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Technical Specification

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(Release 15)

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Foreword

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

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

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x the first digit:

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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".

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].

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.

NG-RAN node: 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].

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
CGI	Cell Global Identifier
CP	Control Plane
DL	Downlink
EN-DC	E-UTRA-NR Dual Connectivity
E-RAB	E-UTRAN Radio Access Bearer
GUAMI	Globally Unique AMF Identifier
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
NSSAI	Network Slice Selection Assistance Information
RANAC	RAN Area Code
SCG	Secondary Cell Group
SCTP	Stream Control Transmission Protocol
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

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 *Information Element Name* is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation “IE”, e.g. *PDU Session ID* IE.
Value of an IE	When referring to the value of an information element (IE) in the specification the “Value” is written as it is specified in sub clause 9.2 enclosed by quotation marks, e.g. “Value”.

5 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	

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

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.

The procedure uses UE-associated signalling.

8.2.1.2 Successful Operation

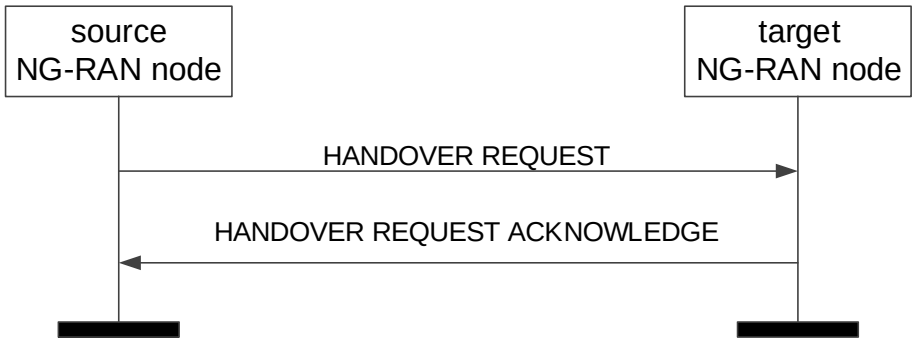

Figure 8.2.1.2-1: Handover Preparation, successful operation

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 $TXn_{RELOCprep}$.

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 HANDOVER REQUEST ACKNOWLEDGE message the NG-RAN node shall stop the timer $TXn_{RELOCprep}$, start the timer $TXn_{RELOCoverall}$ and terminate the Handover Preparation procedure. The source NG-RAN node is then defined to have a Prepared Handover for that Xn UE-associated signalling.

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 HANDOVER 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 HANDOVER REQUEST message. For each PDU session that the target NG-RAN node decides to admit the data forwarding for at

least one QoS flow, the target NG-RAN node includes the *PDU Session level DL data forwarding GTP-U Tunnel Endpoint* 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 HANDOVER 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 HANDOVER 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 HANDOVER 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 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 HANDOVER 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 HANDOVER REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this DRB.

If the HANDOVER REQUEST ACKNOWLEDGE message contains the *UL Forwarding GTP Tunnel Endpoint* 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 HANDOVER 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 HANDOVER 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 HANDOVER 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 HANDOVER REQUEST message, the target NG-RAN node shall
  - consider that no roaming and no access restriction apply to the UE.

If the *Trace Activation* IE is included in the HANDOVER 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 HANDOVER 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 HANDOVER 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 HANDOVER 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].

For each PDU session, if the *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 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 HANDOVER 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 HANDOVER 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 HANDOVER 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 *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].

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 HANDOVER 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

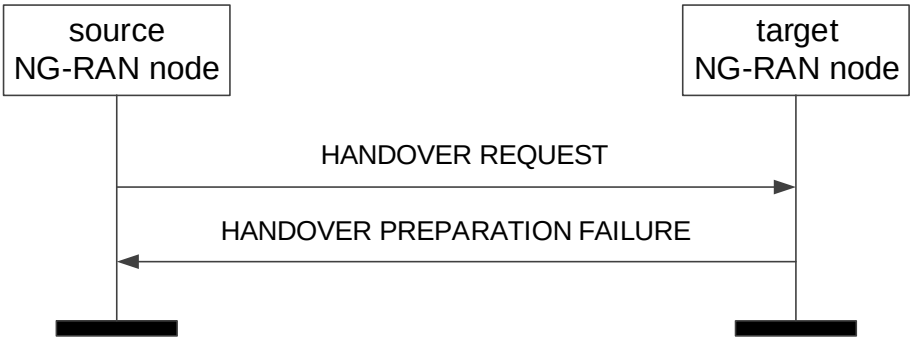

Figure 8.2.1.3-1: Handover Preparation, unsuccessful operation

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 HANDOVER PREPARATION FAILURE message to the source NG-RAN node. The message shall contain the *Cause* IE with an appropriate value.

Interactions with Handover Cancel procedure:

If there is no response from the target NG-RAN node to the HANDOVER REQUEST message before timer $TXn_{RELOCprep}$ 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 HANDOVER REQUEST ACKNOWLEDGE or HANDOVER PREPARATION FAILURE message received after the initiation of the Handover Cancel procedure and remove any reference and release any resources related to the concerned 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 HANDOVER 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 HANDOVER PREPARATION FAILURE message.

8.2.2 SN Status Transfer

8.2.2.1 General

The purpose of the SN Status Transfer procedure is to transfer the uplink PDCP SN and HFN receiver status and the downlink PDCP SN and HFN transmitter status either, from the source to the target 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.

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.

For each DRB for which PDCP-SN and HFN status preservation applies, the source NG-RAN node shall include the *DRB ID* IE, the *UL COUNT Value* IE and the *DL COUNT Value* IE within the *DRBs Subject to Status Transfer List* IE in the SN STATUS TRANSFER message.

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.

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.

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

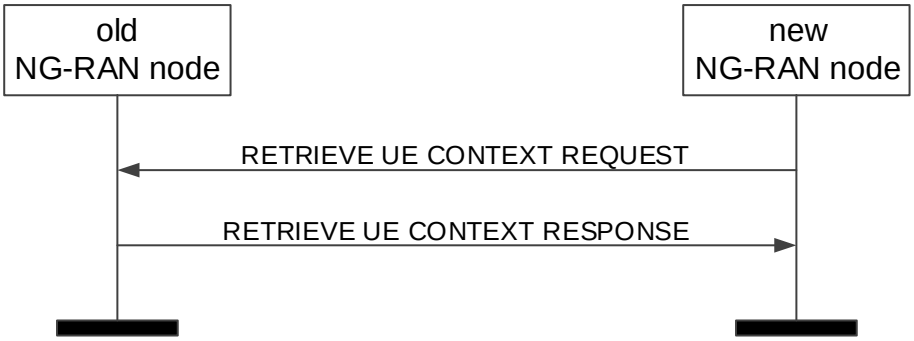

Figure 8.2.4.2-1: Retrieve UE Context, successful operation

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 *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 *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].

8.2.4.3 Unsuccessful Operation

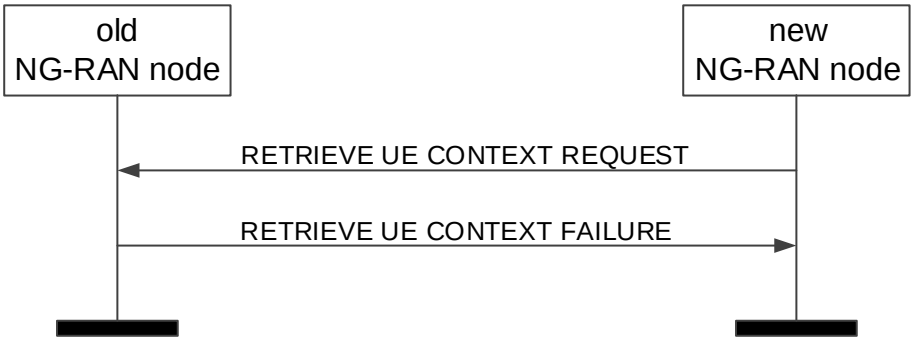

Figure 8.2.4.3-1: Retrieve UE Context, unsuccessful operation

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 $node_1$ to request paging of a UE in the NG-RAN $node_2$.

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 $node_1$ by sending the RAN PAGING message to the NG-RAN $node_2$, 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 $node_2$ may use it to prioritize paging.

If the *Assistance Data for RAN Paging* IE is included in the RAN PAGING message, the NG-RAN $node_2$ 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 $node_2$ may use it to apply specific paging schemes.

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-UAddress Indication procedure is used to provide forwarding addresses 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 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.

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].

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.

8.3 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

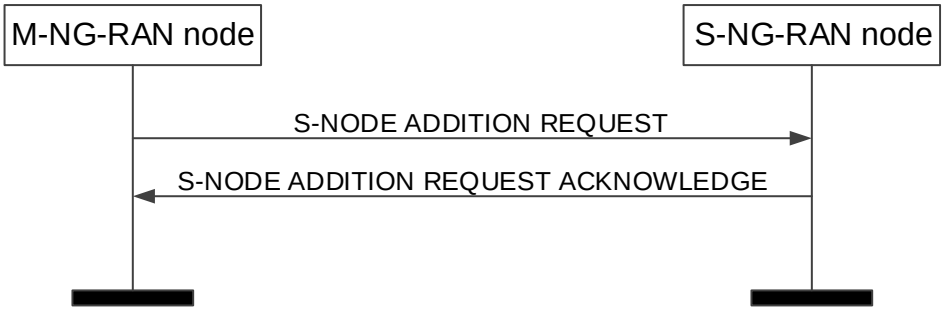

Figure 8.3.1.2-1: S-NG-RAN node Addition Preparation, successful operation

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 TXn_{DCprep}.

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 *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 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 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].

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. 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 indicates 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 ADDTION 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 ADDTION 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.

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 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. If the S-NG-RAN node is an ng-eNB, it shall reject all PDU sessions for which the *Integrity Protection Indication* IE is set to "required" as specified in TS 33.501 [28]. If either the S-NG-RAN node or the M-NG-RAN node is an ng-eNB, the S-NG-RAN node shall behave according to clause 6.10.4 of TS 33.501 [28] for PDU sessions for which the *Integrity Protection Indication* IE is set to "preferred".

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].

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 $TXn_{DCoverall}$ 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 $TXn_{DCoverall}$.

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

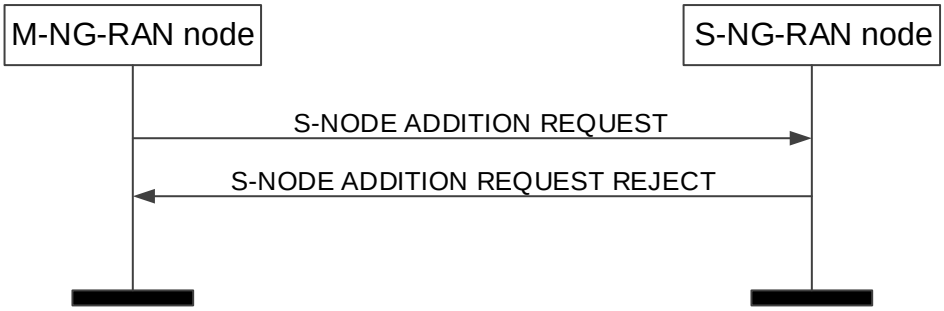

Figure 8.3.1.3-1: S-NG-RAN node Addition Preparation, unsuccessful operation

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 S-NG-RAN node receives an S-NODE ADDITION REQUEST 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 TXn_{DCprep} 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 $TXn_{DCoverall}$ 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 $TXn_{DCoverall}$.

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

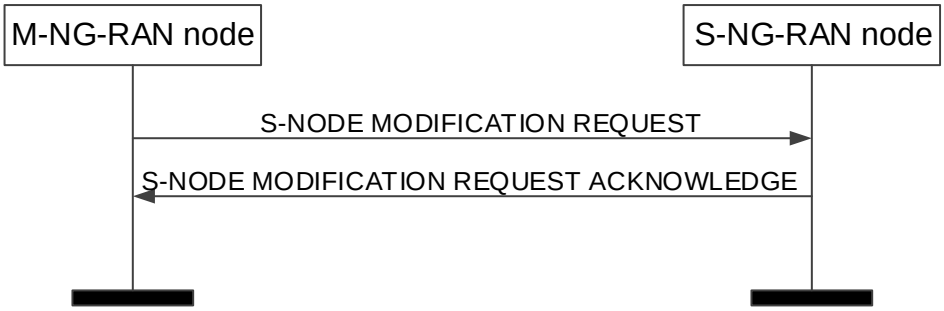

Figure 8.3.3.2-1: M-NG-RAN node initiated S-NG-RAN node Modification Preparation, successful operation

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 TXn_{DCprep}.

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 *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. 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 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].

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 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.

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 *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].

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 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 *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 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 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. If the S-NG-RAN node is an ng-eNB, it shall reject all PDU sessions for which the *Integrity Protection Indication* IE is set to "required" as specified in TS 33.501 [28]. If either the S-NG-RAN node or the M-NG-RAN node is an ng-eNB, the S-NG-RAN node shall behave according to clause 6.10.4 of TS 33.501 [28] for PDU sessions for which the *Integrity Protection Indication* IE is set to "preferred".

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 I*E.

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].

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 $TXn_{DCoverall}$ 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 $TXn_{DCoverall}$.

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 provides 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].

8.3.3.3 Unsuccessful Operation

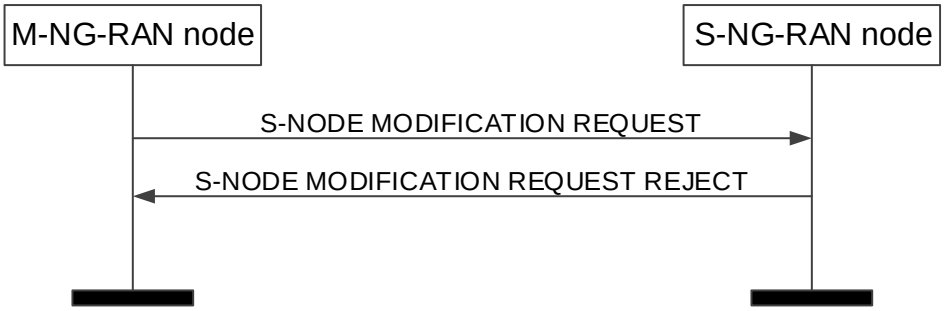

Figure 8.3.3.3-1: M-NG-RAN node initiated S-NG-RAN node Modification Preparation, unsuccessful operation

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 TXn_{DCprep} 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 $TXn_{DCoverall}$ 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 TXn_{DCprep} 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

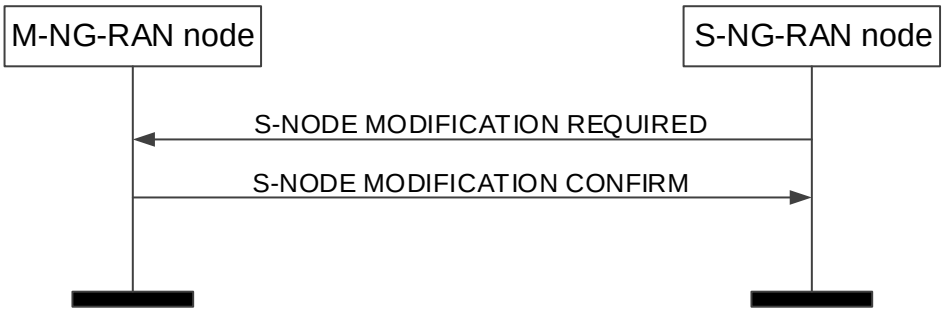

Figure 8.3.4.2-1: S-NG-RAN node initiated S-NG-RAN node Modification, successful operation.

