ProtocolIE-ID ::= 17
id-List-of-served-cells-E-UTRA ProtocolIE-ID ::= 18
id-List-of-served-cells-NR   ProtocolIE-ID ::= 19
id-LocationReportingInformation ProtocolIE-ID ::= 20
id-MAC-I                      ProtocolIE-ID ::= 21
id-MaskedIMEISV              ProtocolIE-ID ::= 22
id-M-NG-RANnodeUEXnAPIID    ProtocolIE-ID ::= 23
id-MN-to-SN-Container        ProtocolIE-ID ::= 24
id-MobilityRestrictionList   ProtocolIE-ID ::= 25
id-new-NG-RAN-Cell-Identity  ProtocolIE-ID ::= 26
id-newNG-RANnodeUEXnAPIID   ProtocolIE-ID ::= 27
id-UEReportRRCTransfer      ProtocolIE-ID ::= 28

```

| | |
|---|----------------------|
| id-oldNG-RANnodeUEXnAPIID | ProtocolIE-ID ::= 29 |
| id-OldtoNewNG-RANnodeResumeContainer | ProtocolIE-ID ::= 30 |
| id-PagingDRX | ProtocolIE-ID ::= 31 |
| id-PCellID | ProtocolIE-ID ::= 32 |
| id-PDCPChangeIndication | ProtocolIE-ID ::= 33 |
| id-PDUSessionAdmittedAddedAddReqAck | ProtocolIE-ID ::= 34 |
| id-PDUSessionAdmittedModSNModConfirm | ProtocolIE-ID ::= 35 |
| id-PDUSessionAdmitted-SNModResponse | ProtocolIE-ID ::= 36 |
| id-PDUSessionNotAdmittedAddReqAck | ProtocolIE-ID ::= 37 |
| id-PDUSessionNotAdmitted-SNModResponse | ProtocolIE-ID ::= 38 |
| id-PDUSessionReleasedList-RelConf | ProtocolIE-ID ::= 39 |
| id-PDUSessionReleasedSNModConfirm | ProtocolIE-ID ::= 40 |
| id-PDUSessionResourcesActivityNotifyList | ProtocolIE-ID ::= 41 |
| id-PDUSessionResourcesAdmitted-List | ProtocolIE-ID ::= 42 |
| id-PDUSessionResourcesNotAdmitted-List | ProtocolIE-ID ::= 43 |
| id-PDUSessionResourcesNotifyList | ProtocolIE-ID ::= 44 |
| id-PDUSession-SNChangeConfirm-List | ProtocolIE-ID ::= 45 |
| id-PDUSession-SNChangeRequired-List | ProtocolIE-ID ::= 46 |
| id-PDUSessionToBeAddedAddReq | ProtocolIE-ID ::= 47 |
| id-PDUSessionToBeModifiedSNModRequired | ProtocolIE-ID ::= 48 |
| id-PDUSessionToBeReleasedList-RelRqd | ProtocolIE-ID ::= 49 |
| id-PDUSessionToBeReleased-RelReq | ProtocolIE-ID ::= 50 |
| id-PDUSessionToBeReleasedSNModRequired | ProtocolIE-ID ::= 51 |
| id-RANPagingArea | ProtocolIE-ID ::= 52 |
| id-PagingPriority | ProtocolIE-ID ::= 53 |
| id-requestedSplitSRB | ProtocolIE-ID ::= 54 |
| id-requestedSplitSRBRelease | ProtocolIE-ID ::= 55 |
| id-ResetRequestTypeInfo | ProtocolIE-ID ::= 56 |
| id-ResetResponseTypeInfo | ProtocolIE-ID ::= 57 |
| id-RespondingNodeTypeConfigUpdateAck | ProtocolIE-ID ::= 58 |
| id-respondingNodeType-ResourceCoordResponse | ProtocolIE-ID ::= 59 |
| id-ResponseInfo-ReconfCompl | ProtocolIE-ID ::= 60 |
| id-RRConfigIndication | ProtocolIE-ID ::= 61 |
| id-RRResumeCause | ProtocolIE-ID ::= 62 |
| id-SCGConfigurationQuery | ProtocolIE-ID ::= 63 |
| id-selectedPLMN | ProtocolIE-ID ::= 64 |
| id-ServedCellsToActivate | ProtocolIE-ID ::= 65 |
| id-servedCellsToUpdate-E-UTRA | ProtocolIE-ID ::= 66 |
| id-ServedCellsToUpdateInitiatingNodeChoice | ProtocolIE-ID ::= 67 |
| id-servedCellsToUpdate-NR | ProtocolIE-ID ::= 68 |
| id-s-ng-RANnode-SecurityKey | ProtocolIE-ID ::= 69 |
| id-S-NG-RANnodeUE-AMBR | ProtocolIE-ID ::= 70 |
| id-S-NG-RANnodeUEXnAPIID | ProtocolIE-ID ::= 71 |
| id-SN-to-MN-Container | ProtocolIE-ID ::= 72 |
| id-sourceNG-RANnodeUEXnAPIID | ProtocolIE-ID ::= 73 |
| id-SplitSRB-RRCTransfer | ProtocolIE-ID ::= 74 |
| id-TAISupport-list | ProtocolIE-ID ::= 75 |
| id-TimeToWait | ProtocolIE-ID ::= 76 |
| id-Target2SourceNG-RANnodeTranspContainer | ProtocolIE-ID ::= 77 |
| id-targetCellGlobalID | ProtocolIE-ID ::= 78 |
| id-targetNG-RANnodeUEXnAPIID | ProtocolIE-ID ::= 79 |
| id-target-S-NG-RANnodeID | ProtocolIE-ID ::= 80 |
| id-TraceActivation | ProtocolIE-ID ::= 81 |
| id-UEContextID | ProtocolIE-ID ::= 82 |

| | |
|---|-----------------------|
| id-UEContextInfoHORequest | ProtocolIE-ID ::= 83 |
| id-UEContextInfoRetrUECtxtResp | ProtocolIE-ID ::= 84 |
| id-UEContextInfo-SNModRequest | ProtocolIE-ID ::= 85 |
| id-UEContextKeptIndicator | ProtocolIE-ID ::= 86 |
| id-UEContextRefAtSN-HORequest | ProtocolIE-ID ::= 87 |
| id-UEHistoryInformation | ProtocolIE-ID ::= 88 |
| id-UEIdentityIndexValue | ProtocolIE-ID ::= 89 |
| id-UERANPagingIdentity | ProtocolIE-ID ::= 90 |
| id-UESecurityCapabilities | ProtocolIE-ID ::= 91 |
| id-UserPlaneTrafficActivityReport | ProtocolIE-ID ::= 92 |
| id-XnRemovalThreshold | ProtocolIE-ID ::= 93 |
| id-DesiredActNotificationLevel | ProtocolIE-ID ::= 94 |
| id-AvailableDRBIDs | ProtocolIE-ID ::= 95 |
| id-AdditionalDRBIDs | ProtocolIE-ID ::= 96 |
| id-SpareDRBIDs | ProtocolIE-ID ::= 97 |
| id-RequiredNumberOfDRBIDs | ProtocolIE-ID ::= 98 |
| id-TNLA-To-Add-List | ProtocolIE-ID ::= 99 |
| id-TNLA-To-Update-List | ProtocolIE-ID ::= 100 |
| id-TNLA-To-Remove-List | ProtocolIE-ID ::= 101 |
| id-TNLA-Setup-List | ProtocolIE-ID ::= 102 |
| id-TNLA-Failed-To-Setup-List | ProtocolIE-ID ::= 103 |
| id-PDUSessionToBeReleased-RelReqAck | ProtocolIE-ID ::= 104 |
| id-S-NG-RANnodeMaxIPDataRate-UL | ProtocolIE-ID ::= 105 |
| id-PDUSessionResourceSecondaryRATUsageList | ProtocolIE-ID ::= 107 |
| id-Additional-UL-NG-U-TNLatUPF-List | ProtocolIE-ID ::= 108 |
| id-SecondarydataForwardingInfoFromTarget-List | ProtocolIE-ID ::= 109 |
| id-LocationInformationSNReporting | ProtocolIE-ID ::= 110 |
| id-LocationInformationSN | ProtocolIE-ID ::= 111 |
| id-LastE-UTRANPLMNIdentity | ProtocolIE-ID ::= 112 |
| id-S-NG-RANnodeMaxIPDataRate-DL | ProtocolIE-ID ::= 113 |
| id-MaxIPRate-DL | ProtocolIE-ID ::= 114 |
| id-SecurityResult | ProtocolIE-ID ::= 115 |
| id-S-NSSAI | ProtocolIE-ID ::= 116 |
| id-MR-DC-ResourceCoordinationInfo | ProtocolIE-ID ::= 117 |
| id-AMF-Region-Information-To-Add | ProtocolIE-ID ::= 118 |
| id-AMF-Region-Information-To-Delete | ProtocolIE-ID ::= 119 |
| id-OldQoSFlowMap-ULendmarkerexpected | ProtocolIE-ID ::= 120 |
| id-RANPagingFailure | ProtocolIE-ID ::= 121 |
| id-UERadioCapabilityForPaging | ProtocolIE-ID ::= 122 |
| id-PDUSessionDataForwarding-SNModResponse | ProtocolIE-ID ::= 123 |
| id-DRBsNotAdmittedSetupModifyList | ProtocolIE-ID ::= 124 |
| id-Secondary-MN-Xn-U-TNLInfoatM | ProtocolIE-ID ::= 125 |
| id-NE-DC-TDM-Pattern | ProtocolIE-ID ::= 126 |
| id-PDUSessionCommonNetworkInstance | ProtocolIE-ID ::= 127 |
| id-BPLMN-ID-Info-EUTRA | ProtocolIE-ID ::= 128 |
| id-BPLMN-ID-Info-NR | ProtocolIE-ID ::= 129 |
| id-InterfaceInstanceIndication | ProtocolIE-ID ::= 130 |
| id-S-NG-RANnode-Addition-Trigger-Ind | ProtocolIE-ID ::= 131 |
| id-DefaultDRB-Allowed | ProtocolIE-ID ::= 132 |