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 $TXn_{DCoverall}$.

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 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 *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 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 $TXn_{DCoverall}$.

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. 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]

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.

8.3.4.3 Unsuccessful Operation

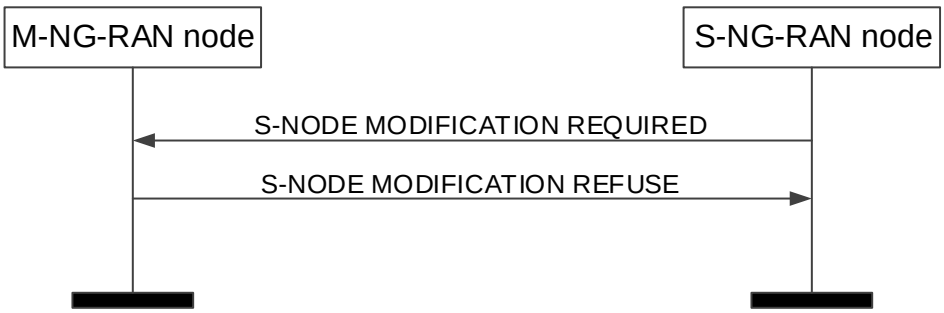

Figure 8.3.4.3-1: S-NG-RAN node initiated S-NG-RAN node Modification, unsuccessful operation.

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 $TXn_{DCoverall}$ 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 applicable forwarding addresses and/or LCID applicable for PDCP duplication, the S-NG-RAN node shall

- regard the S-NG-RAN node initiated S-NG-RAN node Modification Procedure as being failed;
- stop the $TXn_{DCoverall}$, 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

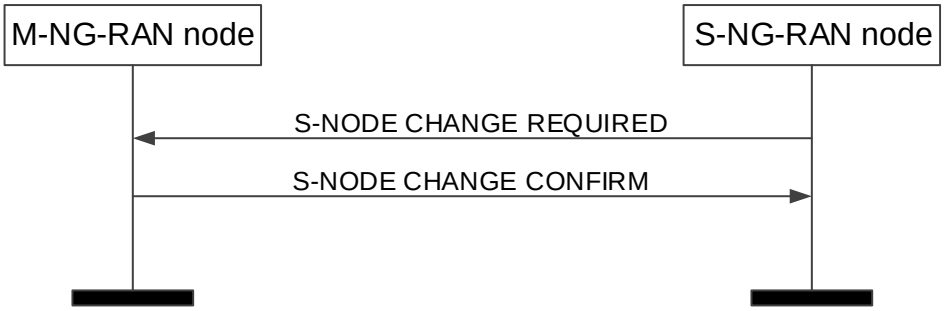

Figure 8.3.5.2-1: S-NG-RAN node initiated S-NG-RAN node Change, successful operation.

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 $TXn_{DCoverall}$.

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 $TXn_{DCoverall}$ upon reception of the S-NODE CHANGE CONFIRM message.

8.3.5.3 Unsuccessful Operation

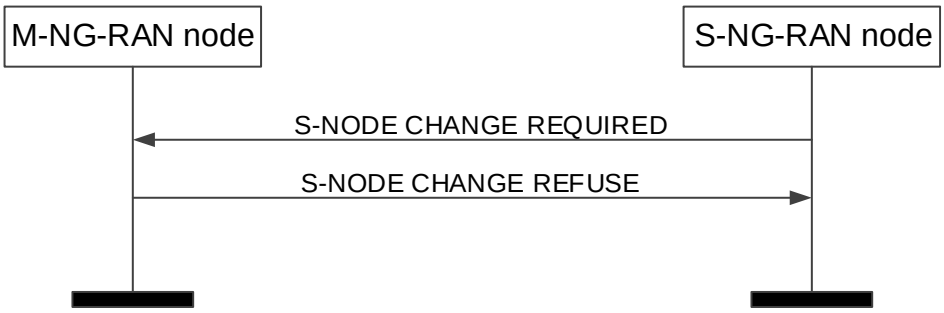

Figure 8.3.5.3-1: S-NG-RAN node initiated S-NG-RAN node Change, unsuccessful operation.

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 $TXn_{DCoverall}$ 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

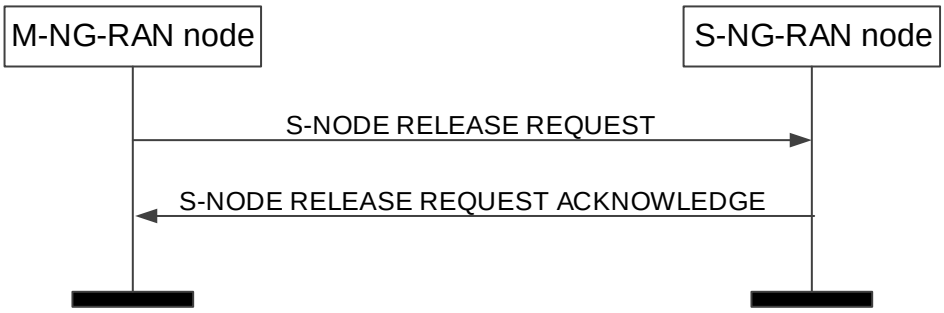

Figure 8.3.6.2-1: M-NG-RAN node initiated S-NG-RAN node Release, successful operation

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 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

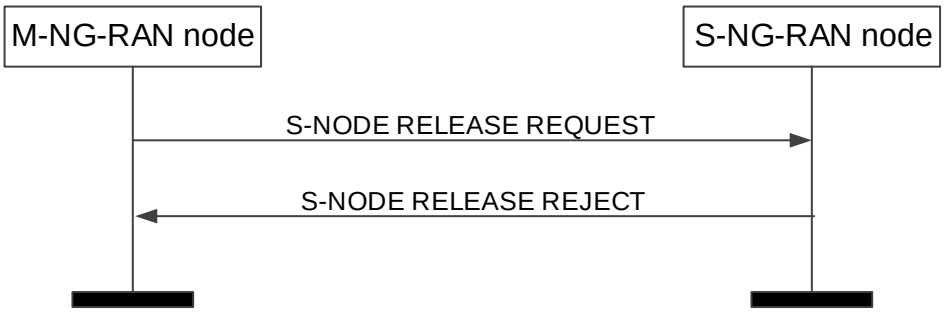

Figure 8.3.6.3-1: M-NG-RAN node initiated S-NG-RAN node Release, unsuccessful operation

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

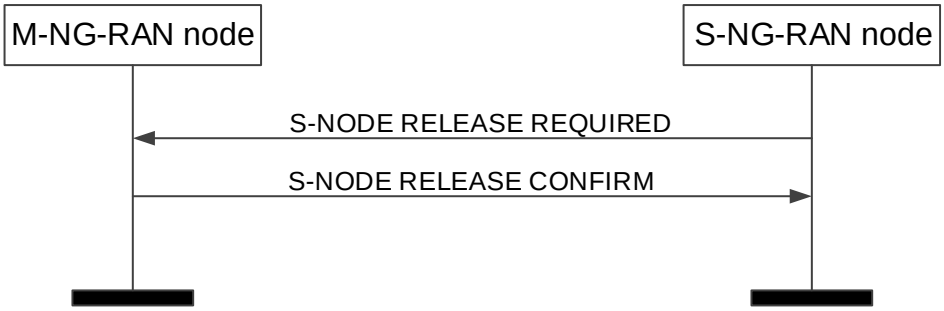

Figure 8.3.7.2-1: S-NG-RAN node initiated S-NG-RAN node Release, successful operation.

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 procedure uses UE-associated signalling.

8.3.9.2 Successful Operation

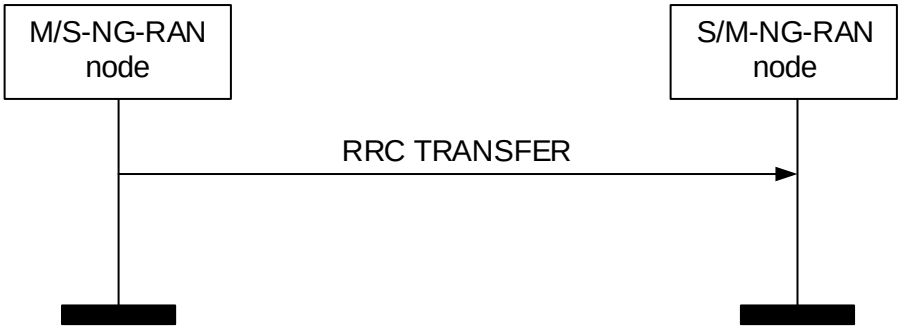

Figure 8.3.9.2-1: RRC Transfer procedure, successful operation.

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 includes neither the *RRC Container* IE in the *Split SRB* IE nor the RRC Container IE in the NR UE Report 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 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.

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 fulfill the GFBR anymore or that it can fulfill 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 fulfill the GFBR anymore or that the GFBR can be fulfilled again, as specified in TS 37.340 [8].

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 fulfill the GFBR anymore or that the GFBR can be fulfilled again, as specified in TS 37.340 [8].

This procedure is triggered to notify the M-NG-RAN node that resources requested for SN-terminated bearers can either not fulfill the GFBR anymore or that the GFBR can be fulfilled again, as specified in TS 37.340 [8].

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

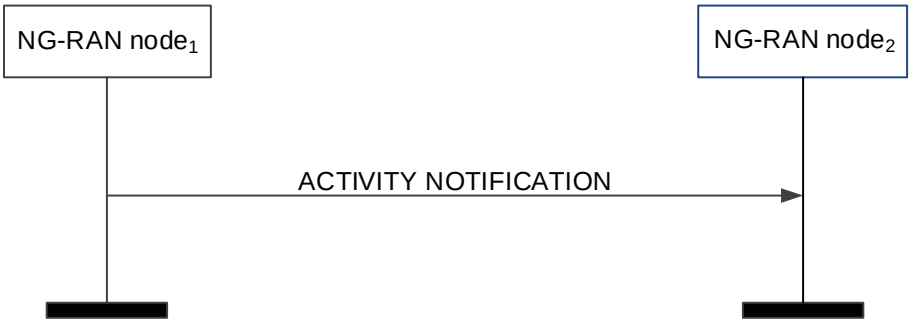

Figure 8.3.11.2-1: Activity Notification

NG-RAN node$_1$ initiates the procedure by sending the ACTIVITY NOTIFICATION message to NG-RAN node$_2$.

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 node$_2$ shall consider that RAN Paging has failed in NG-RAN node$_1$ for the UE. NG-RAN node$_2$ 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 node$_1$ acts as a Secondary Node, while in case of RAN Paging failure indication, NG-RAN node$_1$ 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 node$_1$ 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 node$_2$.

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

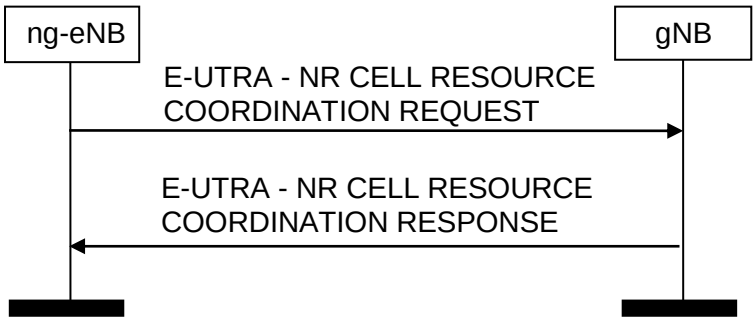

Figure 8.3.12.2-1: ng-eNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation

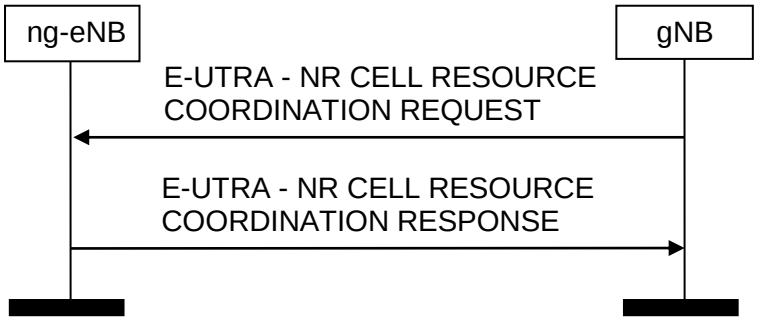

Figure 8.3.12.2-2: gNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation

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 X2 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

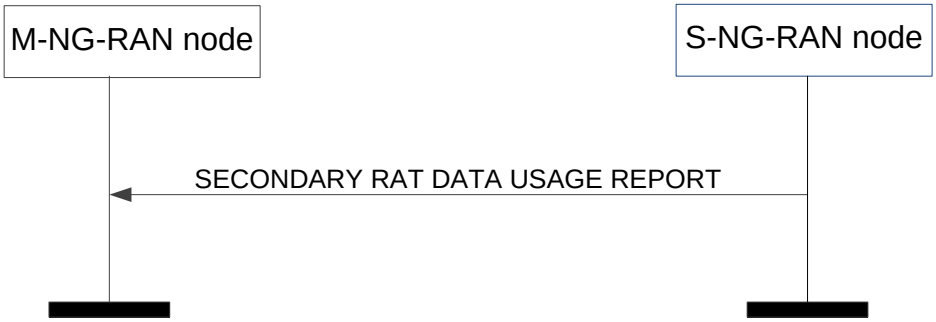

Figure 8.3.13.2-1: Secondary RAT Data Usage Report procedure, successful operation.

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.

8.4 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

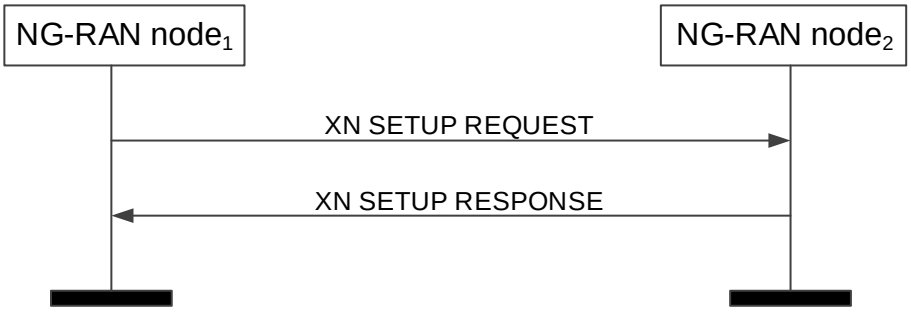

Figure 8.4.1.2: Xn Setup, successful operation

The NG-RAN node$_1$ initiates the procedure by sending the XN SETUP REQUEST message to the candidate NG-RAN node$_2$. The candidate NG-RAN node$_2$ 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 node$_1$ 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 node$_2$ 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 node$_1$. 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 node$_2$.