| id-DRB-IDs-takenintouse | ProtocolIE-ID ::= 133 |
| id-SplitSessionIndicator | ProtocolIE-ID ::= 134 |
| id-CNTypeRestrictionsForEquivalent | ProtocolIE-ID ::= 135 |
| id-CNTypeRestrictionsForServing | ProtocolIE-ID ::= 136 |
| id-DRBs-transferred-to-MN | ProtocolIE-ID ::= 137 |

| | |
|---|-----------------------|
| id-ULForwardingProposal | ProtocolIE-ID ::= 138 |
| id-EndpointIPAddressAndPort | ProtocolIE-ID ::= 139 |
| id-IntendedTDD-DL-ULConfiguration-NR | ProtocolIE-ID ::= 140 |
| id-TNLConfigurationInfo | ProtocolIE-ID ::= 141 |
| id-PartialListIndicator-NR | ProtocolIE-ID ::= 142 |
| id-MessageOversizeNotification | ProtocolIE-ID ::= 143 |
| id-CellAndCapacityAssistanceInfo-NR | ProtocolIE-ID ::= 144 |
| id-NG-RANTraceID | ProtocolIE-ID ::= 145 |
| id-NonGBRRResources-Offered | ProtocolIE-ID ::= 146 |
| id-FastMCGRecoveryRRCTransfer-SN-to-MN | ProtocolIE-ID ::= 147 |
| id-RequestedFastMCGRecoveryViaSRB3 | ProtocolIE-ID ::= 148 |
| id-AvailableFastMCGRecoveryViaSRB3 | ProtocolIE-ID ::= 149 |
| id-RequestedFastMCGRecoveryViaSRB3Release | ProtocolIE-ID ::= 150 |
| id-ReleaseFastMCGRecoveryViaSRB3 | ProtocolIE-ID ::= 151 |
| id-FastMCGRecoveryRRCTransfer-MN-to-SN | ProtocolIE-ID ::= 152 |
| id-ExtendedRATRestrictionInformation | ProtocolIE-ID ::= 153 |
| id-QoSMonitoringRequest | ProtocolIE-ID ::= 154 |
| id-FiveGCMobilityRestrictionListContainer | ProtocolIE-ID ::= 155 |
| id-PartialListIndicator-EUTRA | ProtocolIE-ID ::= 156 |
| id-CellAndCapacityAssistanceInfo-EUTRA | ProtocolIE-ID ::= 157 |
| id-CHOinformation-Req | ProtocolIE-ID ::= 158 |
| id-CHOinformation-Ack | ProtocolIE-ID ::= 159 |
| id-targetCellsToCancel | ProtocolIE-ID ::= 160 |
| id-requestedTargetCellGlobalID | ProtocolIE-ID ::= 161 |
| id-procedureStage | ProtocolIE-ID ::= 162 |
| id-DAPSRequestInfo | ProtocolIE-ID ::= 163 |
| id-DAPSResponseInfo-List | ProtocolIE-ID ::= 164 |
| id-CHO-MRDC-Indicator | ProtocolIE-ID ::= 165 |
| id-OffsetOfNbiotChannelNumberToDL-EARFCN | ProtocolIE-ID ::= 166 |
| id-OffsetOfNbiotChannelNumberToUL-EARFCN | ProtocolIE-ID ::= 167 |
| id-NBIOt-UL-DL-AlignmentOffset | ProtocolIE-ID ::= 168 |
| id-LTEV2XServicesAuthorized | ProtocolIE-ID ::= 169 |
| id-NRV2XServicesAuthorized | ProtocolIE-ID ::= 170 |
| id-LTEUESidelinkAggregateMaximumBitRate | ProtocolIE-ID ::= 171 |
| id-NRUESidelinkAggregateMaximumBitRate | ProtocolIE-ID ::= 172 |
| id-PC5QoSParameters | ProtocolIE-ID ::= 173 |
| id-AlternativeQoSParaSetList | ProtocolIE-ID ::= 174 |
| id-CurrentQoSParaSetIndex | ProtocolIE-ID ::= 175 |
| id-MobilityInformation | ProtocolIE-ID ::= 176 |
| id-InitiatingCondition-FailureIndication | ProtocolIE-ID ::= 177 |
| id-UEHistoryInformationFromTheUE | ProtocolIE-ID ::= 178 |
| id-HandoverReportType | ProtocolIE-ID ::= 179 |
| id-HandoverCause | ProtocolIE-ID ::= 180 |
| id-SourceCellCGI | ProtocolIE-ID ::= 181 |
| id-TargetCellCGI | ProtocolIE-ID ::= 182 |
| id-ReEstablishmentCellCGI | ProtocolIE-ID ::= 183 |
| id-TargetCellinEUTRAN | ProtocolIE-ID ::= 184 |
| id-SourceCellCRNTI | ProtocolIE-ID ::= 185 |
| id-UERLFReportContainer | ProtocolIE-ID ::= 186 |
| id-NGRAN-Node1-Measurement-ID | ProtocolIE-ID ::= 187 |
| id-NGRAN-Node2-Measurement-ID | ProtocolIE-ID ::= 188 |
| id-RegistrationRequest | ProtocolIE-ID ::= 189 |
| id-ReportCharacteristics | ProtocolIE-ID ::= 190 |
| id-CellToReport | ProtocolIE-ID ::= 191 |

| | |
|---|-----------------------|
| id-ReportingPeriodicity | ProtocolIE-ID ::= 192 |
| id-CellMeasurementResult | ProtocolIE-ID ::= 193 |
| id-NG-RANnode1CellID | ProtocolIE-ID ::= 194 |
| id-NG-RANnode2CellID | ProtocolIE-ID ::= 195 |
| id-NG-RANnode1MobilityParameters | ProtocolIE-ID ::= 196 |
| id-NG-RANnode2ProposedMobilityParameters | ProtocolIE-ID ::= 197 |
| id-MobilityParametersModificationRange | ProtocolIE-ID ::= 198 |
| id-TDDULDLConfigurationCommonNR | ProtocolIE-ID ::= 199 |
| id-CarrierList | ProtocolIE-ID ::= 200 |
| id-ULCarrierList | ProtocolIE-ID ::= 201 |
| id-FrequencyShift7p5khz | ProtocolIE-ID ::= 202 |
| id-SSB-PositionsInBurst | ProtocolIE-ID ::= 203 |
| id-NRCellPRACHConfig | ProtocolIE-ID ::= 204 |
| id-RACHReportInformation | ProtocolIE-ID ::= 205 |
| id-IABNodeIndication | ProtocolIE-ID ::= 206 |
| id-Redundant-UL-NG-U-TNLatUPF | ProtocolIE-ID ::= 207 |
| id-CNPacketDelayBudgetDownlink | ProtocolIE-ID ::= 208 |
| id-CNPacketDelayBudgetUplink | ProtocolIE-ID ::= 209 |
| id-Additional-Redundant-UL-NG-U-TNLatUPF-List | ProtocolIE-ID ::= 210 |
| id-RedundantCommonNetworkInstance | ProtocolIE-ID ::= 211 |
| id-TSCTrafficCharacteristics | ProtocolIE-ID ::= 212 |
| id-RedundantQoSFlowIndicator | ProtocolIE-ID ::= 213 |
| id-Redundant-DL-NG-U-TNLatNG-RAN | ProtocolIE-ID ::= 214 |
| id-ExtendedPacketDelayBudget | ProtocolIE-ID ::= 215 |
| id-Additional-PDCP-Duplication-TNL-List | ProtocolIE-ID ::= 216 |
| id-RedundantPDUSessionInformation | ProtocolIE-ID ::= 217 |
| id-UsedRSNInformation | ProtocolIE-ID ::= 218 |
| id-RLCDuplicationInformation | ProtocolIE-ID ::= 219 |
| id-NPN-Broadcast-Information | ProtocolIE-ID ::= 220 |
| id-NPNPagingAssistanceInformation | ProtocolIE-ID ::= 221 |
| id-NPNMobilityInformation | ProtocolIE-ID ::= 222 |
| id-NPN-Support | ProtocolIE-ID ::= 223 |
| id-MDT-Configuration | ProtocolIE-ID ::= 224 |
| id-MDTPLMNList | ProtocolIE-ID ::= 225 |
| id-TraceCollectionEntityURI | ProtocolIE-ID ::= 226 |
| id-UERadioCapabilityID | ProtocolIE-ID ::= 227 |
| id-CSI-RSTransmissionIndication | ProtocolIE-ID ::= 228 |
| id-SNTriggered | ProtocolIE-ID ::= 229 |
| id-DLCarrierList | ProtocolIE-ID ::= 230 |
| id-ExtendedTAISliceSupportList | ProtocolIE-ID ::= 231 |
| id-cellAssistanceInfo-EUTRA | ProtocolIE-ID ::= 232 |
| id-ConfiguredTACIndication | ProtocolIE-ID ::= 233 |
| id-secondary-SN-UL-PDCP-UP-TNLInfo | ProtocolIE-ID ::= 234 |
| id-pdcpDuplicationConfiguration | ProtocolIE-ID ::= 235 |
| id-duplicationActivation | ProtocolIE-ID ::= 236 |
| id-NPRACHConfiguration | ProtocolIE-ID ::= 237 |
| id-QoSMonitoringReportingFrequency | ProtocolIE-ID ::= 238 |
| id-QoSFlowsMappedtoDRB-SetupResponse-MNterminated | ProtocolIE-ID ::= 239 |
| id-DL-scheduling-PDCCH-CCE-usage | ProtocolIE-ID ::= 240 |
| id-UL-scheduling-PDCCH-CCE-usage | ProtocolIE-ID ::= 241 |
| id-SFN-Offset | ProtocolIE-ID ::= 242 |
| id-QoSMonitoringDisabled | ProtocolIE-ID ::= 243 |
| id-ExtendedUEIdentityIndexValue | ProtocolIE-ID ::= 244 |
| id-PagingeDRXInformation | ProtocolIE-ID ::= 245 |

```

id-CHO-MRDC-EarlyDataForwarding
id-SCGIndicator
id-UESpecificDRX
id-PDUSessionExpectedUEActivityBehaviour
id-QoS-Mapping-Information
id-AdditionLocationInformation
id-dataForwardingInfoFromTargetE-UTRANnode
id-DirectForwardingPathAvailability
id-SourceNG-RAN-node-ID
id-SourceDLForwardingIPAddress
id-SourceNodeDLForwardingIPAddress
id-ExtendedReportIntervalMDT
id-SecurityIndication
id-RRConnReestab-Indicator
id-TargetNodeID
id-UERLFRReportContainerLTTEExtension
id-HashedUEIdentityIndexValue
id-QoSFlowMappingIndication

END
-- ASN1STOP

```

```

ProtocolIE-ID ::= 246
ProtocolIE-ID ::= 247
ProtocolIE-ID ::= 248
ProtocolIE-ID ::= 249
ProtocolIE-ID ::= 250
ProtocolIE-ID ::= 251
ProtocolIE-ID ::= 252
ProtocolIE-ID ::= 253
ProtocolIE-ID ::= 254
ProtocolIE-ID ::= 255
ProtocolIE-ID ::= 256
    ProtocolIE-ID ::= 257
ProtocolIE-ID ::= 258
ProtocolIE-ID ::= 259
ProtocolIE-ID ::= 260
ProtocolIE-ID ::= 370
ProtocolIE-ID ::= 372
ProtocolIE-ID ::= 373

```

9.3.8 Container definitions

```

-- ASN1START
-- *****
--
-- Container definitions
--
-- *****

XnAP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) xnap (2) version1 (1) xnap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS
    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs,
    Criticality,
    Presence,
    PrivateIE-ID,
    ProtocolIE-ID

```

```

FROM XnAP-CommonDataTypes;

-- *****
--
-- Class Definition for Protocol IEs
--
-- *****

XNAP-PROTOCOL-IES ::= CLASS {
    &id          ProtocolIE-ID          UNIQUE,
    &criticality Criticality,
    &Value,
    &presence    Presence
}
WITH SYNTAX {
    ID          &id
    CRITICALITY &criticality
    TYPE        &Value
    PRESENCE    &presence
}

-- *****
--
-- Class Definition for Protocol IE pairs
--
-- *****

XNAP-PROTOCOL-IES-PAIR ::= CLASS {
    &id          ProtocolIE-ID          UNIQUE,
    &firstCriticality Criticality,
    &FirstValue,
    &secondCriticality Criticality,
    &SecondValue,
    &presence    Presence
}
WITH SYNTAX {
    ID          &id
    FIRST CRITICALITY &firstCriticality
    FIRST TYPE        &FirstValue
    SECOND CRITICALITY &secondCriticality
    SECOND TYPE        &SecondValue
    PRESENCE          &presence
}