If Supplementary Uplink is configured at the NG-RAN node$_1$, the NG-RAN node$_1$ 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 node$_2$, the candidate NG-RAN node$_2$ 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 node$_1$ 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 REQUEST ACKNOWLEDGE message shall include the *Interface Instance Indication* IE to identify the corresponding interface instance.

8.4.1.3 Unsuccessful Operation

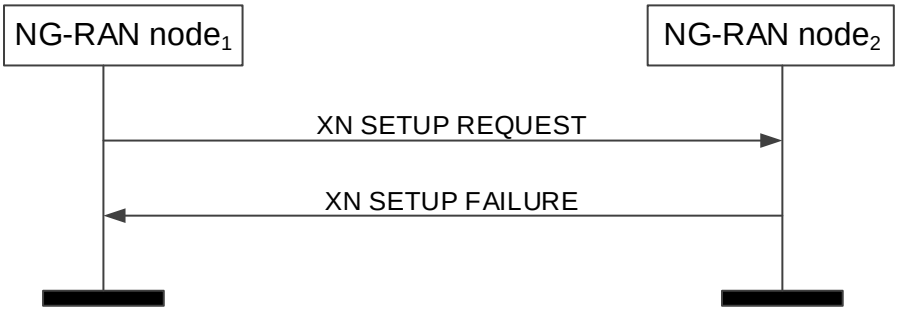

Figure 8.4.1.3-1: Xn Setup, unsuccessful operation

If the candidate NG-RAN node$_2$ 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 node$_1$ shall wait at least for the indicated time before reinitiating the Xn Setup procedure towards the same NG-RAN node$_2$.

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.

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 node$_1$ does not receive either XN SETUP RESPONSE message or XN SETUP FAILURE message, the NG-RAN node$_1$ 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 node$_1$ receives an XN SETUP REQUEST message from the peer entity on the same Xn interface:

- In case the NG-RAN node$_1$ answers with an XN SETUP RESPONSE message and receives a subsequent Xn SETUP FAILURE message, the NG-RAN node$_1$ 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 node$_1$ answers with an XN SETUP FAILURE message and receives a subsequent XN SETUP RESPONSE message, the NG-RAN node$_1$ 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.

The procedure uses non UE-associated signalling.

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.

8.4.2.2 Successful Operation

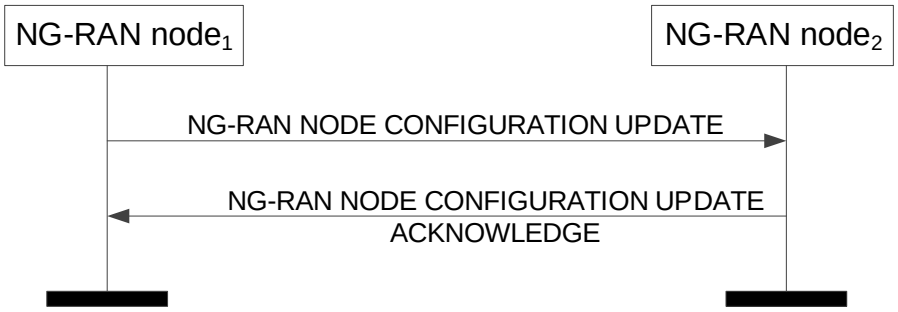

Figure 8.4.2.2-1: NG-RAN node Configuration Update, successful operation

The NG-RAN node$_1$ initiates the procedure by sending the NG-RAN NODE CONFIGURATION UPDATE message to a peer NG-RAN node$_2$.

If Supplementary Uplink is configured at the NG-RAN node$_1$, the NG-RAN node$_1$ 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 node$_2$, the NG-RAN node$_2$ 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 node$_2$ may use it to generate the *Served NR Cells* IE and include the list in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message.

Upon reception of the NG-RAN NODE CONFIGURATION UPDATE message, NG-RAN node$_2$ shall update the information for NG-RAN node$_1$ 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.

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 node$_2$ 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 node$_2$ 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 node$_1$ need to be updated, the whole list of neighbouring cells, if any, shall be contained in the *Neighbour Information NR* IE. The NG-RAN node$_2$ 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 node$_2$ shall delete information of cell indicated by *Old NR-CGI* IE.

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 node$_2$ 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 $node_2$ 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 $node_1$ 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 $node_2$ 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 $node_2$ 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.

Update of TNL addresses for SCTP associations:

If the *TNL Association to Add List* IE is included in the NG-RAN NODE CONFIGURATION UPDATE message, the NG-RAN $node_2$ shall, if supported, use it to establish the TNL association(s) with the NG-RAN $node_1$. The NG-RAN $node_2$ shall report to the NG-RAN $node_1$, in the NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE message, the successful establishment of the TNL association(s) with the NG-RAN $node_1$ as follows:

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

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

If the *TNL Association to Remove List* IE is included in the NG-RAN NODE CONFIGURATION UPDATE message the NG-RAN $node_2$ shall, if supported, initiate removal of the TNL association(s) indicated by the received Transport Layer information towards the NG-RAN $node_1$.

If the *TNL Association to Update List* IE is included in the NG-RAN NODE CONFIGURATION UPDATE message the NG-RAN $node_2$ shall, if supported, update the TNL association(s) indicated by the received Transport Layer information towards the NG-RAN $node_1$.

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 $node_2$ 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 $node_2$ shall remove the AMF Regions from its AMF Region List.

8.4.2.3 Unsuccessful Operation

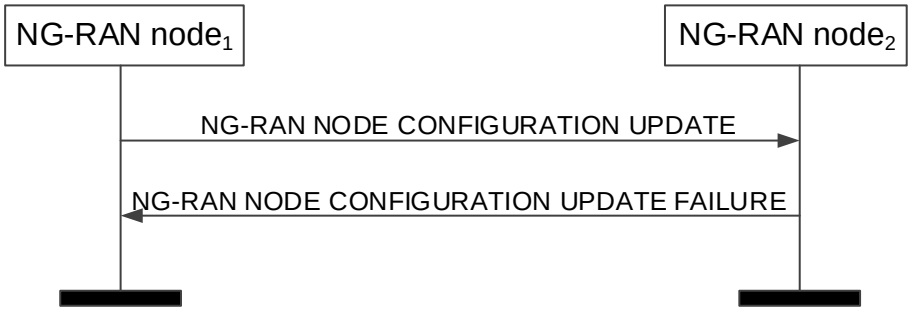

Figure 8.4.2.3-1: NG-RAN node Configuration Update, unsuccessful operation

If the NG-RAN node$_2$ 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 node$_1$ shall wait at least for the indicated time before reinitiating the NG-RAN Node Configuration Update procedure towards the same NG-RAN node$_2$. 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 node$_1$ 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 node$_1$ may reinitiate the NG-RAN node Configuration Update procedure towards the same NG-RAN node$_2$, 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

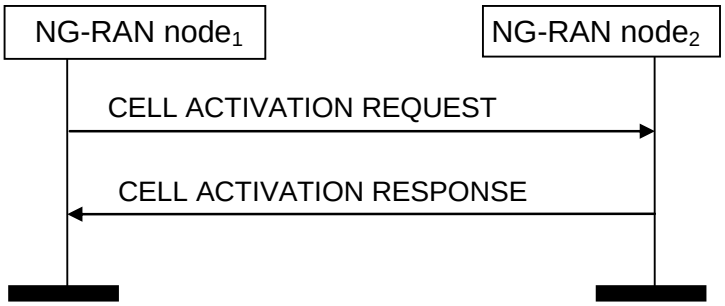

Figure 8.4.3.2-1: Cell Activation, successful operation

The NG-RAN node$_1$ initiates the procedure by sending the CELL ACTIVATION REQUEST message to the peer NG-RAN node$_2$.

Upon receipt of this message, the NG-RAN node$_2$ 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 node$_2$ shall not send the NG-RAN CONFIGURATION UPDATE message to the NG-RAN node$_1$ 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 node$_1$ is used to update the information about the activation state of NG-RAN node$_2$ cells in the NG-RAN node$_1$.

8.4.3.3 Unsuccessful Operation

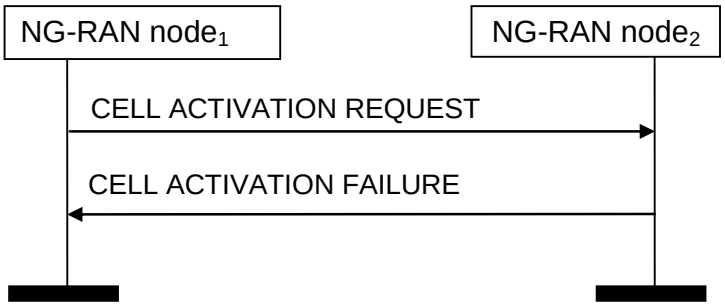

Figure 8.4.3.3-1: Cell Activation, unsuccessful operation

If the NG-RAN node$_2$ 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 node$_1$ and the NG-RAN node$_2$ 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

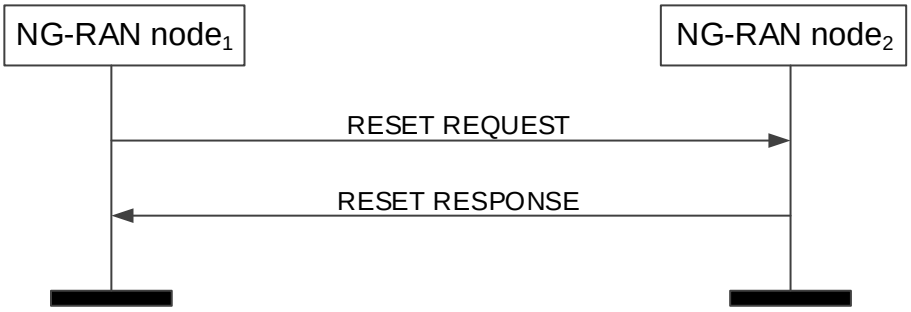

Figure 8.4.4.2-1: Reset, successful operation

The procedure is initiated with the RESET REQUEST message sent from the NG-RAN $node_1$ to the NG-RAN $node_2$. Upon receipt of this message,

- if the RESET REQUEST message indicates full reset the NG-RAN $node_2$ shall abort any other ongoing procedures over Xn between the NG-RAN $node_1$ and the NG-RAN $node_2$. The NG-RAN $node_2$ shall delete all the context information related to the NG-RAN $node_1$, 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 $node_2$ shall respond with the RESET RESPONSE message.

- if the RESET REQUEST message indicates partial reset, the NG-RAN $node_2$ 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 $node_2$ shall delete all the context information related to the NG-RAN $node_1$ and release the corresponding resources. After completion of release of the resources, the NG-RAN $node_2$ shall respond with the RESET RESPONSE message indicating the UE contexts admitted to be released. The NG-RAN $node_2$ 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 $node_2$ 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 $node_2$ shall abort any other ongoing procedure (except for a Reset procedures).

If the RESET REQUEST message indicates partial reset, the NG-RAN $node_2$ 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

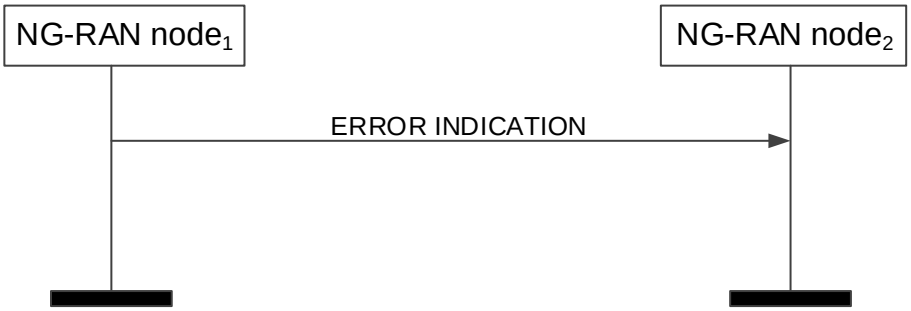

Figure 8.4.5.2-1: Error Indication, successful operation.

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 signaling connection 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

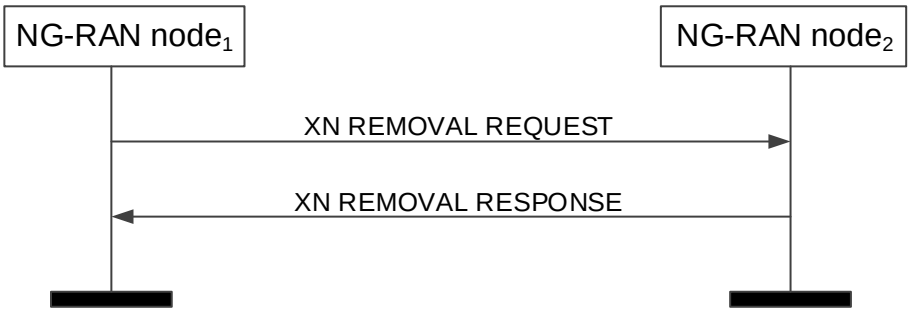

Figure 8.4.6.2-1: Xn Removal, successful operation

An NG-RAN node$_1$ initiates the procedure by sending the XN REMOVAL REQUEST message to a candidate NG-RAN node$_2$. Upon reception of the XN REMOVAL REQUEST message the candidate NG-RAN node$_2$ shall reply with the XN REMOVAL RESPONSE message. After receiving the XN REMOVAL RESPONSE message, the initiating NG-RAN node$_1$ shall initiate removal of the TNL association towards NG-RAN node$_2$ and may remove all resources associated with that signaling connection. The candidate NG-RAN node$_2$ may then remove all resources associated with that signaling connection.

If the *Xn Removal Threshold* IE is included in the XN REMOVAL REQUEST message, the candidate NG-RAN node$_2$ shall, if supported, accept to remove the signalling connection with NG-RAN node$_1$ if the Xn Benefit Value of the signalling connection determined at the candidate NG-RAN node$_2$ 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

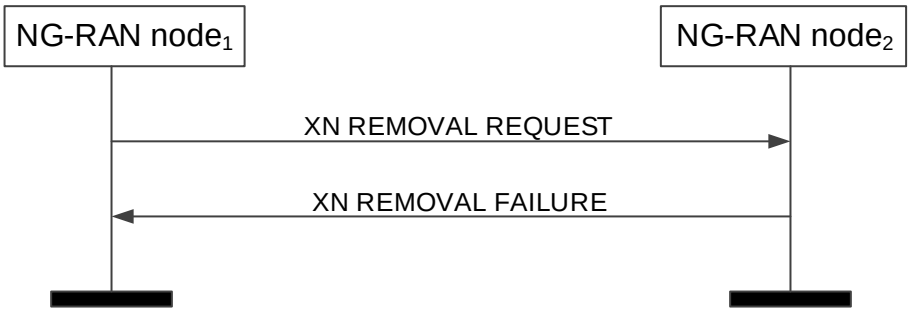

Figure 8.4.6.3-1: Xn Removal, unsuccessful operation

If the candidate NG-RAN node$_2$ cannot accept to remove the signaling connection with NG-RAN node$_1$ 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.