-- *****
--
-- Class Definition for Protocol Extensions
--
-- *****

XNAP-PROTOCOL-EXTENSION ::= CLASS {
    &id          ProtocolIE-ID          UNIQUE,
    &criticality Criticality,
    &Extension,

```

```

    &presence           Presence
}
WITH SYNTAX {
    ID                  &id
    CRITICALITY        &criticality
    EXTENSION           &Extension
    PRESENCE           &presence
}

-- *****
--
-- Class Definition for Private IEs
--
-- *****

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

-- *****
--
-- Container for Protocol IEs
--
-- *****

ProtocolIE-Container {XNAP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Single-Container {XNAP-PROTOCOL-IES : IEsSetParam} ::= ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field {XNAP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {
    id                  XNAP-PROTOCOL-IES.&id                ( {IEsSetParam} ),
    criticality         XNAP-PROTOCOL-IES.&criticality        ( {IEsSetParam} {@id} ),
    value              XNAP-PROTOCOL-IES.&Value              ( {IEsSetParam} {@id} )
}

-- *****
--
-- Container for Protocol IE Pairs
--
-- *****

ProtocolIE-ContainerPair {XNAP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF

```

```

    ProtocolIE-FieldPair {{IEsSetParam}}

ProtocolIE-FieldPair {XNAP-PROTOCOL-IES-PAIR : IEsSetParam} ::= SEQUENCE {
    id                XNAP-PROTOCOL-IES-PAIR.&id                ({IEsSetParam}),
    firstCriticality  XNAP-PROTOCOL-IES-PAIR.&firstCriticality  ({IEsSetParam}@id),
    firstValue        XNAP-PROTOCOL-IES-PAIR.&firstValue        ({IEsSetParam}@id),
    secondCriticality XNAP-PROTOCOL-IES-PAIR.&secondCriticality  ({IEsSetParam}@id),
    secondValue       XNAP-PROTOCOL-IES-PAIR.&secondValue       ({IEsSetParam}@id)
}

-- *****
--
-- Container Lists for Protocol IE Containers
--
-- *****

ProtocolIE-ContainerList {INTEGER : lowerBound, INTEGER : upperBound, XNAP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (lowerBound..upperBound)) OF
        ProtocolIE-Container {{IEsSetParam}}

ProtocolIE-ContainerPairList {INTEGER : lowerBound, INTEGER : upperBound, XNAP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (lowerBound..upperBound)) OF
        ProtocolIE-ContainerPair {{IEsSetParam}}

-- *****
--
-- Container for Protocol Extensions
--
-- *****

ProtocolExtensionContainer {XNAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE (SIZE (1..maxProtocolExtensions)) OF
    ProtocolExtensionField {{ExtensionSetParam}}

ProtocolExtensionField {XNAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
    id                XNAP-PROTOCOL-EXTENSION.&id                ({ExtensionSetParam}),
    criticality        XNAP-PROTOCOL-EXTENSION.&criticality        ({ExtensionSetParam}@id),
    extensionValue     XNAP-PROTOCOL-EXTENSION.&extension         ({ExtensionSetParam}@id)
}

-- *****
--
-- Container for Private IEs
--
-- *****

PrivateIE-Container {XNAP-PRIVATE-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (1..maxPrivateIEs)) OF
        PrivateIE-Field {{IEsSetParam}}

PrivateIE-Field {XNAP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
    id                XNAP-PRIVATE-IES.&id                ({IEsSetParam}),
    criticality        XNAP-PRIVATE-IES.&criticality        ({IEsSetParam}@id),
    value             XNAP-PRIVATE-IES.&value             ({IEsSetParam}@id)
}

```

END
-- ASN1STOP

9.4 Message transfer syntax

XnAP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Rec. X.691 [15].

9.5 Timers

$TXn_{RELOCprep}$

- Specifies the maximum time for the Handover Preparation procedure in the source NG-RAN node.

$TXn_{RELOCoverall}$

- Specifies the maximum time for the protection of the overall handover procedure in the source NG-RAN node.

TXn_{DCprep}

- Specifies the maximum time for the S-NG-RAN node Addition Preparation or M-NG-RAN node initiated S-NG-RAN node Modification Preparation.

$TXn_{DCoverall}$

- Specifies the maximum time in the S-NG-RAN node for either the S-NG-RAN node initiated S-NG-RAN node Modification procedure or the protection of the NG-RAN actions necessary to configure UE resources at S-NG-RAN node Addition or M-NG-RAN node initiated S-NG-RAN node Modification.

10 Handling of unknown, unforeseen and erroneous protocol data

Section 10 of TS 38.413 [5] is applicable for the purposes of the present document.

Annex A (informative): Change history

| Change history | | | | | | | |
|----------------|--------------|-----------|------|-----|-----|---|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2017-04 | RAN3#95 bis | R3-171316 | | | | Implementing agreements from meeting RAN3#95bis: R3-171147 (removing last two IEs and FFS on NG-C UE), R3-171372, R3-171351 (only NSSAI related text), R3-171338 (with Editor's Note on text and message structure), R3-171371 (with Editor's Note in generic section and name for RAN Paging FFS), R3-171345, R3-171347 | 0.0.1 |
| 2017-05 | RAN3#96 | | | | | Add SGNB MODIFICATION REQUEST in tabular. Editorial change | 0.0.2 |
| 2017-05 | RAN3#96 | | | | | Implementing agreements from meeting RAN3#96: R3-171925 (Handover messages – tabular format), R3-171928 (additions for RAN Paging) Editorials (remove highlight, change style sheet assignments, correcting and adding references to other TSs and TRs, replacing some FFSs by Editor's Notes) | 0.1.0 |
| 2017-06 | RAN3#ad-hoc2 | R3-172548 | | | | Submission | 0.1.1 |
| 2017-06 | RAN3#ad-hoc2 | R3-173452 | | | | Implementing agreed R3-172612 and agreed node naming conventions. | 0.2.0 |
| 2017-08 | RAN3#97 | R3-173462 | | | | Implement the agreed pCRs from RAN3#97 meeting: R3-173237, R3-173337, R3-173416, R3-173429, R3-173431 | 0.3.0 |
| 2017-10 | RAN3#97 bis | R3-174242 | | | | Implementing the agreed pCRs from RAN3#97bis meeting: R3-173976, R3-174097, R3-174183, R3-174192, R3-174205 | 0.4.0 |
| 2017-12 | RAN3#98 | R3-175058 | | | | Implementing agreed pCRs from RAN3#98 meeting: R3-175024, R3-174817, R3-174920, R3-174920, R3-174924, R3-174934, R3-174837, R3-175077 | 0.5.0 |
| 2018.01 | RAN3 AH 1801 | R3-180656 | | | | Implementing agreed pCRs from RAN3 AH 1801: R3-180114, R3-180545, R3-180548, R3-180561, R3-180569, R3-180601, R3-180607, R3-180615, R3-180629, R3-180631, R3-180638 | 0.6.0 |
| 2018-03 | RAN3#99 | R3-181593 | | | | Implementing agreed pCRs from RAN3#99: R3-180850, R3-180980, R3-181247, R3-181280, R3-181350, R3-181385, R3-181390, R3-181415, R3-181418, R3-181461, R3-181504, R3-181509 | 0.7.0 |
| 2018-04 | RAN3#99 bis | R3-182527 | | | | Implementing agreements from RAN3#99bis: R3-182213, R3-182396, R3-182401, R3-181855, R3-182488, R3-182371, R3-182157, R3-182373, R3-182375, R3-182376, R3-182163, R3-182384, R3-182392, R3-181825, R3-182494, R3-181980, R3-182433, update along R3-182378, update along R3-182344, update along R3-181899 | 0.8.0 |
| 2018-05 | RAN3#100 | R3-183597 | | | | Implementing agreements from RAN3#100: R3-182614, R3-182615, R3-182635, R3-182815, R3-182935, R3-183091, R3-183154, R3-183165, R3-183252, R3-183314, R3-183369, R3-183376, R3-183386, R3-183389, R3-183393, R3-183404, R3-183407, R3-183411, R3-183441, R3-183442, R3-183444, R3-183450, R3-183455, R3-183497, R3-183511, R3-183517, R3-183519, R3-183534, R3-183541. Adding ASN.1 and performing editorial cleanups. | 0.9.0 |
| 2018-06 | RAN#80 | RP-180816 | | | | Submission to TSG RAN for approval | 1.0.0 |
| 2018-06 | RAN#80 | | - | - | - | Specification approved at TSG-RAN and placed under change control | 15.0.0 |
| 2018-09 | RAN#81 | RP-181922 | 0008 | 2 | F | Collected corrections for XnAP version 15.0.0 | 15.1.0 |
| 2018-09 | RAN#81 | RP-181921 | 0002 | 1 | F | Addition of MCG cell ID to solve the PCI confusion at SN | 15.1.0 |
| 2018-12 | RAN#82 | RP-182448 | 0011 | 4 | F | NR Corrections (TS 38.423 Baseline CR covering RAN3-101Bis and RAN3-102 agreements) | 15.2.0 |
| 2019-03 | RAN#83 | RP-190555 | 0012 | 3 | F | Correction to RRC transfer | 15.3.0 |
| 2019-03 | RAN#83 | RP-190201 | 0017 | 3 | F | Transfer of the PSCell information for LI purposes | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0023 | 1 | F | Missing causes for context retrieval failure | 15.3.0 |
| 2019-03 | RAN#83 | RP-190554 | 0024 | 1 | F | Data volume reporting for MR-DC with 5GC | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0025 | 2 | F | Separate UL/DL limits for UE's maximum IP rate | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0027 | 2 | F | LTE-NR UE Level Resource Coordination | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0029 | 2 | F | Support of PDU session split during handover procedure | 15.3.0 |
| 2019-03 | RAN#83 | RP-190554 | 0035 | - | F | Correction of RAN triggered PDU Session split | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0036 | - | F | Correction of Slice Support over Xn | 15.3.0 |
| 2019-03 | RAN#83 | RP-190556 | 0041 | 2 | F | Correction of QoS Flow Mapping Indication | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0042 | - | F | Correction for RRC container in SN MODIFICATION CONFIRM message | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0048 | - | F | Clarification on Inter-node message for NE-DC | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0050 | - | F | Introduce IMEISV to addition request to Xn | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0051 | 2 | F | Support of integrity protection for Option 4&7 | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0053 | 1 | F | Correction on partial reset | 15.3.0 |

| Change history | | | | | | | |
|----------------|---------|-----------|------|-----|-----|---|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2019-03 | RAN#83 | RP-190555 | 0054 | 1 | F | Correction on TAI Support List | 15.3.0 |
| 2019-03 | RAN#83 | RP-190555 | 0061 | 1 | F | Rapporteur updates on version 15.2.0 | 15.3.0 |
| 2019-03 | RAN#83 | RP-190556 | 0065 | 2 | F | S-NSSAI update during EPS to 5GS handover | 15.3.0 |
| 2019-03 | RAN#83 | RP-190556 | 0067 | 1 | F | Correction of EPC interworking | 15.3.0 |
| 2019-07 | RAN#84 | RP-191394 | 0056 | 3 | F | Correction on AMF connectivity | 15.4.0 |
| 2019-07 | RAN#84 | RP-191397 | 0059 | 2 | F | Support of ongoing re-mapping on source side during SDAP mobility | 15.4.0 |