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.	–	
>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 *HandoverPreparationInformation* 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 *HandoverPreparationInformation* 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		–	
>5GC Mobility Restriction List Container	O		9.2.3.100		YES	ignore
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		–	

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 *HandoverCommand* 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 *HandoverCommand* 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

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

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
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

9.1.1.7 RAN PAGING

This message is sent by the NG-RAN $node_1$ to NG-RAN $node_2$ to page a UE.

Direction: NG-RAN $node_1$ → NG-RAN $node_2$.

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		YES	ignore
RAN Paging Area	M		9.2.3.38		YES	reject
Paging Priority	O		9.2.3.44		YES	ignore
Assistance Data for RAN Paging	O		9.2.3.41		YES	ignore
UE Radio Capability for Paging	O		9.2.3.91		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:** *ResumeMAC-I* either contained in the *RRC ResumeRequest* or the *RRCResumeRequest1* message as defined in TS 38.331 [10]) or the *ShortResumeMAC-I* in the *RRCConnection ResumeRequest* message as defined in TS 36.331 [14]) **RRC Reestablishment:** *ShortMAC-I* contained in the *RRCReestablishmentRequest* as defined in TS 38.331 [10]) or the *ShortMAC-I* in the *RRCConnection ReestablishmentRequest* message as defined in TS 36.331 [14]).	YES	reject
New Cell Identifier	M		NG-RAN Cell Identity 9.2.2.9	**RRC Resume:** Corresponds to the *targetCellIdentity* within the *VarResumeMAC-Input* as specified in TS 38.331 [10] or the *cellIdentity* within the *VarShortINACTIVE-MAC-Input* as specified in TS 36.331 [14]. **RRC Reestablishment:** Corresponds to the *targetCellIdentity* within the *VarShortMAC-Input* as specified in TS 38.331 [10] or the *cellIdentity* within the *VarShortMAC-Input* 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 *RRCResumeRequest* or the *RRCResumeRequest1* message, as defined in TS 38.331 [10], or in the *RRCConnection ResumeRequest* message, as defined in TS 36.331 [14].	YES	ignore

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

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 *RRCRelease* message as defined in TS 38.331 [10], or the *RRCConnectionRelease* 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 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..<maxnoofPDUSessions>*			–	
>>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 by the target NG-RAN node, as specified in TS 37.340 [8].	YES	reject

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

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
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 .. <maxnoofPDUSessions>*		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 *PDU Session Resources To Be Added Item* 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 *CG-ConfigInfo* message as defined in subclause 11.2.2 of TS 38.331 [10]	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
Expected UE Behaviour	O		9.2.3.81		YES	ignore
Requested Split SRBs	O		ENUMERATED (srb1, srb2,	Indicates that resources for Split SRBs are requested.	YES	reject

			srb1&2, ...)			
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-ifSNterminated		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 *S-NG-RAN node Maximum Integrity Protected Data Rate Downlink* 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
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

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 *PDU Session Resource Setup Info – SN terminated* in the *PDU Session Resources To Be Added List* 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 .. <maxnoofPDUSessions>*		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 in a *PDU Session Resources Admitted to be Added Item* IE, abnormal conditions as specified in clause 8.3.1.4 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 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 *CG-Config* 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

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 *Response Type*	M				–	
>>Configuration successfully applied					–	
>>>M-NG-RAN node to S-NG-RAN node Container	O		OCTET STRING	Includes the *RRCReconfiguration Complete* message as defined in subclause 6.2.2 of TS 38.331 [10] or the *RRCConnectionReconfigurationComplete* message as defined in subclause 6.2.2 of TS 36.331 [14].	–	
>>Configuration rejected by the M-NG-RAN node					–	
>>>Cause	M		9.2.3.2		–	
>>>M-NG-RAN node to S-NG-RAN node Container	O		OCTET STRING	Includes the *CG-ConfigInfo* 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 .. <maxnoofPDUSessions>*		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 *PDU Session Resources To Be Added Item* 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 Resources To Be Modified List		*0..1*			–	
>>PDU Session Resources To Be Modified Item		*1 .. <maxnoofPDUSessions>*		NOTE: If neither the *PDU Session Resource Modification Info – SN terminated* IE	–	

				nor the *PDU Session Resource Modification Info – MN terminated* IE is present in a *PDU Session Resources To Be Modified Item* 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 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 *CG-ConfigInfo* 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 *S-NG-RAN node Maximum Integrity Protected Data Rate Downlink* 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	YES	reject

				Rate in the Downlink, which is enforced by the S-NG-RAN node for the UE's SN terminated PDU sessions.		
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

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 Admitted To Be Added Item		*1 .. <maxnoofPDUSessions>*		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 in a *PDU Session Resources Admitted To Be Added Item* 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		*0..1*			–	
>>PDU Session Resources Admitted To Be Modified Item		*1 .. <maxnoofPDUSessions>*		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 in a *PDU Session Resources Admitted To Be Modified Item* 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 Resources Admitted To Be Released		*0..1*			–	

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 *CG-Config* 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

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 .. <maxnoofPDUSessions>*		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 in a *PDU Session Resources To Be Modified Item* IE, abnormal conditions as specified in clause 8.3.4.4 apply.	–	
>>PDU Session ID	M		9.2.3.18		–	
>>PDU Session Resource Modification Required Info – SN terminated	O		9.2.1.20		–	
>>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 .. <maxnoofPDUSessions>*			–	
>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	YES	Ignore

				utilisation between M-NG-RAN node and S-NG-RAN node.		
RRC Config Indication	O		9.2.3.72		YES	reject

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 .. <maxnoofPDUsessions>*		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 in a *PDU Session Resources Admitted To Be Modified Item* 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 *RRCReconfigurationComplete* message as defined in subclause 6.2.2 of TS 38.331 [10] or the *RRCConnectionReconfigurationComplete* message as defined in subclause 6.2.2 of TS 36.331 [14].	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
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-	YES	Ignore

				NG-RAN node.		

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 *CG-ConfigInfo* 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 9.2.2.3		YES	reject
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 .. <maxnoofPDUsessions>*		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 Resource Change Confirm Info – SN terminated	O		9.2.1.19		–	
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 *CG-ConfigInfo* 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 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 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 XnAP ID	M		NG-RAN node UE XnAP ID 9.2.3.16	Allocated at the S-NG-RAN node	YES	ignore
Bearers Subject to Counter Check List		*1*			YES	ignore
>Bearers Subject to Counter Check Item		*1 .. <maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>UL COUNT	M	INTEGER (0.. 4294967295)		Indicates the value of uplink COUNT associated to this DRB.	–	
>>DL COUNT	M	INTEGER (0.. 4294967295)		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 *UL-DCCH-Message* as defined in subclause 6.2.1 of TS 38.331 [10] containing the *MeasurementReport* message or the *FailureInformation* message. For NE-DC, includes the *UL-DCCH-Message* as defined in subclause 6.2.1 of TS 36.331 [14] containing the *MeasurementReport* 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..<maxnoofPDUSessions>*			–	
>>PDU Session ID	M		9.2.3.18		–	
>>QoS Flow Notification Control Indication Info	M		9.2.3.57		–	

Range bound	Explanation
maxnoofPDUSessions	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 Resource Activity Notify Item		*1..<maxnoofPDUSessions>*			–	
>>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**		*0..1*			–	
>>>**QoS Flows Activity Notify Item**		*1..<maxnoofQoSflows>*			–	
>>>>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
maxnoofPDUSessions	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 *Initiating Node Type*	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 *Spectrum Sharing Group ID.*	–	
>>List of E-UTRA Cells in E-UTRA Coordination Request		*1.. < maxnoofCellsinNG-RANnode >*		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 Cells in NR Coordination Request		*0 .. < maxnoofCellsinNG-RANnode >*		List of applicable 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 *Spectrum Sharing Group ID.*	–	
>>List of NR Cells in NR Coordination Request		*1.. < maxnoNRcellsSpectrumSharingwithE-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 *Spectrum Sharing Group ID* involved in cell resource coordination with a number of E-UTRA cells affiliated with the same *Spectrum Sharing Group ID*. Value is 64.
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 *Responding NodeType*	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 *Spectrum Sharing Group ID.*	–	
>>List of E-UTRA Cells in E-UTRA Coordination Response		*1.. < maxnoofCellsinNG-RANnode >*		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.	–	
>>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 *Spectrum Sharing Group ID.*	–	
>>List of NR Cells in NR Coordination Response		*1.. < maxnoNRcellsSpectrumSharingwithE-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 *Spectrum Sharing Group ID* involved in cell resource coordination with a number of E-UTRA cells affiliated with the same *Spectrum Sharing Group ID*. Value is 64.
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..<maxnoofPDU Sessions>				
>>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.

9.1.3 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 $node_1$ → NG-RAN $node_2$.

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 .. <maxnoofCellsinNG-RAN node>*		Contains a complete list of cells served by 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 .. <maxnoofCellsinNG-RAN node>*		Contains a complete list of cells served by 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		–	
Interface Instance Indication	O		9.2.2.39		YES	reject

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 node$_2$ → NG-RAN node$_1$.

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 .. <maxnoofCellsinNG-RAN node>*		Contains a complete list of cells served by 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 .. <maxnoofCellsinNG-RAN node>*		Contains a complete list of cells served by 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		–	
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

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 node$_2$ → NG-RAN node$_1$.

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

9.1.3.4 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 node$_1$ → NG-RAN node$_2$.

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 *Initiating NodeType*	M				YES	ignore
>gNB						
>>Served Cells To Update NR	O		9.2.2.15		YES	ignore
>>Cell Assistance Information NR	O		9.2.2.17		YES	ignore
>ng-eNB						
>>Served Cells to Update E-UTRA	O		9.2.2.16		YES	ignore
>>Cell Assistance Information NR	O		9.2.2.17		YES	ignore
TNLA To Add List		*0..1*			YES	ignore
>TNLA To Add Item		*1..<maxnoofTNLAssociations>*			–	
>>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 Update List		*0..1*			YES	ignore
>TNLA To Update Item		*1..<maxnoofTNLAssociations>*			–	
>>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..<maxnoofTNLAssociations>*			–	
>>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

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 node$_2$ → NG-RAN node$_1$.

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						
>>Served NR Cells		*0 .. < maxnoofCellsinNG-RANnode>*		Complete or limited list of cells served by a gNB, if requested by an NG-RAN node.	–	
>>>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	–	
TNLA Setup List		*0..1*			YES	ignore
>TNLA Setup Item		*1..<maxnoofTNLAssociations>*			–	
>>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 Lis		*0..1*			YES	ignore
>TNLA Failed To Setup Item		*1..<maxnoofTNLAssociations>*			–	
>>TNLA Transport Layer Address	M		CP Transport Layer Information 9.2.3.31	CP Transport Layer Information as received from 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

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 node$_2$ → NG-RAN node$_1$.

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 node$_1$ to the peer NG-RAN node$_2$ to request a previously switched-off cell/s to be re-activated.

Direction: NG-RAN node$_1$ → NG-RAN node$_2$.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.3.1		YES	reject
CHOICE *Served Cells To Activate*	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 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.

9.1.3.8 CELL ACTIVATION RESPONSE

This message is sent by an NG-RAN node$_2$ to a peer NG-RAN node$_1$ to indicate that one or more cell(s) previously switched-off has (have) been activated.

Direction: NG-RAN node$_2$ → NG-RAN node$_1$.

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 .. < maxnoffCellsinNG-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 node$_2$ to a peer NG-RAN node$_1$ to indicate cell activation failure.

Direction: NG-RAN node$_2$ → NG-RAN node$_1$.

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 node$_1$ → NG-RAN node$_2$.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.3.1		YES	reject
CHOICE *Reset Request TypeInfo*	M				YES	reject
>Full Reset						
>Partial Reset						
>>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 $node_2 \rightarrow$ NG-RAN $node_1$.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.3.1		YES	reject
CHOICE *Reset Response Type Info*	M				YES	ignore
>Full Reset						
>Partial Reset						
>>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 node$_1$ → NG-RAN node$_2$.

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 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 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 signaling connection.

Direction: NG-RAN node$_1$ → NG-RAN node$_2$.

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 signaling connection.

Direction: NG-RAN node$_2$ → NG-RAN node$_1$.

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 signaling connection cannot be accepted.

Direction: NG-RAN node $_2$ → NG-RAN node $_1$.

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

9.2 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.	–	
>>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 *Common Network Instance* IE is present.	–	
>>QoS Flows To Be Setup List		*1*			–	
>>>QoS Flows To Be Setup Item		*1 .. <maxnoofQoS Flows>*			–	
>>>>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, …)		–	
>>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

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..<maxnoofPDUSessions>*			–	
>>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..<maxnoofQoSFlows>*			–	
>>>>>QoS Flow Identifier	M		9.2.3.10		–	
>>>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 Item**		*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

9.2.1.4 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..<maxnoof QoSFlows>*		
>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..<maxnoof QoSFlows>*		
>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 *Common Network Instance* IE is present.	–	
QoS Flows To Be Setup List		*1*			–	
>**QoS Flow To Be Setup Item**		*1 .. <maxnoofQoSFlows>*			–	
>>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.	–	
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

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*			–	
>DRBs to Be Setup Item		*1 .. <maxnoofDRBs>*			–	
>>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	–	
>>UL Configuration	O		9.2.3.75	Information about UL usage in the M-NG-RAN node.	–	
>>QoS Flows Mapped To DRB List		*1*			–	
>>>QoS Flows Mapped To DRB Item		*1 .. <maxnoofQoSFlows>*			–	
>>>>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		–	
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	YES	reject

				37.340 [8].		

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs allowed towards one UE. Value is 32.
maxnoofQoSFlows	Maximum no. of QoS flows. Value is 64

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
PDU Session Type	M		9.2.3.19	
DRBs To Be Setup List		*1*		
>DRBs to Be Setup Item		*1 .. <maxnoofDRBs>*		
>>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.
>>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
>>QoS Flows Mapped To DRB List		*1*		
>>>QoS Flows Mapped To DRB Item		*1 .. <maxnoofQoSFlows>*		
>>>>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	

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.

9.2.1.8 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 PDUs.	–	–
>>secondary 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 in case of PDCP duplication.	–	–
>>LCID	O		9.2.3.70	LCID for primary path if PDCP duplication is applied	–	–
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.