| 2019-07 | RAN#84 | RP-191397 | 0068 | 1 | F | XnAP Alignment of MN Triggered PDU Session Split | 15.4.0 |
| 2019-07 | RAN#84 | RP-191395 | 0071 | 2 | F | CR38423 for Addition of MN (MeNB) cell ID to solve the PCI confusion in SN(SgNB) modification Request message | 15.4.0 |
| 2019-07 | RP-84 | RP-191394 | 0076 | 1 | F | RAN paging failure handling in SN in case of MR-DC | 15.4.0 |
| 2019-07 | RP-84 | RP-191397 | 0082 | 3 | F | Correction to behaviour of SN for security handling This CR was not implemented as is was not based on the latest version of the spec. | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0083 | - | F | Support for delivering UE band information in RAN paging | 15.4.0 |
| 2019-07 | RP-84 | RP-191396 | 0086 | - | F | Corrections for support of data forwarding for reestablishment UE | 15.4.0 |
| 2019-07 | RP#84 | RP-191395 | 0096 | 2 | F | Rapporteur's corrections to version 15.3.0 | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0099 | 1 | F | Correction for SN terminated DRB To Be Setup in SN Addition Response | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0100 | 2 | F | CR for TS 38.423 for Data Forwarding Proposal | 15.4.0 |
| 2019-07 | RP-84 | RP-191430 | 0102 | 5 | F | RAN sharing with multiple Cell ID broadcast | 15.4.0 |
| 2019-07 | RP-84 | RP-191397 | 0104 | 1 | F | Correction of Core Network Type Restriction This CR was not implemented as is was not based on the latest version of the spec. | 15.4.0 |
| 2019-07 | RP-84 | RP-191397 | 0105 | 2 | F | Data forwarding and QoS flow remapping | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0112 | 1 | F | XnAP Correction of PDU Session Resource Setup Response Info – MN terminated | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0113 | 1 | F | XnAP Correction of PDU Session Resource Setup Complete Info – SN terminated | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0125 | - | F | Support of single UL transmission for NE-DC | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0126 | 1 | F | In-order delivery when QoS flows offloaded from SN | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0132 | - | F | Transferring of RRC message from Master node to Secondary node | 15.4.0 |
| 2019-07 | RP-84 | RP-191395 | 0133 | 1 | F | Clarification on Retrieve UE Context procedure | 15.4.0 |
| 2019-07 | RP-84 | RP-191394 | 0135 | 1 | F | PDCCP SN length related clean-up over To Be Modified structure in MN initiated SN Modification procedure | 15.4.0 |
| 2019-07 | RP-84 | RP-191397 | 0140 | | F | Correction of Network Instance | 15.4.0 |
| 2019-09 | RP-85 | RP-192166 | 0121 | 2 | F | Correction of handling of the Location Information at the MN | 15.5.0 |
| 2019-09 | RP-85 | RP-192167 | 0146 | | F | XnAP Rel-15 Leftover Clean-ups | 15.5.0 |
| 2019-09 | RP-85 | RP-192167 | 0147 | 1 | F | XnAP Corrections of Activity Notification Usage | 15.5.0 |
| 2019-09 | RP-85 | RP-192167 | 0153 | - | F | Critical correction to the presence of the TAC lists in the Service Area Item IE | 15.5.0 |
| 2019-09 | RP-85 | RP-192167 | 0158 | 1 | F | CR38.423 for Correction on RRC configuration indication | 15.5.0 |
| 2019-09 | RP-85 | RP-192166 | 0170 | 2 | F | Correction on source TNL ADDRESS in NG-C interface | 15.5.0 |
| 2019-09 | RP-85 | RP-192166 | 0173 | 1 | F | Correction on Maximum Integrity Protected Data Rate | 15.5.0 |
| 2019-09 | RP-85 | RP-192167 | 0197 | 1 | F | Rapporteur's corrections for TS 38.423 | 15.5.0 |
| 2019-09 | RP-85 | RP-192166 | 0210 | 1 | F | Corrections regarding mandatory statements in Semantics Descriptions | 15.5.0 |
| 2019-09 | RP-85 | RP-192167 | 0216 | 1 | F | Support of default DRB coordination in MR-DC with 5GC | 15.5.0 |
| 2019-12 | RP-86 | RP-192916 | 0063 | 7 | F | Correction on DRB ID co-ordination between MN and SN | 15.6.0 |
| 2019-12 | RP-86 | RP-192916 | 0082 | 4 | F | Correction to behaviour of SN for security handling | 15.6.0 |
| 2019-12 | RP-86 | RP-192916 | 0104 | 2 | F | Correction of Core Network Type Restriction | 15.6.0 |
| 2019-12 | RP-86 | RP-192916 | 0236 | 2 | F | SN Status Transfer for bearer reconfiguration during HO with DC | 15.6.0 |
| 2019-12 | RP-86 | RP-192915 | 0244 | 1 | F | Misalignment between tabular and ASN.1 | 15.6.0 |
| 2019-12 | RP-86 | RP-192915 | 0249 | 1 | F | Correction of S-NSSAI coding | 15.6.0 |
| 2019-12 | RP-86 | RP-192915 | 0252 | 2 | F | Correction to UL data forwarding | 15.6.0 |
| 2019-12 | RP-86 | RP-192915 | 0262 | | F | Add the missing dynamic port support | 15.6.0 |
| 2019-12 | RP-86 | RP-192915 | 0266 | - | F | Correction on the data forwarding in S-NG-RAN initiated S-NG-RAN Release | 15.6.0 |
| 2019-12 | RP-86 | RP-192916 | 0272 | | F | Correction of Xn handover | 15.6.0 |
| 2019-12 | RP-86 | RP-192916 | 0282 | 1 | F | Support of delta configuration in MR-DC | 15.6.0 |
| 2019-12 | RP-86 | RP-192916 | 0288 | 1 | F | Missing description of a cause value | 15.6.0 |
| 2019-12 | RP-86 | RP-192916 | 0294 | 1 | F | Correction to SN Status Transfer considering MR-DC operations | 15.6.0 |
| 2019-12 | RP-86 | RP-192908 | 0089 | 4 | B | BL CR to 38.423: CLI support on XnAP | 16.0.0 |
| 2019-12 | RP-86 | RP-192693 | 0201 | 7 | F | Support for setting up IPSec a priori in Xn | 16.0.0 |
| 2019-12 | RP-86 | RP-192913 | 0208 | 7 | F | Xn Setup message size limitation | 16.0.0 |

| Change history | | | | | | | |
|----------------|---------|-----------|------|-----|-----|---|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2019-12 | RP-86 | RP-192915 | 0237 | 2 | F | Trace function in MR-DC | 16.0.0 |
| 2019-12 | RP-86 | RP-192913 | 0253 | 1 | C | Extending the MDBV Range | 16.0.0 |
| 2019-12 | RP-86 | RP-192910 | 0259 | 2 | B | Resuming SCG in RRC Resume | 16.0.0 |
| 2019-12 | RP-86 | RP-192916 | 0283 | 3 | F | Correction on the offered non-GBR resources | 16.0.0 |
| 2019-12 | RP-86 | RP-192910 | 0285 | 2 | B | Fast MCG link Recovery with SRB3 | 16.0.0 |
| 2020-03 | RP-87-e | RP-200422 | 0274 | 2 | B | Introduction of NR-U | 16.1.0 |
| 2020-03 | RP-87-e | RP-200423 | 0300 | 1 | B | Supporting of RACS in XnAP (The CR is not implemented. The CR was marked agreed by mistake while the WI is not yet complete) | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 0303 | - | A | Correction of the referred RRCResumeRequest1 name | 16.1.0 |
| 2020-03 | RP-87-e | RP-200476 | 0310 | 4 | B | E2E delay measurement for Qos monitoring for URLLC | 16.1.0 |
| 2020-03 | RP-87-e | RP-200427 | 0318 | 1 | F | Cleanup for Fast MCG link Recovery with SRB3 | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 0322 | 1 | A | Misalignment between the tabular and ASN.1 within the SN modification procedure | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 0327 | - | A | Propagation of Roaming and Access Restriction information in NG-RAN in non-homogenous NG-RAN node deployments | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 0329 | - | A | Correction of CR0236r2 to explicate procedural interaction | 16.1.0 |
| 2020-03 | RP-87-e | RP-200428 | 0331 | 1 | A | Correction of CR0282r1 – procedure text | 16.1.0 |
| 2020-03 | RP-87-e | RP-200429 | 0334 | 1 | F | Correction of CR0089r4: CLI Support on XnAP | 16.1.0 |
| 2020-03 | RP-87-e | RP-200425 | 0335 | - | F | Correction of CR0208 on Xn Setup Message Size Control | 16.1.0 |
| 2020-03 | RP-87-e | RP-200425 | 0337 | 1 | D | Rapporteur Corrections Rel-16 | 16.1.0 |
| 2020-07 | RP-88-e | RP-201075 | 0136 | 13 | B | Baseline CR for introducing Rel-16 NR mobility enhancement | 16.2.0 |
| 2020-07 | RP-88-e | RP-201088 | 0144 | 7 | B | Introduction of CP UP NB-IoT Others | 16.2.0 |
| 2020-07 | RP-88-e | RP-201074 | 0151 | 13 | B | Support of NR V2X over Xn | 16.2.0 |
| 2020-07 | RP-88-e | RP-201086 | 0182 | 8 | B | Introduction of Suspend-Resume | 16.2.0 |
| 2020-07 | RP-88-e | RP-201082 | 0221 | 12 | B | Addition of SON features | 16.2.0 |
| 2020-07 | RP-88-e | RP-201077 | 0223 | 6 | B | BL CR to 38.423: Support for IAB | 16.2.0 |
| 2020-07 | RP-88-e | RP-201079 | 0230 | 11 | B | Introduction of NR_IOT support to TS 38.423 | 16.2.0 |
| 2020-07 | RP-88-e | RP-201080 | 0289 | 7 | B | Introduction of Non-Public Networks | 16.2.0 |
| 2020-07 | RP-88-e | RP-201082 | 0291 | 10 | B | MDT Configuration support for XnAP | 16.2.0 |
| 2020-07 | RP-88-e | RP-201078 | 0300 | 5 | B | Supporting of RACS in XnAP | 16.2.0 |
| 2020-07 | RP-88-e | RP-201087 | 0343 | 2 | B | Introduction of eMTC connected to 5GC | 16.2.0 |
| 2020-07 | RP-88-e | RP-201076 | 0344 | 1 | B | CR38.423 on TDD pattern for NR-DC power control coordination for sol1 | 16.2.0 |
| 2020-07 | RP-88-e | RP-201073 | 0346 | 3 | F | Slot length correction in Intended TDD UL-DL Configuration | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 0348 | 1 | F | Introduction of CSI-RS configuration switch on Xn | 16.2.0 |
| 2020-07 | RP-88-e | RP-201090 | 0350 | 2 | A | Encoding PLMNs in served cell information NR | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 0359 | 1 | F | Rapporteur's Correction to XnAP version 16.1.0 | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 0360 | - | F | Correctinos to Xn Setup message size limitation solution | 16.2.0 |
| 2020-07 | RP-88-e | RP-201091 | 0373 | | F | Correction on nested SN modification procedure | 16.2.0 |
| 2020-07 | RP-88-e | RP-201090 | 0375 | - | A | Encoding PLMNs in served cell information IEs - semantics corrections | 16.2.0 |
| 2020-07 | RP-88-e | RP-201090 | 0381 | 4 | A | Clarification on MIB only scenario | 16.2.0 |
| 2020-07 | RP-88-e | RP-201093 | 0382 | | A | TS38.423 Resolving Erroneous unknown-old-en-gNB-UE-X2AP-ID Rel-16 | 16.2.0 |
| 2020-07 | RP-88-e | RP-201076 | 0388 | - | B | Inter-RAT HO support for fast MCG recovery | 16.2.0 |
| 2020-07 | RP-88-e | RP-201085 | 0393 | 2 | F | Correction on RF parameters in NR cell information | 16.2.0 |
| 2020-07 | RP-88-e | RP-201090 | 0394 | 4 | F | Correction of S-NSSAI range | 16.2.0 |
| 2020-09 | RP-89-e | RP-201955 | 0358 | 2 | A | Support of PSCell/SCell-only operation mode | 16.3.0 |
| 2020-09 | RP-89-e | RP-201946 | 0389 | 2 | F | Further correction on fast MCG recovery via SRB3 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0395 | 2 | F | Correction for TS38.423 on Unsuccessful Operation and Abnormal Conditions of MLB | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0405 | | B | Introduction of NR SCG Release for Power Saving | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0412 | 1 | F | Correction of NPN CAG Cells and non-CAG Cells | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0419 | 2 | F | SON Corrections | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0420 | 2 | F | Clarification of the TNL Capacity Indicator | 16.3.0 |
| 2020-09 | RP-89-e | RP-201950 | 0426 | 1 | F | Correction of CR0360 - Enabling an ng-eNB to reply to Cell Assistance Information E-UTRA. | 16.3.0 |
| 2020-09 | RP-89-e | RP-201950 | 0427 | - | F | Correction of CR 0393r2 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0428 | - | F | Correcting Target Cell List for Rel-16 mobility enhancements | 16.3.0 |
| 2020-09 | RP-89-e | RP-201955 | 0429 | - | A | Missing QoS Flow Mapping Indication IE in PDU Session Resource Modification Info - SN terminated IE. | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0430 | 1 | F | Rapporteur's corrections to TS 38.423 v16.2.0 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0431 | - | F | Restructuring FAILURE INDICATION message - avoid condition upon absence of IE | 16.3.0 |
| 2020-09 | RP-89-e | RP-201955 | 0432 | 1 | A | Correction CR0063 implementation - missing DRB-IDs-takenintouse in PDU Session Resource Setup Response Info - SN terminated | 16.3.0 |

| Change history | | | | | | | |
|----------------|---------|-----------|------|-----|-----|---|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2020-09 | RP-89-e | RP-201955 | 0436 | 1 | A | Multiple location reporting requests and report | 16.3.0 |
| 2020-09 | RP-89-e | RP-201955 | 0454 | 1 | A | Correction for Industrial IoT PDCP duplication for Carrier Aggregation | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0464 | - | F | Correction of mandatory ProtocolExtensionContainer | 16.3.0 |
| 2020-12 | RP-90-e | RP-202314 | 0399 | 2 | F | NPRACH configuration exchanging | 16.4.0 |
| 2020-12 | RP-90-e | RP-202311 | 0466 | 1 | F | Correction on CPC Complete Transfer | 16.4.0 |
| 2020-12 | RP-90-e | RP-202312 | 0472 | 1 | F | CR38423 for NR SCG release for power saving | 16.4.0 |
| 2020-12 | RP-90-e | RP-202312 | 0485 | 2 | F | Support of release on CAG subscription change | 16.4.0 |
| 2020-12 | RP-90-e | RP-202313 | 0492 | 1 | F | Introduction of reporting frequency for Qos monitoring for URLLC | 16.4.0 |
| 2020-12 | RP-90-e | RP-202312 | 0493 | 1 | F | Propagation of immediate MDT configuration in case of Xn inter-RAT HO | 16.4.0 |
| 2020-12 | RP-90-e | RP-202310 | 0494 | 1 | F | Correction of alternative QoS profile | 16.4.0 |
| 2020-12 | RP-90-e | RP-202312 | 0495 | 1 | F | Corrections of MLB and MDT | 16.4.0 |
| 2020-12 | RP-90-e | RP-202315 | 0501 | 1 | F | XnAP Rapporteur CR | 16.4.0 |
| 2020-12 | RP-90-e | RP-202315 | 0514 | - | F | Correction on XnAP ASN.1 | 16.4.0 |
| 2021-03 | RP-91-e | RP-210124 | 0206 | 7 | B | Introduction of SFN Offset per cell over Xn | 16.5.0 |
| 2021-03 | RP-91-e | RP-210239 | 0512 | 4 | F | Cause value on Xn for insufficient UE capabilities CR 38.423 | 16.5.0 |
| 2021-03 | RP-91-e | RP-210240 | 0519 | 1 | F | Update on QoS monitoring control | 16.5.0 |
| 2021-03 | RP-91-e | RP-210237 | 0529 | - | F | Correction on UE identity index for eMTC UE in RRC_INACTIVE | 16.5.0 |
| 2021-03 | RP-91-e | RP-210240 | 0534 | 2 | A | Correction of SN modification request ack message | 16.5.0 |
| 2021-03 | RP-91-e | RP-210240 | 0537 | 2 | A | Correction on UL Configuration handling | 16.5.0 |
| 2021-03 | RP-91-e | RP-210232 | 0548 | 1 | F | Correction of NPN related Cell Information | 16.5.0 |
| 2021-03 | RP-91-e | RP-210235 | 0554 | 2 | F | Clarification of Secondary RAT in mobility restrictions | 16.5.0 |
| 2021-03 | RP-91-e | RP-210239 | 0555 | 1 | F | Cause value on Xn for normal release CR 38.423 | 16.5.0 |