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 *Common Network Instance* IE is present.	–	
QoS Flows To Be Setup List		*0..1*			–	
>QoS Flows To Be Setup Item		*1 .. <maxnoofQoSFlows>*			–	
>>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.	–	
>>QoS Flow Mapping Indication	O		9.2.3.79		–	
Data Forwarding and Offloading Info from source NG-RAN node	O		9.2.1.17	Applicable for the QoS flows contained in the *QoS Flows To Be Setup List* IE.	–	
QoS Flows To Be Modified List		*0..1*			–	
>QoS Flows To Be Modified Item		*1 .. <maxnoofQoSFlows>*			–	
>>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 Flows To Be Released List		*0..1*	QoS Flow List with Cause 9.2.1.4		–	
DRBs To Be Modified List		*0..1*			–	
>DRBs to Be Modified Item		*1 .. <maxnoofDRBs>*			–	
>>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 if PDCP duplication is applied	–	
>>RLC Status	O		9.2.3.80		–	
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

Range bound	Explanation
maxnoofQoSFlows	Maximum no. of QoS flows. Value is 64.

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 .. <maxnoofDRBs>*			–	
>>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	–	
>>UL Configuration	O		9.2.3.75	Information about UL usage in the S-NG-RAN node.	–	
>>QoS Flows Mapped To DRB List		*1*			–	
>>>QoS Flows Mapped To DRB Item		*1 .. <maxnoofQoSFlows>*			–	
>>>>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		–	
>>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.	YES	ignore

>>PDCP Duplication Configuration	O		9.2.3.86		YES	ignore
>>Duplication Activation	O		9.2.3.71		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*			–	
>DRBs to Be Modified Item		*1 .. <maxnoofDRBs>*			–	
>>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 .. <maxnoofQoSFlows>*			–	
>>>>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		–	
DRBs To Be Released List		*0..1*			–	
>DRBs to Be Released Item		*1 .. <maxnoofDRBs>*			–	
>>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

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs allowed towards one UE. Value is 32.
maxnoofQoSFlows	Maximum no. of QoS flows. Value is 64.

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
PDU Session Type	M		9.2.3.19	
DRBs To Be Setup List		*0..1*		
>DRBs to Be Setup Item		*1 .. <maxnoofDRBs>*		
>>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.
>>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
>>QoS Flows Mapped to DRB List		*1*		
>>>QoS Flows Mapped To DRB Item		*1 .. <maxnoofQoSFlows>*		
>>>>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	
DRBs To Be Modified List		*0..1*		
>DRBs to Be Modified Item		*1 .. <maxnoofDRBs>*		
>>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	
>>QoS Flows Mapped To DRB List		*0..1*		Overwriting the existing QoS Flow List
>>>QoS Flows Mapped To DRB Item		*1 .. <maxnoofQoS*		

		Flows>		
>>>>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	
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.

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
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 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 in case of PDCP duplication.
>>LCID	O		9.2.3.70	LCID for primary path if PDCP duplication is applied
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.

9.2.1.13 UE Context Information Retrieve UE Context Response

This IE contains the UE context information.

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	Either includes the *HandoverPreparationInformation* message as defined in subclause 11.2.2 of TS 38.331[10], if the old and new serving NG-RAN nodes are gNBs, or the *HandoverPreparationInformation* message as defined in subclause 10.2.2 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

9.2.1.14 DRBs Subject To Status Transfer List

This IE contains a list of DRBs containing information about PDCP PDU transfer 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 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 *PDCP Status Transfer DL*	M				–	
>>12 bits						
>>>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
DRBs to QoS Flow Mapping Item		*1 .. <maxnoofDRBs>*		
>DRB ID	M		9.2.3.33	
>QoS Flows List		*1*		
>>QoS Flow Item		*1..<maxnoofQoSFlows>*		
>>>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.

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..<maxnoof QoSFlows>*		
>>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..<maxnoof DRBs>*		
>>DRB ID	M		9.2.3.33	
>>DL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	
>>UL Forwarding UP TNL Information	O		UP Transport Layer 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 .. <maxnoofQoSFlows>*			–	
>>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 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 *Source DRB to QoS Flow Mapping List* 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
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 *QoS FlowS To Be Released List* IE.
DRBs To Be Setup List		*0..1*		
>DRBs to Be Setup Item		*1 .. <maxnoof DRBs>*		
>>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 PDUs.
>>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.
>>UL Configuration	O		9.2.3.75	Information about UL usage in the S-NG-RAN node.
>>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	
>>RLC Mode	M		9.2.3.28	Indicates the RLC mode at the assisting node.
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	O		9.2.3.86	

Configuration				
>>Duplication Activation	O		9.2.3.71	
>>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	
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.

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 .. <maxnoofDRBs>*			–	
>>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 of PDCP duplication.	–	
>>LCID	O		9.2.3.70	Shall be ignored by the S-NG-RAN node if received.	–	
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.

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
DRBs To Be Modified List	O			
>DRBs To Be Modified Item		*1..<maxnoof DRBs>*		
>>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.
>>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 if PDCP duplication is applied
>>RLC Status	O		9.2.3.80	
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.

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
PDU Session List with data forwarding request info		*1 .. <maxnoofPDU sessions>*		
>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.

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 .. <maxnoofPDUsessions>*		
>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 .. <maxnoof DRBs>*		
>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 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		*1..<maxnoofMultiConnectivityMinusOne>*		
> 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
maxnoofMultiConnectivityMinusOne	Maximum no. of *MultiConnectivity minus one*. 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
Additional UL NG-U UP TNL Information at UPF Item		*1..<maxnoofMultiConnectivityMinusOne>*		
> Additional UL NG-U UP TNL Information at UPF	M		UP Transport Layer Information 9.2.3.30	

Range bound	Explanation
maxnoofMultiConnectivityMinusOne	Maximum no. of *MultiConnectivity minus one*. Value is 3

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 *gNB ID*	M			
>gNB ID				
>>gNB ID	M		BIT STRING (SIZE(22..32))	Equal to the leftmost bits of the *NR Cell Identity* IE contained in the *NR CGI* IE of each cell served by the 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 *ng-eNB ID*	M			
>Macro ng-eNB ID				
>>Macro ng-eNB ID	M		BIT STRING (SIZE(20))	Equal to the 20 leftmost bits of the *E-UTRA Cell Identity* IE contained in the *E-UTRA CGI* IE of each cell served by the ng-eNB.
>Short Macro ng-eNB ID				
>>Short Macro ng-eNB ID	M		BIT STRING (SIZE(18))	Equal to the 18 leftmost bits of the *E-UTRA Cell Identity* IE contained in the *E-UTRA CGI* IE of each cell served by the ng-eNB.
>Long Macro ng-eNB ID				
>>Long Macro ng-eNB ID	M		BIT STRING (SIZE(21))	Equal to the 21 leftmost bits of the *E-UTRA Cell Identity* IE contained in the *E-UTRA CGI* 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 *NG-RAN node*	M			
>gNB				
>>Global gNB ID	M		9.2.2.1	
>ng-eNB				
>>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))	Digits 0 to 9 encoded 0000 to 1001, 1111 used as filler digit. Two digits per octet: - bits 4 to 1 of octet n encoding digit 2n-1 - bits 8 to 5 of octet n encoding digit 2n PLMN Identity consists of 3 digits from MCC followed by either: - a filler digit plus 2 digits from MNC (in case of 2 digit MNC) or - 3 digits from MNC (in case of 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 *NR Cell Identity* 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 *E-UTRA Cell Identity* 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 *Cell Identifier*	M			
>NR				
>>NR Cell Identity	M		BIT STRING (SIZE(36))	The leftmost bits of the *NR Cell Identity* 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 *E-UTRA Cell Identity* 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 *RAT*	M			
>nr				
>>NR PCI	M		INTEGER (0..1007, …)	NR Physical Cell ID
>e-utra				
>>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		*1..<maxnoof BPLMNs>*		Broadcast PLMNs in SIB1 associated to the NR Cell Identity in the *NR CGI* IE.	–	
>PLMN Identity	M		9.2.2.4		–	
CHOICE *NR-Mode-Info*	M				–	
>FDD						
>>**FDD Info**		*1*			–	
>>>UL NR Frequency Info	M		NR Frequency Info 9.2.2.19		–	
>>>DL NR Frequency Info	M		NR Frequency Info 9.2.2.19		–	
>>>UL Transmission Bandwidth	M		NR Transmission Bandwidth 9.2.2.20		–	
>>>DL Transmission Bandwidth	M		NR Transmission Bandwidth 9.2.2.20		–	
>TDD						
>>**TDD Info**		*1*			–	
>>>Frequency Info	M		NR Frequency Info 9.2.2.19		–	
>>>Transmission Bandwidth	M		NR Transmission Bandwidth 9.2.2.20		–	
Measurement Timing Configuration	M		OCTET STRING	Contains the *MeasurementTiming Configuration* 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		*0..<maxnoof BPLMNs>*		This IE corresponds to the *PLMN-IdentityInfoList* IE in *SIB1* as specified in TS 38.331 [8]. All PLMN Identities and associated information contained in the *PLMN-IdentityInfoList* IE are included and provided in the same order as broadcast in SIB1.	YES	ignore
>Broadcast PLMNs		*1..<maxnoof BPLMNs>*		Broadcast PLMNs in SIB1 associated to the *NR Cell Identity* IE	–	
>>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 *Broadcast PLMN Identity Info List NR* IE	YES	ignore
Configured TAC Indication	O		9.2.2.39a	NOTE: This IE is associated with the TAC on top-level of the *Served Cell Information NR* IE	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 Code	–	
RANAC	O		RAN Area Code 9.2.2.6		–	
Broadcast PLMNs		*1..<maxnoof BPLMNs>*		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		–	
>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]	–	
>>>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, ...)		–	
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..<maxnoof 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 *FreqBandIndication Priority*, and whether *FreqBandIndicatorPriority* 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 control/reference signal resources are protected and are not subject to E-UTRA - NR Cell Resource Coordination.	–	
Broadcast PLMN Identity Info List E-UTRA		*0..<maxnoof EUTRABPLMNs>*		This IE corresponds to the *cellAccessRelatedInfoList-5GC* IE in *SIB1* as specified in TS 36.331 [14]. All PLMN Identities and associated information contained in the *cellAccessRelatedInfoList-5GC* IE are included and provided in the same order as broadcast in SIB1.	YES	ignore
>Broadcast PLMNs		*1..<maxnoof EUTRABPL*		Broadcast PLMNs in SIB1 associated to	–	

		MNs>		the *E-UTRA Cell Identity* 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		–	

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		*1 .. <maxnoofNeighbours>*		
>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 *NR-Mode-Info*	M			
>>FDD				
>>>FDD Info		*1*		
>>>>UL NR FreqInfo	M		NR Frequency Info 9.2.2.19	
>>>>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 *MeasurementTimingConfiguration* 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 Information NR	O		9.2.2.13		–	
>Neighbour Information E-UTRA	O		9.2.2.14		–	
Served Cells To Modify NR		*0 .. < 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 .. < maxnooffCellsinNG-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 .. < 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		–	
Served Cells To Modify E-UTRA		*0 .. < 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 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		–	
>Deactivation Indication	O		ENUMERATED (deactivated, ...)	Indicates that the concerned cell is switched off for energy saving reasons.	–	
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
SUL Frequency Info	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 SUL carrier. Its lowest subcarrier is also known as Point A.
SUL Transmission Bandwidth	M		NR Transmission Bandwidth 9.2.2.20	

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
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..<maxnoofNRCellBands>*		
>>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 e n1, value 2 corresponds to NR operating band n2, etc.
>>**Supported SUL band List**		*0..<maxnoofNRCellBands>*		
>>>Supported SUL band Item	M		INTEGER (1.. 1024, ...)	Supplementary NR Operating Band as defined in TS 38.104 [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.

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, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...)	This IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "N_{RB}" (TS 38.104 [24]). The values nrb11, nrb18, etc. correspond to the number of resource blocks "N_{RB}" 11, 18, etc.

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..<maxnoofEutra Bands>*		
>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 *EUTRA-Mode-Info* IE in the *Served Cell Information E-UTRA* 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 *Subframe Allocation*	M			
>oneframe				
>>Oneframe Info	M		BITSTRING (SIZE(6))	
>fourframes				
>>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 (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_{RB}^{SC} and the length of PRB in time dimension, measured in REs. N_{RB}^{SC} is defined in TS 36.211 [10]. The intra-PRB pattern consisting of all “1”s is equivalent to PRB-level granularity.
>>Protected Footprint Frequency Pattern	M		BIT STRING(6..110, ...)	The bit string indicates in which PRBs inside carrier bandwidth the Intra-PRB Protected Resource Footprint applies. How often in time dimension this frequency pattern applies, depends on time periodicity of Intra-PRB Protected Resource Footprint. The first bit of the bit string corresponds to the PRB occupying the lowest subcarrier frequencies of the carrier bandwidth, where the indexing first goes into the frequency domain. Each position in the string represents a PRB; value “0” indicates " Intra-PRB Protected Resource Footprint does not appear in PRB", value “1” indicates "Intra-PRB Protected Resource Footprint appears in PRB". The length of the bit string equals the number of PRBs in the carrier bandwidth.
>>Protected Footprint Time Pattern	M			The description of time periodicity of the Intra-PRB Protected Resource Footprint.
>>>Protected Footprint Time-periodicity	M		INTEGER(1..320, ...)	Periodicity with which the periodic Intra-PRB Protected Resource Footprint repeats in time-dimension (1= every PRB (i.e. slot), 2=every other PRB (i.e. slot) etc.
>>>Protected Footprint	M		INTEGER(1..20, ...)	The time-position of the PRB inside

Start Time				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.
CHOICE *Shared Resource Type*	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 Bitmap	M		Data Traffic 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 *Reserved Subframe Pattern* refers to (e.g. MBSFN).
Reserved Subframe Pattern	M		BIT STRING (10..160)	Each position in the bitmap represents a subframe. Value ‘0’ indicates “regular subframe”. Value ‘1’ indicates “reserved subframe”. For MBSFN subframes, the exception refers only to the non-control region of the subframe. The bit string may span across multiple contiguous subframes. The first position of the Subframe Configuration IE corresponds to the receiving node’s subframe 0 in a receiving node’s radio frame where SFN = Activation SFN. The IE is ignored if received by the 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
CHOICE NG-RAN Node Resource Coordination Information	M			
>EUTRA				
>>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 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. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the *UL Coordination Information* corresponds to subframe 0 in a radio frame where *SFN* = 0. The length of the bit string is an integer multiple of $N_{\mathrm{RB}}^{\mathrm{UL}}$. $N_{\mathrm{RB}}^{\mathrm{UL}}$ is defined in TS 36.211 [10]. The UL Coordination Information is continuously repeated.
DL Coordination Information	O		BIT STRING (6..4400, …)	Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "PCell resource not intended to be used for transmission by the sending node", value "1" indicates "PCell resource intended to be used for transmission by the sending node". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to DL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the *DL Coordination Information* corresponds to the receiving node's subframe 0 in a receiving node's radio frame where *SFN* = 0.

				The length of the bit string is an integer multiple of N_{RB}^{DL}. N_{RB}^{DL} is defined in TS 36.211 [10]. The DL Coordination Information 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 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 node". The bit string spans from the first PRB pair of the first represented subframe to the last PRB pair of the same subframe and then moves to the following PRBs in the following subframes in the same order. Each position is applicable only in positions corresponding to UL subframes. The bit string may span across multiple contiguous subframes (maximum 40). The first position of the *UL Coordination Information* corresponds to the receiving node's subframe 0 in a receiving node's radio frame where *SFN* = 0. The length of the bit string is an integer multiple of $N_{\mathrm{RB}}^{\mathrm{UL}}$. $N_{\mathrm{RB}}^{\mathrm{UL}}$ is defined in TS 36.211 [26]. The UL Coordination Information is continuously repeated.
DL Coordination Information	O		BIT STRING (6..4400, …)	Each position in the bitmap represents a PRB pair in a subframe; value "0" indicates "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 *DL Coordination Information* corresponds to the receiving node's subframe 0 in a

				receiving node's radio frame where *SFN* = 0. The length of the bit string is an integer multiple of N_{RB}^{DL}. N_{RB}^{DL} is defined in TS 36.211 [26]. The DL Coordination Information is continuously repeated.
EUTRA Cell ID	O		ECGI 9.2.2.8	Reference cell for *UL Coordination Information* IE and *DL Coordination Information* 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, ...)	

9.2.3 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 *Cause Group*	M			
>Radio Network Layer				
>>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, $TXn_{RELOCoverall}$ Expiry, $TXn_{RELOCprep}$ 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, $TXn_{DCoverall}$ Expiry, TXn_{DCprep} 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)	
>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.
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.
$TXn_{RELOCoverall}$ Expiry	The reason for the action is expiry of timer $TXn_{RELOCoverall}$.
$TXn_{RELOCprep}$ Expiry	Handover Preparation procedure is cancelled when timer $TXn_{RELOCprep}$ 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.
$TXn_{DCoverall}$ Expiry	The reason for the action is expiry of timer $TXn_{DCoverall}$.
TXn_{DCprep} Expiry	The reason for the action is expiry of timer TXn_{DCprep}
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 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: - 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) 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.

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 Constructed Message)	The received message contained IEs or IE groups in wrong 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		*0..<maxNrOfErrors>*		
>IE Criticality	M		ENUMERATED (reject, ignore, notify)	The IE Criticality is used for reporting the criticality of the triggering IE. The value "ignore" 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 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
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.

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
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].

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 Priority		*1*		
>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
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 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.

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
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].
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 critical, ...)	This IE indicates whether the GBR QoS flow is delay 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 *Delay Critical* IE is set to "delay critical" and is be ignored otherwise.

Condition	Explanation
ifGBRflow	This IE shall be present if the *GBR QoS Flow Information* IE is present in the *QoS Flow Level QoS Parameters* 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, ...)	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
TAI Support Item		*1..<maxnoofsupportedTACs>*		
>TAC	M		9.2.2.5	Broadcast TAC
>Broadcast PLMNs		*1..<maxnoofsupportedPLMNs>*		
>>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 TA

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		*1..<maxnoofSliceItems>*		
>S-NSSAI	M		9.2.3.21	

Range bound	Explanation
maxnoofSliceItems	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		*1*		
>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 *Target Cell*	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 adress and a GTP Tunnel Endpoint Identifier.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *UP Transport Layer Information*	M			
>GTP tunnel				
>>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]

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 *CP Transport Layer Information*						
>Endpoint-IP-address					-	
>>Endpoint IP Address	M		Transport Layer Address 9.2.3.29		-	
>Endpoint-IP-address-and-port					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 reference	Semantics description
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	
CHOICE RAN Paging Area Choice	M			
>Cell List				
>>**Cell List Item**		*1 .. < maxnoofCellsinRNA>*		
>>>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 .. <maxnoofRanAreasinRNA>*		
>>>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 *UE Context ID*	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 allocated to the UE by the cell where the RRC connection has been requested to be resumed, contained in the MAC RAR 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 *RRCReestablishmentRequest* message (TS 38.331 [10]) or *RRCConnectionReestablishmentRequest* 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
RAN Paging Attempt Information	O		9.2.3.42	

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-RNTI*				
>I-RNTI full				
>>I-RNTI full	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-RNTI-Value* IE in TS 38.331 [10] and *I-RNTI* IE in TS 36.331 [14]).
>I-RNTI short				
>>I-RNTI short	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 *ShortI-RNTI-Value* IE in TS 38.331 [10] and *ShortI-RNTI* 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
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	

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.. <maxnoofAoIs>*		
>List of TAIs in Area of Interest		*0..1*		
>>TAI in Area of Interest Item		*1..< maxnoofTAIsinAoI >*		
>>>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..<maxnoofcellsinAoI>*		
>>>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..<maxnoofRANNodesinAoI>*		
>>>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.
maxnoofTAIsinAoI	Maximum no. of tracking areas in an Area of Interest. Value is 16.
maxnoofcellsinAoI	Maximum no. of cells in an Area of Interest. Value is 256.
maxnoofRANNodesinAoI	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, “first bit” – 128-NEA1, “second bit” – 128-NEA2, “third bit” – 128-NEA3, other bits reserved for future use. Value ‘1’ indicates support and value ‘0’ indicates no support of the algorithm. Algorithms are defined in TS 33.501 [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, “first bit” – 128-NIA1, “second bit” – 128-NIA2, “third bit” – 128-NIA3, other bits reserved for future use. Value ‘1’ indicates support and value ‘0’ indicates no support of the algorithm. Algorithms are defined in TS 33.501 [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, “first bit” – 128-EEA1, “second bit” – 128-EEA2, “third bit” – 128-EEA3, other bits reserved for future use. Value ‘1’ indicates support and value ‘0’ indicates no support of the algorithm. Algorithms are defined in TS 33.401 [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, “first bit” – 128-EIA1, “second bit” – 128-EIA2, “third bit” – 128-EIA3, other bits reserved for future use. Value ‘1’ indicates support and value ‘0’ indicates no support of the algorithm. Algorithms are defined in TS 33.401 [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_{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-K_{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-ifIntegrityProtectionrequiredorpreferred		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 *Integrity Protection* IE within the *Security Indication* 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 NR-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..<maxnoofEPLMNs>*		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..<maxnoofPLMNs>*		This IE contains RAT restriction related information as specified in TS 23.501 [7].	–	
>PLMN Identity	M		9.2.2.4		–	
>RAT Restriction Information	M		BIT STRING { e-UTRA (0), nR (1) } (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. This version of the specification does not use bits 2-7, the sending node shall set bits 2-7 to "0", the sender shall ignore bits 2-7.	–	
Forbidden Area Information		*0..<maxnoofPLMNs>*		This IE contains Forbidden Area information as specified in TS 23.501 [7].	–	
>PLMN Identity	M		9.2.2.4		–	
>Forbidden TACs		*1..<maxnoofForbiddenTACs>*			–	
>>TAC	M		9.2.2.5	The TAC of the forbidden TAI.	–	
Service Area Information		*0..<maxnoofPLMNs>*		This IE contains Service Area Restriction information as specified in TS 23.501 [7].	–	
>PLMN Identity	M		9.2.2.4		–	
>Allowed TACs		*0..<maxnooAllowedAreas>*			–	
>>TAC	M		9.2.2.5	The TAC of the allowed TAI.	–	
>Not Allowed TACs		*0..<maxnooAllowedAreas>*			–	
>>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	YES	ignore

				EPS.		
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..<maxnoofEPLMNs>*			YES	ignore
>PLMN Identity	M		9.2.2.4	Includes any of the Equivalent PLMNs listed in the *Mobility Restriction List* 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.	–	

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
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 Reference defined in TS 32.422 [23] (last 2 octets).
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, MinimumWithoutVendorSpecificExtension, MediumWithoutVendorSpecificExtension, MaximumWithoutVendorSpecificExtension, …)	Defined in TS 32.422 [23].
Trace Collection Entity IP Address	M		Transport Layer Address 9.2.3.29	Defined in TS 32.422 [23]

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
QoS Flow Notification Indication Info		*1*		
>QoS Flows Notify Item		*1..<maxnoofQoSFlows>*		
>>QoS Flow Identifier	M		9.2.3.10	
>>Notification Information	M		ENUMERATED (fulfilled, not fulfilled, …)	

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", 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, ...)	"re-establish lower layers" is only set after "release 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		*1..<maxnoofCellsin UEHistoryInfo>*		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 *Last Visited Cell Information*	M			
>NG-RAN Cell				
>>Last Visited NG-RAN Cell Information	M		OCTET STRING	Defined in TS 38.413 [5].
>E-UTRAN Cell				
>>Last Visited E-UTRAN Cell Information	M		OCTET STRING	Defined in TS 36.413 [31].
>UTRAN Cell				
>>Last Visited UTRAN Cell Information	M		OCTET STRING	Defined in TS 25.413 [32].
>GERAN Cell				
>>Last Visited GERAN Cell Information	M		OCTET STRING	Defined in TS 36.413 [31].

9.2.3.66 Paging DRX

This IE indicates the Paging DRX 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, ...)	

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 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 reference	Semantics description
LCID	M		INTEGER (1..32, ...)	Corresponds to the *LogicalChannelIdentity* 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 *Maximum IP Rate Downlink* 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 *PDCP Change Indication*	M			
>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..<maxnoofSCellGroupsplus1>*		
>>UP Transport Layer Information	M		9.2.3.30	
>>Cell Group ID	M		INTEGER (0..maxnoofSCellGroups, ...)	This IE corresponds to the *CellGroupId* 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 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" 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 *Expected Activity Period* IE and the *Expected Idle Period* IE, if present, is derived from subscription information. If "statistics" is indicated, the information contained in the *Expected Activity Period* IE and the *Expected Idle Period* IE, if present, is derived from statistical information.

9.2.3.83 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 (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, …)	
>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>*		
>>QoS Flow Indicator	M		9.2.3.10	
>>RAT Type	M		ENUMERATED (nR, eutra, …)	
>>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.. <maxnoofTimePeriods>		
>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 *Usage Count UL* IE and *Usage Count DL* IE.
>End Timestamp	M		OCTET STRING (SIZE(4))	UTC time encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [37]. It indicates the end time of the collecting period of the included *Usage Count UL* IE and *Usage Count DL* IE.
>Usage Count UL	M		INTEGER (0..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 reference	Semantics description
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 *UERadioPagingInformation* message as defined in TS 38.331 [18].
UE Radio Capability for Paging of E-UTRA	O		OCTET STRING	Includes the RRC *UERadioPagingInformation* 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	

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 - 9.2.3.99 Void

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 *Mobility Restriction List* IE specified in TS 38.413 [5].

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

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

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                                       |
    sNGRANnodeAdditionPreparation                           |
    mNGRANnodeinitiatedSNGRANnodeModificationPreparation    |
    sNGRANnodeinitiatedSNGRANnodeModificationPreparation    |
    mNGRANnodeinitiatedSNGRANnodeRelease                    |
    sNGRANnodeinitiatedSNGRANnodeRelease                    |
    sNGRANnodeChange                                        |
    xnRemoval                                               |
    xnSetup                                                 |
    nGRANnodeConfigurationUpdate                            |
    e-UTRA-NR-CellResourceCoordination                      |
    cellActivation                                          |
    reset                                                   ,
    ...
}

XNAP-ELEMENTARY-PROCEDURES-CLASS-2 XNAP-ELEMENTARY-PROCEDURE ::= {
    sNStatusTransfer                        |
    handoverCancel                          |
    rANPaging                               |
    xnUAddressIndication                    |
    uEContextRelease                        |
    sNGRANnodeReconfigurationCompletion     |
    sNGRANnodeCounterCheck                  |
    rRCTransfer                             |
    errorIndication                         |
    privateMessage                          |
```

```
    notificationControl                     |
    activityNotification                    |
    secondaryRATDataUsageReport ,
    ...

}

-- ************************************************************
--
-- 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
}

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,
    CellAssistanceInfo-NR,
    CPTransportLayerInformation,
    TNLA-To-Add-List,
    TNLA-To-Update-List,
    TNLA-To-Remove-List,
    TNLA-Setup-List,
    TNLA-Failed-To-Setup-List,
    CriticalityDiagnostics,
    XnUAddressInfoperPDUSession-List,
    DataTrafficResourceIndication,
    DeliveryStatus,
    DesiredActNotificationLevel,
    DRB-ID,
    DRB-List,
    DRB-Number,
    DRBsSubjectToStatusTransfer-List,
    DRBToQoSFlowMapping-List,
    E-UTRA-CGI,
    ExpectedUEBehaviour,
    FiveGCMobilityRestrictionListContainer,
    GlobalNG-RANNode-ID,
    GlobalNG-RANCell-ID,
    GUAMI,
    InterfaceInstanceIndication,
    I-RNTI,
    LocationInformationSNReporting,
    LocationReportingInformation,
    LowerLayerPresenceStatusChange,
    MR-DC-ResourceCoordinationInfo,
    ServedCells-E-UTRA,
    ServedCells-NR,
    ServedCellsToUpdate-E-UTRA,
    ServedCellsToUpdate-NR,
    MAC-I,
    MaskedIMEISV,
    MobilityRestrictionList,
    NG-RAN-Cell-Identity,
    NG-RANnodeUEXnAPID,
    NR-CGI,
    NE-DC-TDM-Pattern,
    PagingDRX,
    PagingPriority,
    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,
    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,
    TAISupport-List,
    Target-CGI,
    TimeToWait,
    TraceActivation,
    UEAggregateMaximumBitRate,
    UEContextID,
    UEContextInfoRetrUECtxtResp,
    UEContextKeptIndicator,
    UEHistoryInformation,
    UEIdentityIndexValue,
    UERadioCapabilityForPaging,
    UERANPagingIdentity,
    UESecurityCapabilities,
    UPTransportLayerInformation,
    UserPlaneTrafficActivityReport,
    XnBenefitValue,
```

```
    RANPagingFailure


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-NR,
    id-ConfigurationUpdateInitiatingNodeChoice,
    id-UEContextID,
    id-CriticalityDiagnostics,
    id-XnUAddressInfoperPDUSession-List,
    id-DesiredActNotificationLevel,
    id-DRBsSubjectToStatusTransfer-List,
    id-ExpectedUEBehaviour,
    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-MAC-I,
    id-MaskedIMEISV,
    id-MN-to-SN-Container,
    id-MobilityRestrictionList,
    id-M-NG-RANnodeUEXnAPID,
    id-new-NG-RAN-Cell-Identity,
    id-newNG-RANnodeUEXnAPID,
```