| 2021-06 | RP-92-e | RP-211323 | 0452 | 3 | F | Correction of the DAPS Response Information IE in the tabular | 16.6.0 |
| 2021-06 | RP-92-e | RP-211323 | 0465 | 3 | F | Clarification of the use of the max no of CHO preparations | 16.6.0 |
| 2021-06 | RP-92-e | RP-211315 | 0473 | 3 | F | Clarification on TAI Slice Support List | 16.6.0 |
| 2021-06 | RP-92-e | RP-211316 | 0504 | 2 | F | Correction of Allocated C-RNTI for 2-step RACH | 16.6.0 |
| 2021-06 | RP-92-e | RP-211324 | 0530 | 6 | F | Paging eDRX information delivery for RRC_INACTIVE UE in XnAP | 16.6.0 |
| 2021-06 | RP-92-e | RP-211317 | 0559 | 2 | F | Maximum Number of RRC Connections | 16.6.0 |
| 2021-06 | RP-92-e | RP-211323 | 0577 | 2 | F | 38.423 correction for CHO early data forwarding in MN to ng-eNB/gNB Change scenario | 16.6.0 |
| 2021-06 | RP-92-e | RP-211334 | 0582 | 1 | A | Correction on the RAT Restriction Information | 16.6.0 |
| 2021-06 | RP-92-e | RP-211317 | 0594 | 1 | F | Correction on description of RACH Report Container in ACCESS AND MOBILITY INDICATION | 16.6.0 |
| 2021-06 | RP-92-e | RP-211317 | 0609 | 3 | F | Correction of ASN.1 definition and semantics for Resource Status Reporting Initiation procedure | 16.6.0 |
| 2021-06 | RP-92-e | RP-211328 | 0624 | 1 | F | Addition of sidelink MR-DC resource coordination | 16.6.0 |
| 2021-06 | RP-92-e | RP-211334 | 0631 | 1 | A | How to release SCG configuration between MN and SN CR 38.423 | 16.6.0 |
| 2021-06 | RP-92-e | RP-211336 | 0632 | 1 | A | Rel-16 CR for UE specific DRX delivery | 16.6.0 |
| 2021-09 | RP-93-e | RP-211881 | 0622 | 2 | F | Expected UE Activity Behaviour | 16.7.0 |
| 2021-09 | RP-93-e | RP-211878 | 0643 | - | F | Support for using IAB for a NR-DC UE | 16.7.0 |
| 2021-09 | RP-93-e | RP-211884 | 0659 | 1 | F | Correction of RESOURCE STATUS UPDATE | 16.7.0 |
| 2021-09 | RP-93-e | RP-211882 | 0672 | - | A | Correction of Security | 16.7.0 |
| 2021-09 | RP-93-e | RP-211882 | 0673 | - | F | Correction CR on Network instance | 16.7.0 |
| 2021-12 | RP-94-e | RP-212863 | 0677 | 1 | F | Adding reference for coding of Common Network Instance | 16.8.0 |
| 2021-12 | RP-94-e | RP-212863 | 0689 | - | A | Transfer of PSCell Location Reporting control information at Xn mobility | 16.8.0 |
| 2021-12 | RP-94-e | RP-212871 | 0696 | 1 | F | Redundant network instance for split PDU session | 16.8.0 |
| 2021-12 | RP-94-e | RP-212863 | 0705 | 1 | F | Correction to the S-NODE MODIFICATION REQUIRED message | 16.8.0 |
| 2021-12 | RP-94-e | RP-212860 | 0706 | 1 | F | Correction of Direct data forwarding from NR-DC to E-UTRAN | 16.8.0 |
| 2021-12 | RP-94-e | RP-212864 | 0718 | - | A | Correction on Xn Removal for RAN Sharing in Rel-16 | 16.8.0 |
| 2022-03 | RP-95-e | RP-220243 | 0553 | 7 | F | Direct data forwarding for mobility between DC and SA | 16.9.0 |
| 2022-03 | RP-95-e | RP-220279 | 0691 | 3 | F | Dynamic ACL over Xn CR 38.423 | 16.9.0 |
| 2022-03 | RP-95-e | RP-220278 | 0731 | 1 | A | Correction on UE XnAP ID in the ERROR INDICATION message | 16.9.0 |
| 2022-03 | RP-95-e | RP-220278 | 0736 | 1 | F | Correction of frequency information for DL only cell | 16.9.0 |
| 2022-03 | RP-95-e | RP-220280 | 0742 | 1 | F | Value range misalignment for MDT M1, M8 and M9 configuration | 16.9.0 |
| 2022-03 | RP-95-e | RP-220278 | 0744 | 1 | A | CR to 38.423 on UP security policy update | 16.9.0 |
| 2022-03 | RP-95-e | RP-220280 | 0753 | - | F | MRO Correction | 16.9.0 |
| 2022-03 | RP-95-e | RP-220279 | 0756 | 1 | F | CR on direct data forwarding from MR-DC to SA | 16.9.0 |

| Change history | | | | | | | |
|----------------|---------|-----------|------|-----|-----|---|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2022-03 | RP-95-e | RP-220280 | 0760 | - | F | Unsuccessful Mobility Setting Change | 16.9.0 |
| 2022-03 | RP-95-e | RP-220279 | 0766 | | F | Correction of S-NODE MODIFICATION CONFIRM message | 16.9.0 |
| 2022-06 | RP-96 | RP-221150 | 0803 | 1 | F | Dynamic ACL over Xn CR 38.423 | 16.10.0 |
| 2022-06 | RP-96 | RP-221155 | 0805 | 1 | F | Corrections caused by rapporteur corrections for Version 17.0.0 | 16.10.0 |
| 2022-06 | RP-96 | RP-221153 | 0811 | 2 | F | Trace Activation IE support for the Retrieve UE Context procedure | 16.10.0 |
| 2022-09 | RP-97-e | RP-222199 | 0855 | 1 | F | CAG access control without mobility restrictions | 16.11.0 |
| 2022-09 | RP-97-e | RP-222203 | 0864 | 1 | F | Correction of Xn Data Forwarding | 16.11.0 |
| 2022-09 | RP-97-e | RP-222201 | 0890 | 1 | A | Correction on QoS Flow Mapping Indication | 16.11.0 |
| 2022-12 | RP-98-e | RP-222890 | 0928 | 2 | F | Correction on RACH report | 16.12.0 |
| 2022-12 | RP-98-e | RP-223490 | 0942 | 2 | F | Correction on LTE UE RLF Report in TS38.423 | 16.12.0 |
| 2023-03 | RAN#99 | RP-230595 | 0970 | - | F | Correction of MDT Configuration-EUTRA IE | 16.13.0 |
| 2023-03 | RAN#99 | RP-230601 | 0976 | 2 | F | Correction of SFN offset in served cell information E-UTRA | 16.13.0 |
| 2023-03 | RAN#99 | RP-230595 | 0990 | 1 | F | Correction on MDT area scope | 16.13.0 |
| 2023-03 | RAN#99 | RP-230600 | 0992 | 1 | F | Correction on Conditional Handover Cancel | 16.13.0 |
| 2023-03 | RAN#99 | RP-230595 | 0994 | 1 | F | ASN.1 Correction of MDT Configuration-NR | 16.13.0 |
| 2023-03 | RAN#99 | RP-230593 | 1002 | 1 | A | Correction for TS 38.423 on UP security policy update in MR-DC | 16.13.0 |
| 2023-06 | RAN#100 | RP-231081 | 1011 | 2 | F | Correction on Mobility Change procedure | 16.14.0 |
| 2023-06 | RAN#100 | RP-231075 | 1016 | 2 | F | Clarifications on TNLA Addition/Removal/Modification procedures (XnAP) | 16.14.0 |
| 2023-06 | RAN#100 | RP-231067 | 1025 | 3 | F | Introduction of Hashed UE Identity Index Value for RRC_INACTIVE with eDRX | 16.14.0 |
| 2023-06 | RAN#100 | RP-231081 | 1032 | 2 | F | Correction on Trace Activation IE | 16.14.0 |
| 2023-06 | RAN#100 | RP-231081 | 1034 | 2 | F | Correction on the Area Scope IE in MDT Configuration | 16.14.0 |
| 2023-06 | RAN#100 | RP-231072 | 1056 | 1 | F | Correction on QoS mapping information | 16.14.0 |
| 2023-06 | RAN#100 | RP-231084 | 1059 | 0 | F | Correcting missing extension containers in CHOICE type definitions | 16.14.0 |
| 2023-09 | RAN#101 | RP-231899 | 1074 | - | A | Correction of QoS Flow Mapping Indication IE in PDU Session Resource Modification Required Info - SN terminated | 16.15.0 |
| 2023-09 | RAN#101 | RP-231902 | 1076 | 1 | F | Correction of Additional PDCP Duplication TNL List | 16.15.0 |

History

| Document history | | |
|-------------------------|---------------|-------------|
| V16.2.0 | July 2020 | Publication |
| V16.3.0 | November 2020 | Publication |
| V16.4.0 | January 2021 | Publication |
| V16.5.0 | April 2021 | Publication |
| V16.6.0 | August 2021 | Publication |
| V16.7.0 | October 2021 | Publication |
| V16.8.0 | January 2022 | Publication |
| V16.9.0 | May 2022 | Publication |
| V16.10.0 | July 2022 | Publication |
| V16.11.0 | October 2022 | Publication |
| V16.12.0 | January 2023 | Publication |
| V16.13.0 | May 2023 | Publication |
| V16.14.0 | July 2023 | Publication |
| V16.15.0 | October 2023 | Publication |