```
    id-oldNG-RANnodeUEXnAPID,
    id-OldtoNewNG-RANnodeResumeContainer,
    id-PagingDRX,
    id-PagingPriority,
    id-PCellID,
    id-PDUSessionResourceSecondaryRATUsageList,
    id-PDUSessionResourcesActivityNotifyList,
    id-PDUSessionResourcesAdmitted-List,
    id-PDUSessionResourcesNotAdmitted-List,
    id-PDUSessionResourcesNotifyList,
    id-PDUSessionToBeAddedAddReq,
    id-PDUSessionToBeReleased-RelReqAck,
    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-RRCConfigIndication,
    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-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-DRBs-transferred-to-MN,


    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-RANnodeUEXnAPID            CRITICALITY reject  TYPE NG-RANnodeUEXnAPID                  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 },
    ...
}

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 },
    ...
}

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 ::={
    ...
}

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

-- ************************************************************
--
-- HANDOVER PREPARATION FAILURE
--
-- ************************************************************

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

HandoverPreparationFailure-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-sourceNG-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 },
    ...
}

-- ************************************************************
--
-- SN STATUS TRANSFER
--
-- ************************************************************

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

SNStatusTransfer-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-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},
    ...
}

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

-- ************************************************************
--
-- RETRIEVE UE CONTEXT REQUEST
--
-- ************************************************************

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

RetrieveUEContextRequest-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-newNG-RANnodeUEXnAPID                   CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                   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-RANnodeUEXnAPID                   CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                   PRESENCE mandatory}|
    { ID id-oldNG-RANnodeUEXnAPID                   CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                   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 },
    ...
}
```

```
-- ************************************************************
--
-- RETRIEVE UE CONTEXT FAILURE
--
-- ************************************************************

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

RetrieveUEContextFailure-IEs XNAP-PROTOCOL-IES ::= {
    { ID id-newNG-RANnodeUEXnAPID                   CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                   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},
    ...
}

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

PDUSessionToBeAddedAddReq ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionToBeAddedAddReq-Item

PDUSessionToBeAddedAddReq-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 8.3.1.4 apply.
    iE-Extension            ProtocolExtensionContainer { {PDUSessionToBeAddedAddReq-Item-ExtIEs} }   OPTIONAL,
    ...
}

PDUSessionToBeAddedAddReq-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}



-- ************************************************************
--
-- 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-PDUSessionAdmittedAddedAddReqAck    CRITICALITY ignore      TYPE PDUSessionAdmittedAddedAddReqAck    PRESENCE mandatory}|
    { ID id-PDUSessionNotAdmittedAddReqAck      CRITICALITY ignore      TYPE PDUSessionNotAdmittedAddReqAck      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-RRCConfigIndication                 CRITICALITY reject      TYPE RRCConfigIndication                 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 },
    ...
}

PDUSessionAdmittedAddedAddReqAck ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionAdmittedAddedAddReqAck-Item

PDUSessionAdmittedAddedAddReqAck-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 8.3.1.4 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 ::= {
    ...
}

-- ************************************************************
--
-- S-NODE ADDITION REQUEST REJECT
--
-- ************************************************************

SNodeAdditionRequestReject ::= SEQUENCE {
```

```
    protocolIEs         ProtocolIE-Container    {{ SNodeAdditionRequestReject-IEs}},
    ...
}

SNodeAdditionRequestReject-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-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-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                    PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                    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-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-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-AdditionalDRBIDs                        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},
    ...
```

```
}

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                     PDUSessionsToBeAdded-SNModRequest-List          OPTIONAL,
    pduSessionResourceToBeModified                  PDUSessionsToBeModified-SNModRequest-List       OPTIONAL,
    pduSessionResourceToBeReleased                  PDUSessionsToBeReleased-SNModRequest-List       OPTIONAL,
    iE-Extension            ProtocolExtensionContainer { {UEContextInfo-SNModRequest-ExtIEs} }      OPTIONAL,
    ...
}

UEContextInfo-SNModRequest-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDUSessionsToBeAdded-SNModRequest-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionsToBeAdded-SNModRequest-Item

PDUSessionsToBeAdded-SNModRequest-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 ::= {
    ...
}

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},
    ...
}

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 ::= {
    ...
}

-- ************************************************************
--
-- S-NODE MODIFICATION REQUEST ACKNOWLEDGE
--
-- ************************************************************

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

SNodeModificationRequestAcknowledge-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-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-RRCConfigIndication                     CRITICALITY reject      TYPE RRCConfigIndication                      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 ::= {
    ...
}



-- ************************************************************
--
-- 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-RRCConfigIndication                     CRITICALITY reject      TYPE RRCConfigIndication                  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-RANnodeUEXnAPID                    CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                   PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                   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-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-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-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                    PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                    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-RANnodeUEXnAPID                        CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                        PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                        CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                        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-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                   PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                   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-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                   PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                   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-RANnodeUEXnAPID                    CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                   PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                   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 ignore      TYPE NG-RANnodeUEXnAPID                   PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY ignore      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-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 },
    ...
}
```

```
-- ************************************************************
--
-- RRC TRANSFER
--
-- ************************************************************

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

RRCTransfer-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-SplitSRB-RRCTransfer                    CRITICALITY reject      TYPE SplitSRB-RRCTransfer                 PRESENCE optional }|
    { ID id-UEReportRRCTransfer     CRITICALITY reject      TYPE UEReportRRCTransfer        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 ::= {
    ...
}


-- ************************************************************
--
-- NOTIFICATION CONTROL INDICATION
--
-- ************************************************************

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

```
}

NotificationControlIndication-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-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-RANnodeUEXnAPID                    CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                    PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY ignore      TYPE NG-RANnodeUEXnAPID                    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 },
    ...
}

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

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

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

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 },
    ...
}


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 },
        ...
}



-- ************************************************************
--
-- 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 },
    ...
}
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 ::= {
    ...
}


RespondingNodeTypeConfigUpdateAck-gNB ::= SEQUENCE {
    served-NR-Cells     ServedCells-NR                                                          OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {RespondingNodeTypeConfigUpdateAck-gNB-ExtIEs} }   OPTIONAL,
    ...
}

RespondingNodeTypeConfigUpdateAck-gNB-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- ************************************************************
--
-- 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-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                      PRESENCE mandatory}|
    { ID id-S-NG-RANnodeUEXnAPID                    CRITICALITY reject      TYPE NG-RANnodeUEXnAPID                      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 ::= {
    ...
}


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-DefaultDRB-Allowed,
    id-EndpointIPAddressAndPort,
    id-FiveGCMobilityRestrictionListContainer,
    id-SecondarydataForwardingInfoFromTarget-List,
    id-LastE-UTRANPLMNIdentity,
    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-secondary-SN-UL-PDCP-UP-TNLInfo,
```

```
    id-pdcpDuplicationConfiguration,
    id-duplicationActivation,
    maxEARFCN,
    maxnoofAllowedAreas,
    maxnoofAMFRegions,
    maxnoofAoIs,
    maxnoofBPLMNs,
    maxnoofCellsinAoI,
    maxnoofCellsinNG-RANnode,
    maxnoofCellsinRNA,
    maxnoofCellsinUEHistoryInfo,
    maxnoofCellsUEMovingTrajectory,
    maxnoofDRBs,
    maxnoofEPLMNs,
    maxnoofEUTRABands,
    maxnoofEUTRABPLMNs,
    maxnoofForbiddenTACs,
    maxnoofMBSFNEUTRA,
    maxnoofMultiConnectivityMinusOne,
    maxnoofNeighbours,
    maxnoofNRCellBands,
    maxnoofPDUSessions,
    maxnoofPLMNs,
    maxnoofProtectedResourcePatterns,
    maxnoofQoSFlows,
    maxnoofRANAreaCodes,
    maxnoofRANAreasinRNA,
    maxnoofSCellGroups,
    maxnoofSCellGroupsplus1,
    maxnoofSliceItems,
    maxnoofsupportedTACs,
    maxnoofsupportedPLMNs,
    maxnoofTAI,
    maxnoofTAIsinAoI,
    maxnoofTNLAssociations,
    maxnoofUEContexts,
    maxNRARFCN,
    maxNrOfErrors,
    maxnoofRANNodesinAoI,
    maxnooftimeperiods

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

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 ::= {
    ...
}

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)


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 ::= {
    ...
}


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 ::= {
    ...
}


AveragingWindow ::= INTEGER (0..4095, ...)


-- B

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 },
    ...
}

BitRate ::= INTEGER (0..4000000000000,...)


BroadcastPLMNs ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF PLMN-Identity

BroadcastEUTRAPLMNs ::= 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 ::= {
    ...
}


-- C


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,
    tTXnRELOCprep-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
}

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 ::= {
    ...
}
```

```
CellGroupID ::= INTEGER (0..maxnoofSCellGroups)


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,
    ...
}


-- 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},
    ...
}

DataForwardingAccepted  ::= ENUMERATED {data-forwarding-accepted, ...}


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 },
    ...
}



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 ::= {
    ...
}
```

```
DeliveryStatus  ::= INTEGER (0..4095, ...)


DesiredActNotificationLevel ::= ENUMERATED {none, qos-flow, pdu-session, ue-level, ...}

DefaultDRB-Allowed ::= ENUMERATED {true, false, ...}

DLForwarding    ::= ENUMERATED {dl-forwarding-proposed, ...}


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, ...)


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,
    ...
}

DRBsSubjectToStatusTransfer-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 ::= {
    ...
}


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 ::= {
    ...
}


-- 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 ::= {
    ...
}

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
}

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,
    ...
}



-- 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, ...)

-- 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 ::= {
    ...
}

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 ::= {
    ...
}


GlobalngeNB-ID  ::= SEQUENCE {
    plmn-id         PLMN-Identity,
    enb-id          ENB-ID-Choice,
    iE-Extensions       ProtocolExtensionContainer { {GlobaleNB-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 ::= {
    ...
}


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


-- I

InterfaceInstanceIndication ::= INTEGER (0..255, ...)

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, ...)



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 ::={
    ...
}


LowerLayerPresenceStatusChange ::= ENUMERATED {
    release-lower-layers,
    re-establish-lower-layers,
    ...
}


-- M


MAC-I ::= BIT STRING (SIZE(16))


MaskedIMEISV    ::= BIT STRING (SIZE(64))


MaximumDataBurstVolume ::= INTEGER (0..4095, ...)


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,
    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 ::={
    ...
}


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-CNTypeRestrictionsForServing            CRITICALITY ignore  EXTENSION CNTypeRestrictionsForServing         PRESENCE optional    }|
{ ID id-CNTypeRestrictionsForEquivalent         CRITICALITY ignore  EXTENSION CNTypeRestrictionsForEquivalent      PRESENCE optional    },
    ...
}

CNTypeRestrictionsForEquivalent ::= SEQUENCE (SIZE(1..maxnoofEPLMNs)) OF CNTypeRestrictionsForEquivalentItem

CNTypeRestrictionsForEquivalentItem ::= SEQUENCE {
    plmn-Identity                       PLMN-Identity,
```

```
    cn-Type                             ENUMERATED {epc-forbidden, fiveGC-forbidden, ...},
    iE-Extensions                       ProtocolExtensionContainer { {CNTypeRestrictionsForEquivalentItem-ExtIEs} }         OPTIONAL,
    ...
}

CNTypeRestrictionsForEquivalentItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::={
    ...
}

CNTypeRestrictionsForServing ::= 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 ::={
    ...
}


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, ...}

-- N

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-FequInfo      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 ::= {
    ...
}


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)


NonDynamic5QIDescriptor ::= SEQUENCE {
    fiveQI                      FiveQI,
    priorityLevelQoS            PriorityLevelQoS                                                OPTIONAL,
    averagingWindow             AveragingWindow                                                 OPTIONAL,
    maximumDataBurstVolume      MaximumDataBurstVolume                                          OPTIONAL,
    iE-Extension                ProtocolExtensionContainer { {NonDynamic5QIDescriptor-ExtIEs } } OPTIONAL,
    ...
}

NonDynamic5QIDescriptor-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


NRARFCN ::= INTEGER (0.. maxNRARFCN)


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 ::= {
    ...
}


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 ::= {
    ...
}


NRModeInfo ::= CHOICE {
    fdd                         NRModeInfoFDD,
    tdd                         NRModeInfoTDD,
    choice-extension            ProtocolIE-Single-Container { {NRModeInfo-ExtIEs} }
}

NRModeInfo-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

NRModeInfoFDD ::= SEQUENCE {
    ulNRFrequencyInfo           NRFrequencyInfo,
    dlNRFrequencyInfo           NRFrequencyInfo,
    ulNRTransmissonBandwidth    NRTransmissionBandwidth,
    dlNRTransmissonBandwidth    NRTransmissionBandwidth,
    iE-Extension        ProtocolExtensionContainer { {NRModeInfoFDD-ExtIEs} }   OPTIONAL,
    ...
}

NRModeInfoFDD-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


NRModeInfoTDD ::= SEQUENCE {
    nrFrequencyInfo         NRFrequencyInfo,
    nrTransmissonBandwidth  NRTransmissionBandwidth,
    iE-Extension            ProtocolExtensionContainer { {NRModeInfoTDD-ExtIEs} }   OPTIONAL,
```

```
    ...
}

NRModeInfoTDD-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


NRNRB ::= ENUMERATED { nrb11, nrb18, nrb24, nrb25, nrb31, nrb32, nrb38, nrb51, nrb52, nrb65, nrb66, nrb78, nrb79, nrb93, nrb106, nrb107, nrb121,
nrb132, nrb133, nrb135, nrb160, nrb162, nrb189, nrb216, nrb217, nrb245, nrb264, nrb270, nrb273, ...}

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, ...}


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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 ::= {
    ...
}

PER-Scalar ::= INTEGER (0..9, ...)
```

```
PER-Exponent ::= INTEGER (0..9, ...)


PacketLossRate ::= INTEGER (0..1000, ...)


PagingDRX   ::= ENUMERATED {
    v32,
    v64,
    v128,
    v256,
    ...
   }


PagingPriority ::= ENUMERATED {
    priolevel1,
    priolevel2,
    priolevel3,
    priolevel4,
    priolevel5,
    priolevel6,
    priolevel7,
    priolevel8,
    ...
}


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 ::= {
    ...
}



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

PDUSessionResourcesNotAdmitted-Item ::= SEQUENCE {
    pduSessionId                PDUSession-ID,
    cause                       Cause               OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {PDUSessionResourcesNotAdmitted-Item-Item-ExtIEs} }   OPTIONAL,
    ...
}

PDUSessionResourcesNotAdmitted-Item-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- ************************************************************
--
-- PDU Session Resources To Be Setup List
--
-- ************************************************************


PDUSessionResourcesToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionResourcesToBeSetup-Item

PDUSessionResourcesToBeSetup-Item ::= SEQUENCE {
    pduSessionId                    PDUSession-ID,
    s-NSSAI                         S-NSSAI,
    pduSessionAMBR                  PDUSessionAggregateMaximumBitRate                                   OPTIONAL,
    uL-NG-U-TNLatUPF                UPTransportLayerInformation,
    source-DL-NG-U-TNL-Information  UPTransportLayerInformation                                         OPTIONAL,
    securityIndication              SecurityIndication                                                  OPTIONAL,
    pduSessionType                  PDUSessionType,
    pduSessionNetworkInstance       PDUSessionNetworkInstance                                           OPTIONAL,
    qosFlowsToBeSetup-List          QoSFlowsToBeSetup-List,
    dataforwardinginfofromSource    DataforwardingandOffloadingInfofromSource                           OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourcesToBeSetup-Item-ExtIEs} }   OPTIONAL,
    ...
```

```
}

PDUSessionResourcesToBeSetup-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-PDUSessionCommonNetworkInstance     CRITICALITY ignore  EXTENSION PDUSessionCommonNetworkInstance    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},
    ...
}

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 ::= {
    ...
}

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

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 ::= {
    ...
}

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 ::= {
    ...
```

```
}


-- ************************************************************
--
-- 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 ::= {
    ...
}

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 ::= {
```

```
    ...
}


-- ************************************************************
--
-- 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 ::= {
    ...
}


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

    ...
}

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 ::= {
    ...
}

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 ::= {
    ...
}

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

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-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 ::= {
    ...
}


-- ************************************************************
--
-- 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 ::= {
    ...
}


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

PDUSessionResourceChangeConfirmInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    { ID id-DRB-IDs-takenintouse    CRITICALITY reject  EXTENSION DRB-List  PRESENCE optional},
    ...
}


-- ************************************************************
--
-- PDU Session Resource Change Required Info - MN terminated
--
-- ************************************************************
```

```
PDUSessionResourceChangeRequiredInfo-MNterminated ::= SEQUENCE {
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceChangeRequiredInfo-MNterminated-ExtIEs} }  OPTIONAL,
    ...
}

PDUSessionResourceChangeRequiredInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- ***************************************************************
--
-- PDU Session Resource Change Confirm Info - MN terminated
--
-- ***************************************************************


PDUSessionResourceChangeConfirmInfo-MNterminated ::= SEQUENCE {
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceChangeConfirmInfo-MNterminated-ExtIEs} }   OPTIONAL,
    ...
}

PDUSessionResourceChangeConfirmInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- ***************************************************************
--
-- PDU Session Resource Modification Required Info - SN terminated
--
-- ***************************************************************


PDUSessionResourceModRqdInfo-SNterminated ::= 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 ::= {
    ...
}

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 ::= {
    ...
}

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 ::= {
    ...
}

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 ::= {
    ...
}


-- ************************************************************
--
-- PDU Session Resource Modification Confirm Info - SN terminated
--
-- ************************************************************


PDUSessionResourceModConfirmInfo-SNterminated ::= SEQUENCE {
    uL-NG-U-TNLatUPF                        UPTransportLayerInformation                         OPTIONAL,
    dRBsAdmittedList                        DRBsAdmittedList-ModConfirm-SNterminated,
    dRBsNotAdmittedSetupModifyList          DRB-List-withCause                                  OPTIONAL,
    dataforwardinginfoTarget                DataForwardingInfoFromTargetNGRANnode               OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceModConfirmInfo-SNterminated-ExtIEs} }   OPTIONAL,
    ...
}

PDUSessionResourceModConfirmInfo-SNterminated-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 ::= {
    ...
}
```

```
-- ************************************************************
--
-- 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 ::= {
    ...
}


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

PLMN-Identity ::= OCTET STRING (SIZE(3))

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, ...),
    protectedFootrpintStartTime                 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 ::= {
    ...
}


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 ::= {
    ...
}


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 ::= {
    ...
}


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 ::= {
    ...
}
```

```
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 ::= {
    ...
}

QoSFlowsUsageReportList ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsUsageReport-Item

QoSFlowsUsageReport-Item ::= SEQUENCE {
    qosFlowIdentifier                   QoSFlowIdentifier,
    rATType                             ENUMERATED {nr, eutra, ...},
    qoSFlowsTimedReportList             VolumeTimedReportList,
    iE-Extensions                       ProtocolExtensionContainer { {QoSFlowsUsageReport-Item-ExtIEs} } OPTIONAL,
...
}

QoSFlowsUsageReport-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- R


RANAC ::= INTEGER (0..255)


RANAreaID ::= SEQUENCE {
    tAC                 TAC,
    rANAC               RANAC                                           OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { {RANAreaID-ExtIEs} }   OPTIONAL,
    ...
}

RANAreaID-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


RANAreaID-List ::= SEQUENCE (SIZE(1..maxnoofRANAreasinRNA)) OF RANAreaID


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,
    ...
}

ReferenceID ::= INTEGER (1..64, ...) -- This IE may need to be refined.


ReflectiveQoSAttribute ::= ENUMERATED {subject-to-reflective-QoS, ...}


ReportArea ::= ENUMERATED {
    cell,
    ...
}


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 ::= {
    ...
}

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 ::= {
    ...
}

Reestablishment-Indication ::= ENUMERATED {
    reestablished,
    ...
}


RFSP-Index ::= INTEGER (1..256)


RRCConfigIndication ::= ENUMERATED {
    full-config,
    delta-config,
    ...
}


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, ...}
```

```
SecondaryRATUsageInformation ::= SEQUENCE {
    pDUSessionUsageReport       PDUSessionUsageReport               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 ::= {
    ...
}


-- 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, 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 },
    ...
}


ServedCellInformation-E-UTRA-perBPLMN ::= SEQUENCE {
    plmn-id                 PLMN-Identity,
    iE-Extensions           ProtocolExtensionContainer { {ServedCellInformation-E-UTRA-perBPLMN-ExtIEs} } OPTIONAL,
    ...
}

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 ::= {
    ...
}


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 ::= {
    ...
}


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,
    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 ::= {
    ...
}


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-RANnode)) 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-RANnode)) 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 ::= {
```

```
    ...
}


-- 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 },
    ...
}


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 ::= {
    ...
}


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} }
}

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 ::= {
    ...
}


SliceSupport-List   ::= SEQUENCE (SIZE(1..maxnoofSliceItems)) OF S-NSSAI


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 ::= {
    ...
}


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, ...}


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 ::= {
    ...
}


SupportedSULBandList ::= SEQUENCE (SIZE(1..maxnoofNRCellBands)) OF SupportedSULBandItem

SupportedSULBandItem ::= SEQUENCE {
    sulBandItem                 SUL-FrequencyBand,
    iE-Extensions               ProtocolExtensionContainer { {SupportedSULBandItem-ExtIEs} } OPTIONAL,
    ...
}

SupportedSULBandItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- T


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 ::= {
    ...
}


Target-CGI ::= CHOICE {
    nr                          NR-CGI,
    e-utra                      E-UTRA-CGI,
    choice-extension            ProtocolIE-Single-Container { {TargetCGI-ExtIEs} }
}
```

```
TargetCGI-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}


TimeToWait ::= ENUMERATED {
    v1s,
    v2s,
    v5s,
    v10s,
    v20s,
    v60s,
    ...
}


TNLA-To-Add-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-To-Add-Item

TNLA-To-Add-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CPTransportLayerInformation,
    tNLAssociationUsage                     TNLAssociationUsage,
    iE-Extensions                           ProtocolExtensionContainer { { TNLA-To-Add-Item-ExtIEs} } OPTIONAL
}

TNLA-To-Add-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


TNLA-To-Update-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-To-Update-Item

TNLA-To-Update-Item::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CPTransportLayerInformation,
    tNLAssociationUsage                     TNLAssociationUsage     OPTIONAL,
    iE-Extensions                           ProtocolExtensionContainer { { TNLA-To-Update-Item-ExtIEs} } OPTIONAL
}

TNLA-To-Update-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

TNLA-To-Remove-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-To-Remove-Item

TNLA-To-Remove-Item::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CPTransportLayerInformation,
    iE-Extensions                           ProtocolExtensionContainer { { TNLA-To-Remove-Item-ExtIEs} } OPTIONAL
}

TNLA-To-Remove-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
TNLA-Setup-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-Setup-Item

TNLA-Setup-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CPTransportLayerInformation,
    iE-Extensions                           ProtocolExtensionContainer { { TNLA-Setup-Item-ExtIEs} } OPTIONAL,
    ...
}

TNLA-Setup-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


TNLA-Failed-To-Setup-List ::= SEQUENCE (SIZE(1..maxnoofTNLAssociations)) OF TNLA-Failed-To-Setup-Item

TNLA-Failed-To-Setup-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress     CPTransportLayerInformation,
    cause                                   Cause,
    iE-Extensions                           ProtocolExtensionContainer { { TNLA-Failed-To-Setup-Item-ExtIEs} } OPTIONAL
}

TNLA-Failed-To-Setup-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


TNLAssociationUsage ::= ENUMERATED {
    ue,
    non-ue,
    both,
    ...
}


TransportLayerAddress ::= BIT STRING (SIZE(1..160, ...))


TraceActivation ::= SEQUENCE {
    ng-ran-TraceID          OCTET STRING (SIZE (8)),
    interfaces-to-trace     BIT STRING { ng-c (0), x-nc (1), uu (2), f1-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 ::= {
    ...
}
```

```
Trace-Depth ::= ENUMERATED {
    minimum,
    medium,
    maximum,
    minimumWithoutVendorSpecificExtension,
    mediumWithoutVendorSpecificExtension,
    maximumWithoutVendorSpecificExtension,
    ...
}


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 },
    ...
}


UEHistoryInformation ::= SEQUENCE (SIZE(1..maxnoofCellsinUEHistoryInfo)) OF LastVisitedCell-Item


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

UERANPagingIdentity ::= CHOICE {
    i-RNTI-full         BIT STRING ( SIZE (40)),
    choice-extension    ProtocolIE-Single-Container { {UERANPagingIdentity-ExtIEs} }
}

UERANPagingIdentity-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}


UESecurityCapabilities ::= SEQUENCE {
    nr-EncyptionAlgorithms                  BIT STRING {nea1-128(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-EncyptionAlgorithms              BIT STRING {eea1-128(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 ::= {
    ...
}


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, ...}

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, ...}


-- V

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


-- 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


-- ************************************************************
--
-- Lists
--
-- ************************************************************

maxEARFCN                                   INTEGER ::= 262143
maxnoofAllowedAreas                         INTEGER ::= 16
maxnoofAMFRegions                           INTEGER ::= 16
maxnoofAoIs                                 INTEGER ::= 64
maxnoofBPLMNs                               INTEGER ::= 12
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
maxnoofForbiddenTACs                            INTEGER ::= 4096
maxnoofMBSFNEUTRA                           INTEGER ::= 8
```

```
maxnoofMultiConnectivityMinusOne            INTEGER ::= 3
maxnoofNeighbours                           INTEGER ::= 1024
maxnoofNRCellBands                          INTEGER ::= 32
maxnoofPLMNs                                INTEGER ::= 16
maxnoofPDUSessions                          INTEGER ::= 256
maxnoofProtectedResourcePatterns            INTEGER ::= 16
maxnoofQoSFlows                             INTEGER ::= 64
maxnoofRANAreaCodes                         INTEGER ::= 32
maxnoofRANAreasinRNA                        INTEGER ::= 16
maxnoofRANNodesinAoI                        INTEGER ::= 64
maxnoofSCellGroups                          INTEGER ::= 3
maxnoofSCellGroupsplus1                     INTEGER ::= 4
maxnoofSliceItems                           INTEGER ::= 1024
maxnoofsupportedPLMNs                       INTEGER ::= 12
maxnoofsupportedTACs                        INTEGER ::= 256
maxnoofTAI                                  INTEGER ::= 16
maxnoofTAIsinAoI                            INTEGER ::= 16
maxnooftimeperiods                          INTEGER ::= 2
maxnoofTNLAssociations                      INTEGER ::= 32
maxnoofUEContexts                           INTEGER ::= 8192
maxNRARFCN                                  INTEGER ::= 3279165
maxNrOfErrors                               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-indexToRatFrequSelectionPriority                                        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-RANnodeUEXnAPID                                    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-RANnodeUEXnAPID                                   ProtocolIE-ID ::= 27
id-UEReportRRCTransfer                                     ProtocolIE-ID ::= 28
id-oldNG-RANnodeUEXnAPID                                   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-RRCConfigIndication                                     ProtocolIE-ID ::= 61
id-RRCResumeCause                                          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-RANnodeUEXnAPID                                    ProtocolIE-ID ::= 71
id-SN-to-MN-Container                                      ProtocolIE-ID ::= 72
id-sourceNG-RANnodeUEXnAPID                                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-RANnodeUEXnAPID                                 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-FiveGCMobilityRestrictionListContainer                       ProtocolIE-ID ::= 155
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

END
-- ASN1STOP
```

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#95bis	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#97bis	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#99bis	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
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	PDCP 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
2020-03	RP-87-e	RP-200428	0302	-	F	Correction of the referred RRCResumeRequest1	15.7.0
2020-03	RP-87-e	RP-200428	0308	1	F	Correction on handover related timer	15.7.0

2020-03	RP-87-e	RP-200428	0321	-	F	Misalignment between the tabular and ASN.1 within the SN modification procedure	15.7.0
2020-03	RP-87-e	RP-200428	0326	-	F	Propagation of Roaming and Access Restriction information in NG-RAN in non-homogenous NG-RAN node deployments	15.7.0
2020-03	RP-87-e	RP-200428	0328	-	F	Correction of CR0236r2 to explicate procedural interaction	15.7.0
2020-03	RP-87-e	RP-200428	0330	1	F	Correction of CR0282r1 - procedure text	15.7.0
2020-07	RP-88-e	RP-201090	0349	2	F	Encoding PLMNs in served cell information NR	15.8.0
2020-07	RP-88-e	RP-201090	0374	-	F	Encoding PLMNs in served cell information IEs - semantics corrections	15.8.0
2020-07	RP-88-e	RP-201090	0379	4	F	Clarification on MIB only scenario	15.8.0
2020-07	RP-88-e	RP-201093	0380		F	TS38.423 Resolving Erroneous unknown-old-en-gNB-UE-X2AP-ID Rel-15	15.8.0
2020-09	RP-89-e	RP-201955	0357	2	F	Support of PSCell/SCell-only operation mode	15.9.0
2020-09	RP-89-e	RP-201955	0425	1	F	Correction CR0063 implementation - missing DRB-IDs-takenintouse in PDU Session Resource Setup Response Info - SN terminated	15.9.0
2020-09	RP-89-e	RP-201955	0435	1	F	Multiple location reporting requests and report	15.9.0
2020-09	RP-89-e	RP-201955	0438	1	F	Missing QoS Flow Mapping Indication IE in PDU Session Resource Modification Info - SN terminated IE.	15.9.0
2020-09	RP-89-e	RP-201955	0453	1	F	Correction for Industrial IoT PDCP duplication for Carrier Aggregation	15.9.0
2020-12	RP-90-e	RP-202315	0500	1	F	XnAP Rapporteur CR	15.10.0